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**Department of Defense  
Fiscal Year (FY) 2019 Budget Estimates**

February 2018



**Army**

*Justification Book of*

***Research, Development, Test & Evaluation, Army***

**RDT&E – Volume II, Budget Activity 5A**

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Army • Budget Estimates FY 2019 • RDT&E Program

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**RESEARCH, DEVELOPMENT, TEST AND EVALUATION, ARMY**

**APPROPRIATION LANGUAGE**

For expenses necessary for basic and applied scientific research, development, test and evaluation, including maintenance, rehabilitation, lease, and operation of facilities and equipment, \$10,484,483,000.00 to remain available for obligation until September 30, 2020.

The following Justification Books were prepared at a cost of \$226,413: Aircraft (ACFT), Missile (MSLS), Weapons & Tracked Combat Vehicles (WTCV), Ammunition (AMMO), Other Procurement Army (OPA) 1 - Tactical & Support Vehicles, Other Procurement Army (OPA) 2 – Communications & Electronics, Other Procurement Army (OPA) 3 & 4 - Other Support Equipment & Spares, Research, Development, Test and Evaluation (RDTE) for: Budget Activity 1, Budget Activity 2, Budget Activity 3, Budget Activity 4, Budget Activity 5A, Budget Activity 5B, Budget Activity 6, and Budget Activity 7.

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 (Dollars in Thousands)

18 Jan 2018

<u>Appropriation</u>	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO
Research, Development, Test & Eval, Army	8,852,507	8,273,447	8,273,447	342,356	342,356
Total Research, Development, Test & Evaluation	8,852,507	8,273,447	8,273,447	342,356	342,356



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Appropriation	FY 2018	FY 2018	FY 2018	FY 2018	FY 2018	
	Emergency Requests**	Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	Remaining Req Emergency	Total PB Requests* with CR Adj Base + OCO + Emergency**	Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	Remaining Req with CR Adj Base + OCO + Emergency
Research, Development, Test & Eval, Army	20,700	-20,700		8,636,503	-20,700	8,615,803
Total Research, Development, Test & Evaluation	20,700	-20,700		8,636,503	-20,700	8,615,803

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<u>Appropriation</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>
Research, Development, Test & Eval, Army	10,159,379	325,104	10,484,483
Total Research, Development, Test & Evaluation	10,159,379	325,104	10,484,483

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	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests* with CR Adj OCO
<u>Summary Recap of Budget Activities</u>					
Basic Research	473,216	430,022	430,022		
Applied Research	1,196,132	889,182	889,182		
Advanced Technology Development	1,351,035	1,070,977	1,070,977		
Advanced Component Development & Prototypes	619,976	890,889	890,889	18,000	18,000
System Development & Demonstration	2,502,560	3,012,840	3,012,840	57,840	57,840
RDT&E Management Support	1,413,481	1,253,845	1,253,845		
Operational Systems Development	1,296,107	1,877,685	1,877,685	43,528	43,528
Undistributed		-1,151,993	-1,151,993	222,988	222,988
Total Research, Development, Test & Evaluation	8,852,507	8,273,447	8,273,447	342,356	342,356
<u>Summary Recap of FYDP Programs</u>					
General Purpose Forces	611,072	710,401	710,401	15,000	15,000
Intelligence and Communications	342,648	370,519	370,519	29,728	29,728
Research and Development	7,826,372	8,215,942	8,215,942	74,640	74,640
Central Supply and Maintenance	59,891	60,877	60,877		
Administration and Associated Activities	7,899	-1,151,993	-1,151,993	222,988	222,988
Space		60,547	60,547		
Classified Programs	4,625	7,154	7,154		
Total Research, Development, Test & Evaluation	8,852,507	8,273,447	8,273,447	342,356	342,356

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	FY 2018 Emergency Requests**	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency
<u>Summary Recap of Budget Activities</u>						
Basic Research				430,022		430,022
Applied Research				889,182		889,182
Advanced Technology Development	12,000	-12,000		1,082,977	-12,000	1,070,977
Advanced Component Development & Prototypes	8,700	-8,700		917,589	-8,700	908,889
System Development & Demonstration				3,070,680		3,070,680
RDT&E Management Support				1,253,845		1,253,845
Operational Systems Development				1,921,213		1,921,213
Undistributed				-929,005		-929,005
Total Research, Development, Test & Evaluation	20,700	-20,700		8,636,503	-20,700	8,615,803
<u>Summary Recap of FYDP Programs</u>						
General Purpose Forces				725,401		725,401
Intelligence and Communications				400,247		400,247
Research and Development	20,700	-20,700		8,311,282	-20,700	8,290,582
Central Supply and Maintenance				60,877		60,877
Administration and Associated Activities				-929,005		-929,005
Space				60,547		60,547
Classified Programs				7,154		7,154
Total Research, Development, Test & Evaluation	20,700	-20,700		8,636,503	-20,700	8,615,803

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Summary Recap of Budget Activities	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Basic Research	445,895		445,895
Applied Research	919,609		919,609
Advanced Technology Development	1,026,698		1,026,698
Advanced Component Development & Prototypes	1,329,393	28,500	1,357,893
System Development & Demonstration	3,192,689	236,863	3,429,552
RDT&E Management Support	1,322,481		1,322,481
Operational Systems Development	1,922,614	59,741	1,982,355
Undistributed			
Total Research, Development, Test & Evaluation	10,159,379	325,104	10,484,483
Summary Recap of FYDP Programs			
General Purpose Forces	783,464	10,000	793,464
Intelligence and Communications	313,112	40,613	353,725
Research and Development	8,775,582	274,491	9,050,073
Central Supply and Maintenance	53,958		53,958
Administration and Associated Activities			
Space	227,308		227,308
Classified Programs	5,955		5,955
Total Research, Development, Test & Evaluation	10,159,379	325,104	10,484,483

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	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO
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Basic Research	473,216	430,022	430,022		
Applied Research	1,196,132	889,182	889,182		
Advanced Technology Development	1,351,035	1,070,977	1,070,977		
Advanced Component Development & Prototypes	619,976	890,889	890,889	18,000	18,000
System Development & Demonstration	2,502,560	3,012,840	3,012,840	57,840	57,840
RDT&E Management Support	1,413,481	1,253,845	1,253,845		
Operational Systems Development	1,296,107	1,877,685	1,877,685	43,528	43,528
Undistributed		-1,151,993	-1,151,993	222,988	222,988
Total Research, Development, Test & Evaluation	8,852,507	8,273,447	8,273,447	342,356	342,356
<u>Summary Recap of FYDP Programs</u>					
General Purpose Forces	611,072	710,401	710,401	15,000	15,000
Intelligence and Communications	342,648	370,519	370,519	29,728	29,728
Research and Development	7,826,372	8,215,942	8,215,942	74,640	74,640
Central Supply and Maintenance	59,891	60,877	60,877		
Administration and Associated Activities	7,899	-1,151,993	-1,151,993	222,988	222,988
Space		60,547	60,547		
Classified Programs	4,625	7,154	7,154		
Total Research, Development, Test & Evaluation	8,852,507	8,273,447	8,273,447	342,356	342,356

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	FY 2018 Emergency Requests** Emergency	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency
<u>Summary Recap of Budget Activities</u>						
Basic Research				430,022		430,022
Applied Research				889,182		889,182
Advanced Technology Development	12,000	-12,000		1,082,977	-12,000	1,070,977
Advanced Component Development & Prototypes	8,700	-8,700		917,589	-8,700	908,889
System Development & Demonstration				3,070,680		3,070,680
RDT&E Management Support				1,253,845		1,253,845
Operational Systems Development				1,921,213		1,921,213
Undistributed				-929,005		-929,005
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Intelligence and Communications				400,247		400,247
Research and Development	20,700	-20,700		8,311,282	-20,700	8,290,582
Central Supply and Maintenance				60,877		60,877
Administration and Associated Activities				-929,005		-929,005
Space				60,547		60,547
Classified Programs				7,154		7,154
Total Research, Development, Test & Evaluation	20,700	-20,700		8,636,503	-20,700	8,615,803

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Summary Recap of Budget Activities	FY 2019 Base	FY 2019 OCO	FY 2019 Total
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Advanced Component Development & Prototypes	1,329,393	28,500	1,357,893
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Undistributed			
Total Research, Development, Test & Evaluation	10,159,379	325,104	10,484,483
Summary Recap of FYDP Programs			
General Purpose Forces	783,464	10,000	793,464
Intelligence and Communications	313,112	40,613	353,725
Research and Development	8,775,582	274,491	9,050,073
Central Supply and Maintenance	53,958		53,958
Administration and Associated Activities			
Space	227,308		227,308
Classified Programs	5,955		5,955
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Appropriation: 2040A Research, Development, Test & Eval, Army

Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO	S e c
1	0601101A	In-House Laboratory Research	01	11,936	12,010	12,010			U
2	0601102A	Defense Research Sciences	01	286,086	263,590	263,590			U
3	0601103A	University Research Initiatives	01	66,506	67,027	67,027			U
4	0601104A	University and Industry Research Centers	01	108,688	87,395	87,395			U
		Basic Research		473,216	430,022	430,022			
5	0602105A	Materials Technology	02	81,950	29,640	29,640			U
6	0602120A	Sensors and Electronic Survivability	02	50,574	35,730	35,730			U
7	0602122A	TRACTOR HIP	02	6,995	8,627	8,627			U
8	0602126A	TRACTOR JACK	02						U
9	0602211A	Aviation Technology	02	67,593	66,086	66,086			U
10	0602270A	Electronic Warfare Technology	02	34,528	27,144	27,144			U
11	0602303A	Missile Technology	02	66,173	43,742	43,742			U
12	0602307A	Advanced Weapons Technology	02	52,766	22,785	22,785			U
13	0602308A	Advanced Concepts and Simulation	02	29,767	28,650	28,650			U
14	0602601A	Combat Vehicle and Automotive Technology	02	89,852	67,232	67,232			U
15	0602618A	Ballistics Technology	02	103,484	85,309	85,309			U
16	0602622A	Chemical, Smoke and Equipment Defeating Technology	02	3,772	4,004	4,004			U
17	0602623A	Joint Service Small Arms Program	02	5,331	5,615	5,615			U

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Line No	Program Element Number	Item	Act	FY 2018	FY 2018	FY 2018	FY 2018	FY 2018	S	
				Emergency Requests**	Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	Emergency Remaining Req	Total PB Requests* with CR Adj Base + OCO + Emergency**	Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs		Remaining Req with CR Adj Base + OCO + Emergency
1	0601101A	In-House Laboratory Independent Research	01					12,010	12,010	U
2	0601102A	Defense Research Sciences	01					263,590	263,590	U
3	0601103A	University Research Initiatives	01					67,027	67,027	U
4	0601104A	University and Industry Research Centers	01					87,395	87,395	U
		Basic Research						430,022	430,022	
5	0602105A	Materials Technology	02					29,640	29,640	U
6	0602120A	Sensors and Electronic Survivability	02					35,730	35,730	U
7	0602122A	TRACTOR HIP	02					8,627	8,627	U
8	0602126A	TRACTOR JACK	02							U
9	0602211A	Aviation Technology	02					66,086	66,086	U
10	0602270A	Electronic Warfare Technology	02					27,144	27,144	U
11	0602303A	Missile Technology	02					43,742	43,742	U
12	0602307A	Advanced Weapons Technology	02					22,785	22,785	U
13	0602308A	Advanced Concepts and Simulation	02					28,650	28,650	U
14	0602601A	Combat Vehicle and Automotive Technology	02					67,232	67,232	U
15	0602618A	Ballistics Technology	02					85,309	85,309	U
16	0602622A	Chemical, Smoke and Equipment Defeating Technology	02					4,004	4,004	U
17	0602623A	Joint Service Small Arms Program	02					5,615	5,615	U

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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Se
1	0601101A	In-House Laboratory Independent Research	01	11,585		11,585	U
2	0601102A	Defense Research Sciences	01	276,912		276,912	U
3	0601103A	University Research Initiatives	01	65,283		65,283	U
4	0601104A	University and Industry Research Centers	01	92,115		92,115	U
		Basic Research		445,895		445,895	
5	0602105A	Materials Technology	02	28,600		28,600	U
6	0602120A	Sensors and Electronic Survivability	02	32,366		32,366	U
7	0602122A	TRACTOR HIP	02	8,674		8,674	U
8	0602126A	TRACTOR JACK	02	400		400	U
9	0602211A	Aviation Technology	02	64,847		64,847	U
10	0602270A	Electronic Warfare Technology	02	25,571		25,571	U
11	0602303A	Missile Technology	02	50,183		50,183	U
12	0602307A	Advanced Weapons Technology	02	29,502		29,502	U
13	0602308A	Advanced Concepts and Simulation	02	28,500		28,500	U
14	0602601A	Combat Vehicle and Automotive Technology	02	70,450		70,450	U
15	0602618A	Ballistics Technology	02	75,541		75,541	U
16	0602622A	Chemical, Smoke and Equipment Defeating Technology	02	5,032		5,032	U
17	0602623A	Joint Service Small Arms Program	02	12,394		12,394	U

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18	0602624A	Weapons and Munitions Technology	02	118,068	41,455	41,455			U
19	0602705A	Electronics and Electronic Devices	02	72,979	58,352	58,352			U
20	0602709A	Night Vision Technology	02	34,762	34,723	34,723			U
21	0602712A	Countermines Systems	02	29,495	26,190	26,190			U
22	0602716A	Human Factors Engineering Technology	02	23,359	24,127	24,127			U
23	0602720A	Environmental Quality Technology	02	21,553	21,678	21,678			U
24	0602782A	Command, Control, Communications Technology	02	36,396	33,123	33,123			U
25	0602783A	Computer and Software Technology	02	13,452	14,041	14,041			U
26	0602784A	Military Engineering Technology	02	92,140	67,720	67,720			U
27	0602785A	Manpower/Personnel/Training Technology	02	23,475	20,216	20,216			U
28	0602786A	Warfighter Technology	02	59,327	39,559	39,559			U
29	0602787A	Medical Technology	02	78,341	83,434	83,434			U
		Applied Research		1,196,132	889,182	889,182			
30	0603001A	Warfighter Advanced Technology	03	50,004	44,863	44,863			U
31	0603002A	Medical Advanced Technology	03	106,040	67,780	67,780			U
32	0603003A	Aviation Advanced Technology	03	111,654	160,746	160,746			U
33	0603004A	Weapons and Munitions Advanced Technology	03	198,245	84,079	84,079			U
34	0603005A	Combat Vehicle and Automotive Advanced Technology	03	163,501	125,537	125,537			U

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Line No	Program Element Number	Item	Act	FY 2018 Emergency Requests**	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency	S e c
18	0602624A	Weapons and Munitions Technology	02				41,455		41,455	U
19	0602705A	Electronics and Electronic Devices	02				58,352		58,352	U
20	0602709A	Night Vision Technology	02				34,723		34,723	U
21	0602712A	Countermine Systems	02				26,190		26,190	U
22	0602716A	Human Factors Engineering Technology	02				24,127		24,127	U
23	0602720A	Environmental Quality Technology	02				21,678		21,678	U
24	0602782A	Command, Control, Communications Technology	02				33,123		33,123	U
25	0602783A	Computer and Software Technology	02				14,041		14,041	U
26	0602784A	Military Engineering Technology	02				67,720		67,720	U
27	0602785A	Manpower/Personnel/Training Technology	02				20,216		20,216	U
28	0602786A	Warfighter Technology	02				39,559		39,559	U
29	0602787A	Medical Technology	02				83,434		83,434	U
	Applied Research						889,182		889,182	
30	0603001A	Warfighter Advanced Technology	03				44,863		44,863	U
31	0603002A	Medical Advanced Technology	03				67,780		67,780	U
32	0603003A	Aviation Advanced Technology	03				160,746		160,746	U
33	0603004A	Weapons and Munitions Advanced Technology	03				84,079		84,079	U
34	0603005A	Combat Vehicle and Automotive Advanced Technology	03				125,537		125,537	U

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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Se c
18	0602624A	Weapons and Munitions Technology	02	40,444		40,444	U
19	0602705A	Electronics and Electronic Devices	02	58,283		58,283	U
20	0602709A	Night Vision Technology	02	29,582		29,582	U
21	0602712A	Countermine Systems	02	21,244		21,244	U
22	0602716A	Human Factors Engineering Technology	02	24,131		24,131	U
23	0602720A	Environmental Quality Technology	02	13,242		13,242	U
24	0602782A	Command, Control, Communications Technology	02	55,003		55,003	U
25	0602783A	Computer and Software Technology	02	14,958		14,958	U
26	0602784A	Military Engineering Technology	02	78,159		78,159	U
27	0602785A	Manpower/Personnel/Training Technology	02	21,862		21,862	U
28	0602786A	Warfighter Technology	02	40,566		40,566	U
29	0602787A	Medical Technology	02	90,075		90,075	U
		Applied Research		919,609		919,609	
30	0603001A	Warfighter Advanced Technology	03	39,338		39,338	U
31	0603002A	Medical Advanced Technology	03	62,496		62,496	U
32	0603003A	Aviation Advanced Technology	03	124,958		124,958	U
33	0603004A	Weapons and Munitions Advanced Technology	03	102,686		102,686	U
34	0603005A	Combat Vehicle and Automotive Advanced Technology	03	119,739		119,739	U

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35	0603006A	Space Application Advanced Technology	03	3,787	12,231	12,231			U
36	0603007A	Manpower, Personnel and Training Advanced Technology	03	12,110	6,466	6,466			U
37	0603009A	TRACTOR HIKE	03	21,374	28,552	28,552			U
38	0603015A	Next Generation Training & Simulation Systems	03	18,238	16,434	16,434			U
39	0603020A	TRACTOR ROSE	03	11,910					U
40	0603125A	Combating Terrorism - Technology Development	03	33,553	26,903	26,903			U
41	0603130A	TRACTOR NAIL	03	2,340	4,880	4,880			U
42	0603131A	TRACTOR EGGS	03	2,470	4,326	4,326			U
43	0603270A	Electronic Warfare Technology	03	40,819	31,296	31,296			U
44	0603313A	Missile and Rocket Advanced Technology	03	113,683	62,850	62,850			U
45	0603322A	TRACTOR CAGE	03	11,107	12,323	12,323			U
46	0603461A	High Performance Computing Modernization Program	03	215,462	182,331	182,331			U
47	0603606A	Landmine Warfare and Barrier Advanced Technology	03	16,798	17,948	17,948			U
48	0603607A	Joint Service Small Arms Program	03	5,615	5,796	5,796			U
49	0603710A	Night Vision Advanced Technology	03	42,798	47,135	47,135			U
50	0603728A	Environmental Quality Technology Demonstrations	03	21,415	10,421	10,421			U

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35	0603006A	Space Application Advanced Technology	03				12,231		12,231	U
36	0603007A	Manpower, Personnel and Training Advanced Technology	03				6,466		6,466	U
37	0603009A	TRACTOR HIKE	03	12,000	-12,000		40,552	-12,000	28,552	U
38	0603015A	Next Generation Training & Simulation Systems	03				16,434		16,434	U
39	0603020A	TRACTOR ROSE	03							U
40	0603125A	Combating Terrorism - Technology Development	03				26,903		26,903	U
41	0603130A	TRACTOR NAIL	03				4,880		4,880	U
42	0603131A	TRACTOR EGGS	03				4,326		4,326	U
43	0603270A	Electronic Warfare Technology	03				31,296		31,296	U
44	0603313A	Missile and Rocket Advanced Technology	03				62,850		62,850	U
45	0603322A	TRACTOR CAGE	03				12,323		12,323	U
46	0603461A	High Performance Computing Modernization Program	03				182,331		182,331	U
47	0603606A	Landmine Warfare and Barrier Advanced Technology	03				17,948		17,948	U
48	0603607A	Joint Service Small Arms Program	03				5,796		5,796	U
49	0603710A	Night Vision Advanced Technology	03				47,135		47,135	U
50	0603728A	Environmental Quality Technology Demonstrations	03				10,421		10,421	U

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35	0603006A	Space Application Advanced Technology	03	13,000		13,000	U
36	0603007A	Manpower, Personnel and Training Advanced Technology	03	8,044		8,044	U
37	0603009A	TRACTOR HIKE	03	22,631		22,631	U
38	0603015A	Next Generation Training & Simulation Systems	03	25,682		25,682	U
39	0603020A	TRACTOR ROSE	03				U
40	0603125A	Combating Terrorism - Technology Development	03	3,762		3,762	U
41	0603130A	TRACTOR NAIL	03	4,896		4,896	U
42	0603131A	TRACTOR EGGS	03	6,041		6,041	U
43	0603270A	Electronic Warfare Technology	03	31,491		31,491	U
44	0603313A	Missile and Rocket Advanced Technology	03	61,132		61,132	U
45	0603322A	TRACTOR CAGE	03	16,845		16,845	U
46	0603461A	High Performance Computing Modernization Program	03	183,322		183,322	U
47	0603606A	Landmine Warfare and Barrier Advanced Technology	03	11,104		11,104	U
48	0603607A	Joint Service Small Arms Program	03	5,885		5,885	U
49	0603710A	Night Vision Advanced Technology	03	61,376		61,376	U
50	0603728A	Environmental Quality Technology Demonstrations	03	9,136		9,136	U

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51	0603734A	Military Engineering Advanced Technology	03	59,101	32,448	32,448			U
52	0603772A	Advanced Tactical Computer Science and Sensor Technology	03	52,572	52,206	52,206			U
53	0603794A	C3 Advanced Technology	03	36,439	33,426	33,426			U
		Advanced Technology Development		1,351,035	1,070,977	1,070,977			
54	0603305A	Army Missile Defense Systems Integration	04	39,395	9,634	9,634			U
55	0603308A	Army Space Systems Integration	04	32,278					U
56	0603327A	Air and Missile Defense Systems Engineering	04	6,100	33,949	33,949	15,000	15,000	U
57	0603619A	Landmine Warfare and Barrier - Adv Dev	04	65,062	72,909	72,909			U
58	0603627A	Smoke, Obscurant and Target Defeating Sys-Adv Dev	04	43,177	7,135	7,135			U
59	0603639A	Tank and Medium Caliber Ammunition	04	47,745	41,452	41,452			U
60	0603645A	Armored System Modernization - Adv Dev	04		32,739	32,739			U
61	0603747A	Soldier Support and Survivability	04	13,607	10,157	10,157	3,000	3,000	U
62	0603766A	Tactical Electronic Surveillance System - Adv Dev	04	15,730	27,733	27,733			U
63	0603774A	Night Vision Systems Advanced Development	04	9,930	12,347	12,347			U
64	0603779A	Environmental Quality Technology - Dem/Val	04	7,480	10,456	10,456			U

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				Emergency Requests**	Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	Remaining Req	Total PB Requests* with CR Adj Base + OCO + Emergency**	Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs		Remaining Req with CR Adj Base + OCO + Emergency
51	0603734A	Military Engineering Advanced Technology	03				32,448		32,448	U
52	0603772A	Advanced Tactical Computer Science and Sensor Technology	03				52,206		52,206	U
53	0603794A	C3 Advanced Technology	03				33,426		33,426	U
		Advanced Technology Development		12,000	-12,000		1,082,977	-12,000	1,070,977	
54	0603305A	Army Missile Defense Systems Integration	04				9,634		9,634	U
55	0603308A	Army Space Systems Integration	04							U
56	0603327A	Air and Missile Defense Systems Engineering	04	8,700	-8,700		57,649	-8,700	48,949	U
57	0603619A	Landmine Warfare and Barrier - Adv Dev	04				72,909		72,909	U
58	0603627A	Smoke, Obscurant and Target Defeating Sys-Adv Dev	04				7,135		7,135	U
59	0603639A	Tank and Medium Caliber Ammunition	04				41,452		41,452	U
60	0603645A	Armored System Modernization - Adv Dev	04				32,739		32,739	U
61	0603747A	Soldier Support and Survivability	04				13,157		13,157	U
62	0603766A	Tactical Electronic Surveillance System - Adv Dev	04				27,733		27,733	U
63	0603774A	Night Vision Systems Advanced Development	04				12,347		12,347	U
64	0603779A	Environmental Quality Technology - Dem/Val	04				10,456		10,456	U

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51	0603734A	Military Engineering Advanced Technology	03	25,864		25,864	U
52	0603772A	Advanced Tactical Computer Science and Sensor Technology	03	34,883		34,883	U
53	0603794A	C3 Advanced Technology	03	52,387		52,387	U
		Advanced Technology Development		1,026,698		1,026,698	
54	0603305A	Army Missile Defense Systems Integration	04	10,777		10,777	U
55	0603308A	Army Space Systems Integration	04				U
56	0603327A	Air and Missile Defense Systems Engineering	04	42,802	1,000	43,802	U
57	0603619A	Landmine Warfare and Barrier - Adv Dev	04	45,254		45,254	U
58	0603627A	Smoke, Obscurant and Target Defeating Sys-Adv Dev	04	22,700	1,500	24,200	U
59	0603639A	Tank and Medium Caliber Ammunition	04	41,974		41,974	U
60	0603645A	Armored System Modernization - Adv Dev	04	119,395		119,395	U
61	0603747A	Soldier Support and Survivability	04	8,746	3,000	11,746	U
62	0603766A	Tactical Electronic Surveillance System - Adv Dev	04	35,667		35,667	U
63	0603774A	Night Vision Systems Advanced Development	04	7,350		7,350	U
64	0603779A	Environmental Quality Technology - Dem/Val	04	14,749		14,749	U

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65	0603790A	NATO Research and Development	04	2,211	2,588	2,588			U
66	0603801A	Aviation - Adv Dev	04	7,702	14,055	14,055			U
67	0603804A	Logistics and Engineer Equipment - Adv Dev	04	17,445	35,333	35,333			U
68	0603807A	Medical Systems - Adv Dev	04	47,336	33,491	33,491			U
69	0603827A	Soldier Systems - Advanced Development	04	54,497	20,239	20,239			U
70	0604017A	Robotics Development	04		39,608	39,608			U
71	0604020A	Cross Functional Team (CFT) Advanced Development & Prototyping	04						U
72	0604100A	Analysis Of Alternatives	04	6,354	9,921	9,921			U
73	0604113A	Future Tactical Unmanned Aircraft System (FTUAS)	04						U
74	0604114A	Lower Tier Air Missile Defense (LTAMD) Sensor	04	33,780	76,728	76,728			U
75	0604115A	Technology Maturation Initiatives	04	57,737	115,221	115,221			U
76	0604117A	Maneuver - Short Range Air Defense (M-SHORAD)	04		20,000	20,000			U
77	0604118A	TRACTOR BEAM	04		10,400	10,400			U
78	0604120A	Assured Positioning, Navigation and Timing (PNT)	04	83,074	164,967	164,967			U
79	0604121A	Synthetic Training Environment Refinement & Prototyping	04		1,600	1,600			U

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65	0603790A	NATO Research and Development	04				2,588		2,588	U
66	0603801A	Aviation - Adv Dev	04				14,055		14,055	U
67	0603804A	Logistics and Engineer Equipment - Adv Dev	04				35,333		35,333	U
68	0603807A	Medical Systems - Adv Dev	04				33,491		33,491	U
69	0603827A	Soldier Systems - Advanced Development	04				20,239		20,239	U
70	0604017A	Robotics Development	04				39,608		39,608	U
71	0604020A	Cross Functional Team (CFT) Advanced Development & Prototyping	04							U
72	0604100A	Analysis Of Alternatives	04				9,921		9,921	U
73	0604113A	Future Tactical Unmanned Aircraft System (FTUAS)	04							U
74	0604114A	Lower Tier Air Missile Defense (LTAMD) Sensor	04				76,728		76,728	U
75	0604115A	Technology Maturation Initiatives	04				115,221		115,221	U
76	0604117A	Maneuver - Short Range Air Defense (M-SHORAD)	04				20,000		20,000	U
77	0604118A	TRACTOR BEAM	04				10,400		10,400	U
78	0604120A	Assured Positioning, Navigation and Timing (PNT)	04				164,967		164,967	U
79	0604121A	Synthetic Training Environment Refinement & Prototyping	04				1,600		1,600	U

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65	0603790A	NATO Research and Development	04	3,687		3,687	U
66	0603801A	Aviation - Adv Dev	04	10,793		10,793	U
67	0603804A	Logistics and Engineer Equipment - Adv Dev	04	14,248		14,248	U
68	0603807A	Medical Systems - Adv Dev	04	34,284		34,284	U
69	0603827A	Soldier Systems - Advanced Development	04	18,044		18,044	U
70	0604017A	Robotics Development	04	95,660		95,660	U
71	0604020A	Cross Functional Team (CFT) Advanced Development & Prototyping	04	38,000		38,000	U
72	0604100A	Analysis Of Alternatives	04	9,765		9,765	U
73	0604113A	Future Tactical Unmanned Aircraft System (FTUAS)	04	12,393		12,393	U
74	0604114A	Lower Tier Air Missile Defense (LTAMD) Sensor	04	120,374		120,374	U
75	0604115A	Technology Maturation Initiatives	04	95,347		95,347	U
76	0604117A	Maneuver - Short Range Air Defense (M-SHORAD)	04	95,085	23,000	118,085	U
77	0604118A	TRACTOR BEAM	04	52,894		52,894	U
78	0604120A	Assured Positioning, Navigation and Timing (PNT)	04				U
79	0604121A	Synthetic Training Environment Refinement & Prototyping	04	77,939		77,939	U

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80	0604319A	Indirect Fire Protection Capability Increment 2-Intercept (IFPC2)	04		11,303	11,303			U
81	0305251A	Cyberspace Operations Forces and Force Support	04	29,336	56,492	56,492			U
82	1206120A	Assured Positioning, Navigation and Timing (PNT)	04						U
83	1206308A	Army Space Systems Integration	04		20,432	20,432			U
		Advanced Component Development & Prototypes		619,976	890,889	890,889	18,000	18,000	
84	0604201A	Aircraft Avionics	05	54,915	30,153	30,153			U
85	0604270A	Electronic Warfare Development	05	33,419	71,671	71,671			U
86	0604290A	Mid-tier Networking Vehicular Radio (MNVR)	05	9,363	10,589	10,589			U
87	0604321A	All Source Analysis System	05	11,958	4,774	4,774			U
88	0604328A	TRACTOR CAGE	05	12,525	17,252	17,252			U
89	0604601A	Infantry Support Weapons	05	63,842	87,643	87,643			U
90	0604604A	Medium Tactical Vehicles	05		6,039	6,039			U
91	0604611A	JAVELIN	05	19,241	21,095	21,095			U
92	0604622A	Family of Heavy Tactical Vehicles	05	10,989	10,507	10,507			U
93	0604633A	Air Traffic Control	05	3,326	3,536	3,536			U
94	0604641A	Tactical Unmanned Ground Vehicle (TUGV)	05	32,315					U
95	0604642A	Light Tactical Wheeled Vehicles	05	476	7,000	7,000			U

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				Emergency Requests**	Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	Remaining Req Emergency	Total PB Requests* with CR Adj Base + OCO + Emergency**	Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs		Remaining Req with CR Adj Base + OCO + Emergency
80	0604319A	Indirect Fire Protection Capability Increment 2-Intercept (IFPC2)	04				11,303		11,303	U
81	0305251A	Cyberspace Operations Forces and Force Support	04				56,492		56,492	U
82	1206120A	Assured Positioning, Navigation and Timing (PNT)	04							U
83	1206308A	Army Space Systems Integration	04				20,432		20,432	U
	Advanced Component Development & Prototypes			8,700	-8,700		917,589	-8,700	908,889	
84	0604201A	Aircraft Avionics	05				30,153		30,153	U
85	0604270A	Electronic Warfare Development	05				71,671		71,671	U
86	0604290A	Mid-tier Networking Vehicular Radio (MNVR)	05				10,589		10,589	U
87	0604321A	All Source Analysis System	05				4,774		4,774	U
88	0604328A	TRACTOR CAGE	05				17,252		17,252	U
89	0604601A	Infantry Support Weapons	05				87,643		87,643	U
90	0604604A	Medium Tactical Vehicles	05				6,039		6,039	U
91	0604611A	JAVELIN	05				21,095		21,095	U
92	0604622A	Family of Heavy Tactical Vehicles	05				10,507		10,507	U
93	0604633A	Air Traffic Control	05				3,536		3,536	U
94	0604641A	Tactical Unmanned Ground Vehicle (TUGV)	05							U
95	0604642A	Light Tactical Wheeled Vehicles	05				7,000		7,000	U

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80	0604319A	Indirect Fire Protection Capability Increment 2-Intercept (IFPC2)	04	51,030		51,030	U
81	0305251A	Cyberspace Operations Forces and Force Support	04	65,817		65,817	U
82	1206120A	Assured Positioning, Navigation and Timing (PNT)	04	146,300		146,300	U
83	1206308A	Army Space Systems Integration	04	38,319		38,319	U
	Advanced Component Development & Prototypes			1,329,393	28,500	1,357,893	
84	0604201A	Aircraft Avionics	05	32,293		32,293	U
85	0604270A	Electronic Warfare Development	05	78,699		78,699	U
86	0604290A	Mid-tier Networking Vehicular Radio (MNVR)	05				U
87	0604321A	All Source Analysis System	05				U
88	0604328A	TRACTOR CAGE	05	17,050	12,000	29,050	U
89	0604601A	Infantry Support Weapons	05	83,155		83,155	U
90	0604604A	Medium Tactical Vehicles	05	3,704		3,704	U
91	0604611A	JAVELIN	05	10,623		10,623	U
92	0604622A	Family of Heavy Tactical Vehicles	05	11,950		11,950	U
93	0604633A	Air Traffic Control	05	12,347		12,347	U
94	0604641A	Tactical Unmanned Ground Vehicle (TUGV)	05				U
95	0604642A	Light Tactical Wheeled Vehicles	05	8,212		8,212	U

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Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO	S
96	0604645A	Armored Systems Modernization (ASM) - Eng Dev	05	9,306	36,242	36,242			U
97	0604710A	Night Vision Systems - Eng Dev	05	76,491	108,504	108,504			U
98	0604713A	Combat Feeding, Clothing, and Equipment	05	1,975	3,702	3,702			U
99	0604715A	Non-System Training Devices - Eng Dev	05	33,888	43,575	43,575			U
100	0604741A	Air Defense Command, Control and Intelligence - Eng Dev	05	200,205	28,726	28,726			U
101	0604742A	Constructive Simulation Systems Development	05	17,363	18,562	18,562			U
102	0604746A	Automatic Test Equipment Development	05	8,503	8,344	8,344			U
103	0604760A	Distributive Interactive Simulations (DIS) - Eng Dev	05	10,150	11,270	11,270			U
104	0604768A	Brilliant Anti-Armor Submunition (BAT)	05		10,000	10,000			U
105	0604780A	Combined Arms Tactical Trainer (CATT) Core	05	14,538	18,566	18,566			U
106	0604798A	Brigade Analysis, Integration and Evaluation	05	101,927	145,360	145,360			U
107	0604802A	Weapons and Munitions - Eng Dev	05	75,845	145,232	145,232			U
108	0604804A	Logistics and Engineer Equipment - Eng Dev	05	76,374	90,965	90,965			U
109	0604805A	Command, Control, Communications Systems - Eng Dev	05	4,166	9,910	9,910			U

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Line No	Program Element Number	Item	Act	FY 2018 Emergency Requests**	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency	S
96	0604645A	Armored Systems Modernization (ASM) - Eng Dev	05				36,242		36,242	U
97	0604710A	Night Vision Systems - Eng Dev	05				108,504		108,504	U
98	0604713A	Combat Feeding, Clothing, and Equipment	05				3,702		3,702	U
99	0604715A	Non-System Training Devices - Eng Dev	05				43,575		43,575	U
100	0604741A	Air Defense Command, Control and Intelligence - Eng Dev	05				28,726		28,726	U
101	0604742A	Constructive Simulation Systems Development	05				18,562		18,562	U
102	0604746A	Automatic Test Equipment Development	05				8,344		8,344	U
103	0604760A	Distributive Interactive Simulations (DIS) - Eng Dev	05				11,270		11,270	U
104	0604768A	Brilliant Anti-Armor Submunition (BAT)	05				10,000		10,000	U
105	0604780A	Combined Arms Tactical Trainer (CATT) Core	05				18,566		18,566	U
106	0604798A	Brigade Analysis, Integration and Evaluation	05				145,360		145,360	U
107	0604802A	Weapons and Munitions - Eng Dev	05				145,232		145,232	U
108	0604804A	Logistics and Engineer Equipment - Eng Dev	05				90,965		90,965	U
109	0604805A	Command, Control, Communications Systems - Eng Dev	05				9,910		9,910	U

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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Se
96	0604645A	Armored Systems Modernization (ASM) - Eng Dev	05	393,613		393,613	U
97	0604710A	Night Vision Systems - Eng Dev	05	139,614		139,614	U
98	0604713A	Combat Feeding, Clothing, and Equipment	05	4,507		4,507	U
99	0604715A	Non-System Training Devices - Eng Dev	05	49,436		49,436	U
100	0604741A	Air Defense Command, Control and Intelligence - Eng Dev	05	95,172	119,300	214,472	U
101	0604742A	Constructive Simulation Systems Development	05	22,628		22,628	U
102	0604746A	Automatic Test Equipment Development	05	13,297		13,297	U
103	0604760A	Distributive Interactive Simulations (DIS) - Eng Dev	05	9,145		9,145	U
104	0604768A	Brilliant Anti-Armor Submunition (BAT)	05	9,894		9,894	U
105	0604780A	Combined Arms Tactical Trainer (CATT) Core	05	21,964		21,964	U
106	0604798A	Brigade Analysis, Integration and Evaluation	05	49,288		49,288	U
107	0604802A	Weapons and Munitions - Eng Dev	05	183,100		183,100	U
108	0604804A	Logistics and Engineer Equipment - Eng Dev	05	79,706		79,706	U
109	0604805A	Command, Control, Communications Systems - Eng Dev	05	15,970		15,970	U

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110	0604807A	Medical Materiel/Medical Biological Defense Equipment - Eng Dev	05	36,237	39,238	39,238			U
111	0604808A	Landmine Warfare/Barrier - Eng Dev	05	32,069	34,684	34,684			U
112	0604818A	Army Tactical Command & Control Hardware & Software	05	169,375	164,409	164,409			U
113	0604820A	Radar Development	05	15,368	32,968	32,968			U
114	0604822A	General Fund Enterprise Business System (GFEBs)	05	11,044	49,554	49,554			U
115	0604823A	Firefinder	05	6,177	45,605	45,605			U
116	0604827A	Soldier Systems - Warrior Dem/Val	05	11,929	16,127	16,127			U
117	0604852A	Suite of Survivability Enhancement Systems - EMD	05		98,600	98,600			U
118	0604854A	Artillery Systems - EMD	05	1,689	1,972	1,972			U
119	0605013A	Information Technology Development	05	70,104	81,776	81,776			U
120	0605018A	Integrated Personnel and Pay System-Army (IPPS-A)	05	149,597	172,361	172,361			U
121	0605028A	Armored Multi-Purpose Vehicle (AMPV)	05	177,133	199,778	199,778			U
122	0605029A	Integrated Ground Security Surveillance Response Capability (IGSSR-C)	05	4,789	4,418	4,418			U
123	0605030A	Joint Tactical Network Center (JTNC)	05	14,463	15,877	15,877			U
124	0605031A	Joint Tactical Network (JTN)	05	16,430	44,150	44,150			U
125	0605032A	TRACTOR TIRE	05	27,254	34,670	34,670	5,000	5,000	U

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				Emergency Requests**	Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	Remaining Req	Total PB Requests* with CR Adj Base + OCO + Emergency**	Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs		Remaining Req with CR Adj Base + OCO + Emergency
110	0604807A	Medical Materiel/Medical Biological Defense Equipment - Eng Dev	05				39,238		39,238	U
111	0604808A	Landmine Warfare/Barrier - Eng Dev	05				34,684		34,684	U
112	0604818A	Army Tactical Command & Control Hardware & Software	05				164,409		164,409	U
113	0604820A	Radar Development	05				32,968		32,968	U
114	0604822A	General Fund Enterprise Business System (GFEBS)	05				49,554		49,554	U
115	0604823A	Firefinder	05				45,605		45,605	U
116	0604827A	Soldier Systems - Warrior Dem/Val	05				16,127		16,127	U
117	0604852A	Suite of Survivability Enhancement Systems - EMD	05				98,600		98,600	U
118	0604854A	Artillery Systems - EMD	05				1,972		1,972	U
119	0605013A	Information Technology Development	05				81,776		81,776	U
120	0605018A	Integrated Personnel and Pay System-Army (IPPS-A)	05				172,361		172,361	U
121	0605028A	Armored Multi-Purpose Vehicle (AMPV)	05				199,778		199,778	U
122	0605029A	Integrated Ground Security Surveillance Response Capability (IGSSR-C)	05				4,418		4,418	U
123	0605030A	Joint Tactical Network Center (JTNC)	05				15,877		15,877	U
124	0605031A	Joint Tactical Network (JTN)	05				44,150		44,150	U
125	0605032A	TRACTOR TIRE	05				39,670		39,670	U

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110	0604807A	Medical Materiel/Medical Biological Defense Equipment - Eng Dev	05	44,542		44,542	U
111	0604808A	Landmine Warfare/Barrier - Eng Dev	05	50,817		50,817	U
112	0604818A	Army Tactical Command & Control Hardware & Software	05	178,693		178,693	U
113	0604820A	Radar Development	05	39,338		39,338	U
114	0604822A	General Fund Enterprise Business System (GFEBs)	05	37,851		37,851	U
115	0604823A	Firefinder	05	45,473		45,473	U
116	0604827A	Soldier Systems - Warrior Dem/Val	05	10,395		10,395	U
117	0604852A	Suite of Survivability Enhancement Systems - EMD	05	69,204		69,204	U
118	0604854A	Artillery Systems - EMD	05	1,781		1,781	U
119	0605013A	Information Technology Development	05	113,758		113,758	U
120	0605018A	Integrated Personnel and Pay System-Army (IPPS-A)	05	166,603		166,603	U
121	0605028A	Armored Multi-Purpose Vehicle (AMPV)	05	118,239		118,239	U
122	0605029A	Integrated Ground Security Surveillance Response Capability (IGSSR-C)	05	3,211		3,211	U
123	0605030A	Joint Tactical Network Center (JTNC)	05	15,889		15,889	U
124	0605031A	Joint Tactical Network (JTN)	05	41,972		41,972	U
125	0605032A	TRACTOR TIRE	05	41,166	66,760	107,926	U

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126	0605033A	Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E)	05	4,838	5,207	5,207			U
127	0605034A	Tactical Security System (TSS)	05	2,792	4,727	4,727			U
128	0605035A	Common Infrared Countermeasures (CIRCM)	05	90,685	105,778	105,778	21,540	21,540	U
129	0605036A	Combating Weapons of Mass Destruction (CWMD)	05	2,008	6,927	6,927			U
130	0605037A	Evidence Collection and Detainee Processing	05		214	214			U
131	0605038A	Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) Sensor Suite	05		16,125	16,125			U
132	0605041A	Defensive CYBER Tool Development	05	32,535	55,165	55,165			U
133	0605042A	Tactical Network Radio Systems (Low-Tier)	05	14,198	20,076	20,076			U
134	0605047A	Contract Writing System	05	19,868	20,322	20,322			U
135	0605049A	Missile Warning System Modernization (MWSM)	05		55,810	55,810			U
136	0605051A	Aircraft Survivability Development	05	121,530	30,879	30,879	30,100	30,100	U
137	0605052A	Indirect Fire Protection Capability Inc 2 - Block 1	05	80,781	175,069	175,069			U
138	0605053A	Ground Robotics	05		70,760	70,760			U
139	0605054A	Emerging Technology Initiatives	05						U

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				Emergency Requests**	Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	Remaining Req Emergency	Total PB Requests* with CR Adj Base + OCO + Emergency**	Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	
126	0605033A	Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E)	05				5,207	5,207	U
127	0605034A	Tactical Security System (TSS)	05				4,727	4,727	U
128	0605035A	Common Infrared Countermeasures (CIRCM)	05				127,318	127,318	U
129	0605036A	Combating Weapons of Mass Destruction (CWMD)	05				6,927	6,927	U
130	0605037A	Evidence Collection and Detainee Processing	05				214	214	U
131	0605038A	Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) Sensor Suite	05				16,125	16,125	U
132	0605041A	Defensive CYBER Tool Development	05				55,165	55,165	U
133	0605042A	Tactical Network Radio Systems (Low-Tier)	05				20,076	20,076	U
134	0605047A	Contract Writing System	05				20,322	20,322	U
135	0605049A	Missile Warning System Modernization (MWSM)	05				55,810	55,810	U
136	0605051A	Aircraft Survivability Development	05				60,979	60,979	U
137	0605052A	Indirect Fire Protection Capability Inc 2 - Block 1	05				175,069	175,069	U
138	0605053A	Ground Robotics	05				70,760	70,760	U
139	0605054A	Emerging Technology Initiatives	05						U

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126	0605033A	Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E)	05	5,175		5,175	U
127	0605034A	Tactical Security System (TSS)	05	4,496		4,496	U
128	0605035A	Common Infrared Countermeasures (CIRCM)	05	51,178	2,670	53,848	U
129	0605036A	Combating Weapons of Mass Destruction (CWMD)	05	11,311		11,311	U
130	0605037A	Evidence Collection and Detainee Processing	05				U
131	0605038A	Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) Sensor Suite	05	17,154		17,154	U
132	0605041A	Defensive CYBER Tool Development	05	36,626		36,626	U
133	0605042A	Tactical Network Radio Systems (Low-Tier)	05	3,829		3,829	U
134	0605047A	Contract Writing System	05	41,928		41,928	U
135	0605049A	Missile Warning System Modernization (MWSM)	05	28,276		28,276	U
136	0605051A	Aircraft Survivability Development	05	21,965	34,933	56,898	U
137	0605052A	Indirect Fire Protection Capability Inc 2 - Block 1	05	157,710		157,710	U
138	0605053A	Ground Robotics	05	86,167		86,167	U
139	0605054A	Emerging Technology Initiatives	05	42,866		42,866	U

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Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO	S e c
140	0605380A	AMF Joint Tactical Radio System (JTRS)	05	4,088	8,965	8,965			U
141	0605450A	Joint Air-to-Ground Missile (JAGM)	05	47,446	34,626	34,626			U
142	0605457A	Army Integrated Air and Missile Defense (AIAMD)	05	273,240	336,420	336,420			U
143	0605766A	National Capabilities Integration (MIP)	05	4,955	6,882	6,882			U
144	0605812A	Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph	05	11,086	23,467	23,467			U
145	0605830A	Aviation Ground Support Equipment	05	2,060	6,930	6,930			U
146	0210609A	Paladin Integrated Management (PIM)	05	39,902	6,112	6,112			U
147	0303032A	TROJAN - RH12	05	4,273	4,431	4,431	1,200	1,200	U
148	0303267A	Auctioned Spectrum Relocation Fund	05	34,967					U
149	0303367A	Spectrum Access Research and Development	05	66,125					U
150	0304270A	Electronic Warfare Development	05	18,425	14,616	14,616			U
151	1205117A	Tractor Bears	05		17,928	17,928			U
		System Development & Demonstration		2,502,560	3,012,840	3,012,840	57,840	57,840	
152	0604256A	Threat Simulator Development	06	28,883	22,862	22,862			U
153	0604258A	Target Systems Development	06	18,518	13,902	13,902			U
154	0604759A	Major T&E Investment	06	93,668	102,901	102,901			U
155	0605103A	Rand Arroyo Center	06	19,863	20,140	20,140			U

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				Emergency Requests**	Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	Remaining Req Emergency	Total PB Requests* with CR Adj Base + OCO + Emergency**	Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs		Remaining Req with CR Adj Base + OCO + Emergency
140	0605380A	AMF Joint Tactical Radio System (JTRS)	05				8,965		8,965	U
141	0605450A	Joint Air-to-Ground Missile (JAGM)	05				34,626		34,626	U
142	0605457A	Army Integrated Air and Missile Defense (AIAMD)	05				336,420		336,420	U
143	0605766A	National Capabilities Integration (MIP)	05				6,882		6,882	U
144	0605812A	Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph	05				23,467		23,467	U
145	0605830A	Aviation Ground Support Equipment	05				6,930		6,930	U
146	0210609A	Paladin Integrated Management (PIM)	05				6,112		6,112	U
147	0303032A	TROJAN - RH12	05				5,631		5,631	U
148	0303267A	Auctioned Spectrum Relocation Fund	05							U
149	0303367A	Spectrum Access Research and Development	05							U
150	0304270A	Electronic Warfare Development	05				14,616		14,616	U
151	1205117A	Tractor Bears	05				17,928		17,928	U
		System Development & Demonstration					3,070,680		3,070,680	
152	0604256A	Threat Simulator Development	06				22,862		22,862	U
153	0604258A	Target Systems Development	06				13,902		13,902	U
154	0604759A	Major T&E Investment	06				102,901		102,901	U
155	0605103A	Rand Arroyo Center	06				20,140		20,140	U

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140	0605380A	AMF Joint Tactical Radio System (JTRS)	05	15,984		15,984	U
141	0605450A	Joint Air-to-Ground Missile (JAGM)	05	11,773		11,773	U
142	0605457A	Army Integrated Air and Missile Defense (AIAMD)	05	277,607		277,607	U
143	0605766A	National Capabilities Integration (MIP)	05	12,340		12,340	U
144	0605812A	Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph	05	2,686		2,686	U
145	0605830A	Aviation Ground Support Equipment	05	2,706		2,706	U
146	0210609A	Paladin Integrated Management (PIM)	05				U
147	0303032A	TROJAN - RH12	05	4,521	1,200	5,721	U
148	0303267A	Auctioned Spectrum Relocation Fund	05				U
149	0303367A	Spectrum Access Research and Development	05				U
150	0304270A	Electronic Warfare Development	05	8,922		8,922	U
151	1205117A	Tractor Bears	05	23,170		23,170	U
		System Development & Demonstration		3,192,689	236,863	3,429,552	
152	0604256A	Threat Simulator Development	06	12,835		12,835	U
153	0604258A	Target Systems Development	06	12,135		12,135	U
154	0604759A	Major T&E Investment	06	82,996		82,996	U
155	0605103A	Rand Arroyo Center	06	19,821		19,821	U

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Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests* with CR Adj OCO	S e c
156	0605301A	Army Kwajalein Atoll	06	219,271	246,663	246,663			U
157	0605326A	Concepts Experimentation Program	06	24,668	29,820	29,820			U
158	0605502A	Small Business Innovative Research	06	230,691					U
159	0605601A	Army Test Ranges and Facilities	06	305,238	307,588	307,588			U
160	0605602A	Army Technical Test Instrumentation and Targets	06	70,523	49,242	49,242			U
161	0605604A	Survivability/Lethality Analysis	06	38,245	41,843	41,843			U
162	0605606A	Aircraft Certification	06	4,486	4,804	4,804			U
163	0605702A	Meteorological Support to RDT&E Activities	06	6,793	7,238	7,238			U
164	0605706A	Materiel Systems Analysis	06	21,510	21,890	21,890			U
165	0605709A	Exploitation of Foreign Items	06	12,415	12,684	12,684			U
166	0605712A	Support of Operational Testing	06	49,580	51,040	51,040			U
167	0605716A	Army Evaluation Center	06	55,460	56,246	56,246			U
168	0605718A	Army Modeling & Sim X-Cmd Collaboration & Integ	06	7,653	1,829	1,829			U
169	0605801A	Programwide Activities	06	50,971	55,060	55,060			U
170	0605803A	Technical Information Activities	06	29,905	33,934	33,934			U
171	0605805A	Munitions Standardization, Effectiveness and Safety	06	63,983	43,444	43,444			U
172	0605857A	Environmental Quality Technology Mgmt Support	06	2,048	5,087	5,087			U

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156	0605301A	Army Kwajalein Atoll	06				246,663		246,663	U
157	0605326A	Concepts Experimentation Program	06				29,820		29,820	U
158	0605502A	Small Business Innovative Research	06							U
159	0605601A	Army Test Ranges and Facilities	06				307,588		307,588	U
160	0605602A	Army Technical Test Instrumentation and Targets	06				49,242		49,242	U
161	0605604A	Survivability/Lethality Analysis	06				41,843		41,843	U
162	0605606A	Aircraft Certification	06				4,804		4,804	U
163	0605702A	Meteorological Support to RDT&E Activities	06				7,238		7,238	U
164	0605706A	Materiel Systems Analysis	06				21,890		21,890	U
165	0605709A	Exploitation of Foreign Items	06				12,684		12,684	U
166	0605712A	Support of Operational Testing	06				51,040		51,040	U
167	0605716A	Army Evaluation Center	06				56,246		56,246	U
168	0605718A	Army Modeling & Sim X-Command Collaboration & Integ	06				1,829		1,829	U
169	0605801A	Programwide Activities	06				55,060		55,060	U
170	0605803A	Technical Information Activities	06				33,934		33,934	U
171	0605805A	Munitions Standardization, Effectiveness and Safety	06				43,444		43,444	U
172	0605857A	Environmental Quality Technology Mgmt Support	06				5,087		5,087	U

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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Se
156	0605301A	Army Kwajalein Atoll	06	246,574		246,574	U
157	0605326A	Concepts Experimentation Program	06	30,430		30,430	U
158	0605502A	Small Business Innovative Research	06				U
159	0605601A	Army Test Ranges and Facilities	06	305,759		305,759	U
160	0605602A	Army Technical Test Instrumentation and Targets	06	62,379		62,379	U
161	0605604A	Survivability/Lethality Analysis	06	40,496		40,496	U
162	0605606A	Aircraft Certification	06	3,941		3,941	U
163	0605702A	Meteorological Support to RDT&E Activities	06	9,767		9,767	U
164	0605706A	Materiel Systems Analysis	06	21,226		21,226	U
165	0605709A	Exploitation of Foreign Items	06	13,026		13,026	U
166	0605712A	Support of Operational Testing	06	52,718		52,718	U
167	0605716A	Army Evaluation Center	06	57,049		57,049	U
168	0605718A	Army Modeling & Sim X-Cmd Collaboration & Integ	06	2,801		2,801	U
169	0605801A	Programwide Activities	06	60,942		60,942	U
170	0605803A	Technical Information Activities	06	29,050		29,050	U
171	0605805A	Munitions Standardization, Effectiveness and Safety	06	42,332		42,332	U
172	0605857A	Environmental Quality Technology Mgmt Support	06	3,216		3,216	U

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173	0605898A	Army Direct Report Headquarters - R&D - MHA	06	49,287	54,679	54,679			U
174	0606001A	Military Ground-Based CREW Technology	06		7,916	7,916			U
175	0606002A	Ronald Reagan Ballistic Missile Defense Test Site	06		61,254	61,254			U
176	0606003A	CounterIntel and Human Intel Modernization	06						U
177	0606942A	Assessments and Evaluations Cyber Vulnerabilities	06						U
178	0303260A	Defense Military Deception Initiative	06	1,923	1,779	1,779			U
179	0909980A	Judgment Fund Reimbursement	06	7,893					U
180	0909999A	Financing for Cancelled Account Adjustments	06	6					U
		RDT&E Management Support		1,413,481	1,253,845	1,253,845			
181	0603778A	MLRS Product Improvement Program	07	34,391	8,929	8,929			U
182	0603813A	TRACTOR PULL	07	3,960	4,014	4,014			U
183	0605024A	Anti-Tamper Technology Support	07	3,498	4,094	4,094			U
184	0607131A	Weapons and Munitions Product Improvement Programs	07	19,969	15,738	15,738			U
185	0607133A	TRACTOR SMOKE	07	4,479	4,513	4,513			U
186	0607134A	Long Range Precision Fires (LRPF)	07	36,322	102,014	102,014			U
187	0607135A	Apache Product Improvement Program	07	60,995	59,977	59,977			U

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173	0605898A	Army Direct Report Headquarters - R&D - MHA	06				54,679		54,679	U
174	0606001A	Military Ground-Based CREW Technology	06				7,916		7,916	U
175	0606002A	Ronald Reagan Ballistic Missile Defense Test Site	06				61,254		61,254	U
176	0606003A	CounterIntel and Human Intel Modernization	06							U
177	0606942A	Assessments and Evaluations Cyber Vulnerabilities	06							U
178	0303260A	Defense Military Deception Initiative	06				1,779		1,779	U
179	0909980A	Judgment Fund Reimbursement	06							U
180	0909999A	Financing for Cancelled Account Adjustments	06							U
		RDT&E Management Support					1,253,845		1,253,845	
181	0603778A	MLRS Product Improvement Program	07				8,929		8,929	U
182	0603813A	TRACTOR PULL	07				4,014		4,014	U
183	0605024A	Anti-Tamper Technology Support	07				4,094		4,094	U
184	0607131A	Weapons and Munitions Product Improvement Programs	07				15,738		15,738	U
185	0607133A	TRACTOR SMOKE	07				4,513		4,513	U
186	0607134A	Long Range Precision Fires (LRPF)	07				102,014		102,014	U
187	0607135A	Apache Product Improvement Program	07				59,977		59,977	U

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173	0605898A	Army Direct Report Headquarters - R&D - MHA	06	54,145		54,145	U
174	0606001A	Military Ground-Based CREW Technology	06	4,896		4,896	U
175	0606002A	Ronald Reagan Ballistic Missile Defense Test Site	06	63,011		63,011	U
176	0606003A	CounterIntel and Human Intel Modernization	06	2,636		2,636	U
177	0606942A	Assessments and Evaluations Cyber Vulnerabilities	06	88,300		88,300	U
178	0303260A	Defense Military Deception Initiative	06				U
179	0909980A	Judgment Fund Reimbursement	06				U
180	0909999A	Financing for Cancelled Account Adjustments	06				U
		RDT&E Management Support		1,322,481		1,322,481	
181	0603778A	MLRS Product Improvement Program	07	8,886		8,886	U
182	0603813A	TRACTOR PULL	07	4,067		4,067	U
183	0605024A	Anti-Tamper Technology Support	07	4,254		4,254	U
184	0607131A	Weapons and Munitions Product Improvement Programs	07	16,022	2,548	18,570	U
185	0607133A	TRACTOR SMOKE	07	4,577	7,780	12,357	U
186	0607134A	Long Range Precision Fires (LRPF)	07	186,475		186,475	U
187	0607135A	Apache Product Improvement Program	07	31,049		31,049	U

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Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO	S e c
188	0607136A	Blackhawk Product Improvement Program	07	44,966	34,416	34,416			U
189	0607137A	Chinook Product Improvement Program	07	88,314	194,567	194,567			U
190	0607138A	Fixed Wing Product Improvement Program	07	765	9,981	9,981			U
191	0607139A	Improved Turbine Engine Program	07	111,638	204,304	204,304			U
192	0607140A	Emerging Technologies from NIE	07	2,278	1,023	1,023			U
193	0607141A	Logistics Automation	07	1,542	1,504	1,504			U
194	0607142A	Aviation Rocket System Product Improvement and Development	07		10,064	10,064			U
195	0607143A	Unmanned Aircraft System Universal Products	07		38,463	38,463			U
196	0607665A	Family of Biometrics	07	11,632	6,159	6,159			U
197	0607865A	Patriot Product Improvement	07	48,073	90,217	90,217			U
198	0202429A	Aerostat Joint Project - COCOM Exercise	07	6,178	6,749	6,749			U
199	0203728A	Joint Automated Deep Operation Coordination System (JADOCs)	07	29,412	33,520	33,520			U
200	0203735A	Combat Vehicle Improvement Programs	07	340,353	343,175	343,175			U
201	0203740A	Maneuver Control System	07	3,943	6,639	6,639			U
202	0203743A	155mm Self-Propelled Howitzer Improvements	07		40,784	40,784			U
203	0203744A	Aircraft Modifications/Product Improvement Programs	07	32,397	39,358	39,358			U

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188	0607136A	Blackhawk Product Improvement Program	07				34,416		34,416	U
189	0607137A	Chinook Product Improvement Program	07				194,567		194,567	U
190	0607138A	Fixed Wing Product Improvement Program	07				9,981		9,981	U
191	0607139A	Improved Turbine Engine Program	07				204,304		204,304	U
192	0607140A	Emerging Technologies from NIE	07				1,023		1,023	U
193	0607141A	Logistics Automation	07				1,504		1,504	U
194	0607142A	Aviation Rocket System Product Improvement and Development	07				10,064		10,064	U
195	0607143A	Unmanned Aircraft System Universal Products	07				38,463		38,463	U
196	0607665A	Family of Biometrics	07				6,159		6,159	U
197	0607865A	Patriot Product Improvement	07				90,217		90,217	U
198	0202429A	Aerostat Joint Project - COCOM Exercise	07				6,749		6,749	U
199	0203728A	Joint Automated Deep Operation Coordination System (JADOCS)	07				33,520		33,520	U
200	0203735A	Combat Vehicle Improvement Programs	07				343,175		343,175	U
201	0203740A	Maneuver Control System	07				6,639		6,639	U
202	0203743A	155mm Self-Propelled Howitzer Improvements	07				40,784		40,784	U
203	0203744A	Aircraft Modifications/Product Improvement Programs	07				39,358		39,358	U

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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Se
188	0607136A	Blackhawk Product Improvement Program	07	35,240		35,240	U
189	0607137A	Chinook Product Improvement Program	07	157,822		157,822	U
190	0607138A	Fixed Wing Product Improvement Program	07	4,189		4,189	U
191	0607139A	Improved Turbine Engine Program	07	192,637		192,637	U
192	0607140A	Emerging Technologies from NIE	07				U
193	0607141A	Logistics Automation	07				U
194	0607142A	Aviation Rocket System Product Improvement and Development	07	60,860		60,860	U
195	0607143A	Unmanned Aircraft System Universal Products	07	52,019		52,019	U
196	0607665A	Family of Biometrics	07	2,400		2,400	U
197	0607865A	Patriot Product Improvement	07	65,369		65,369	U
198	0202429A	Aerostat Joint Project - COCOM Exercise	07	1		1	U
199	0203728A	Joint Automated Deep Operation Coordination System (JADOCs)	07	30,954		30,954	U
200	0203735A	Combat Vehicle Improvement Programs	07	411,927		411,927	U
201	0203740A	Maneuver Control System	07				U
202	0203743A	155mm Self-Propelled Howitzer Improvements	07	40,676		40,676	U
203	0203744A	Aircraft Modifications/Product Improvement Programs	07	17,706		17,706	U

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Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO	S e c
204	0203752A	Aircraft Engine Component Improvement Program	07	249	145	145			U
205	0203758A	Digitization	07	6,234	4,803	4,803			U
206	0203801A	Missile/Air Defense Product Improvement Program	07	24,925	2,723	2,723	15,000	15,000	U
207	0203802A	Other Missile Product Improvement Programs	07	8,283	5,000	5,000			U
208	0203808A	TRACTOR CARD	07	20,333	37,883	37,883			U
209	0205402A	Integrated Base Defense - Operational System Dev	07	3,450					U
210	0205410A	Materials Handling Equipment	07	119	1,582	1,582			U
211	0205412A	Environmental Quality Technology - Operational System Dev	07		195	195			U
212	0205456A	Lower Tier Air and Missile Defense (AMD) System	07	61,449	78,926	78,926			U
213	0205778A	Guided Multiple-Launch Rocket System (GMLRS)	07	21,196	102,807	102,807			U
214	0208053A	Joint Tactical Ground System	07	12,649					U
216	0303028A	Security and Intelligence Activities	07	15,719	13,807	13,807			U
217	0303140A	Information Systems Security Program	07	36,892	132,438	132,438			U
218	0303141A	Global Combat Support System	07	26,176	64,370	64,370			U
219	0303142A	SATCOM Ground Environment (SPACE)	07	18,761					U
220	0303150A	WWMCCS/Global Command and Control System	07	4,536	10,475	10,475			U

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204	0203752A	Aircraft Engine Component Improvement Program	07				145		145	U
205	0203758A	Digitization	07				4,803		4,803	U
206	0203801A	Missile/Air Defense Product Improvement Program	07				17,723		17,723	U
207	0203802A	Other Missile Product Improvement Programs	07				5,000		5,000	U
208	0203808A	TRACTOR CARD	07				37,883		37,883	U
209	0205402A	Integrated Base Defense - Operational System Dev	07							U
210	0205410A	Materials Handling Equipment	07				1,582		1,582	U
211	0205412A	Environmental Quality Technology - Operational System Dev	07				195		195	U
212	0205456A	Lower Tier Air and Missile Defense (AMD) System	07				78,926		78,926	U
213	0205778A	Guided Multiple-Launch Rocket System (GMLRS)	07				102,807		102,807	U
214	0208053A	Joint Tactical Ground System	07							U
216	0303028A	Security and Intelligence Activities	07				13,807		13,807	U
217	0303140A	Information Systems Security Program	07				132,438		132,438	U
218	0303141A	Global Combat Support System	07				64,370		64,370	U
219	0303142A	SATCOM Ground Environment (SPACE)	07							U
220	0303150A	WWMCCS/Global Command and Control System	07				10,475		10,475	U

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204	0203752A	Aircraft Engine Component Improvement Program	07	146		146	U
205	0203758A	Digitization	07	6,316		6,316	U
206	0203801A	Missile/Air Defense Product Improvement Program	07	1,643	2,000	3,643	U
207	0203802A	Other Missile Product Improvement Programs	07	4,947		4,947	U
208	0203808A	TRACTOR CARD	07	34,050		34,050	U
209	0205402A	Integrated Base Defense - Operational System Dev	07		8,000	8,000	U
210	0205410A	Materials Handling Equipment	07	1,464		1,464	U
211	0205412A	Environmental Quality Technology - Operational System Dev	07	249		249	U
212	0205456A	Lower Tier Air and Missile Defense (AMD) System	07	79,283		79,283	U
213	0205778A	Guided Multiple-Launch Rocket System (GMLRS)	07	154,102		154,102	U
214	0208053A	Joint Tactical Ground System	07				U
216	0303028A	Security and Intelligence Activities	07	12,280	23,199	35,479	U
217	0303140A	Information Systems Security Program	07	68,533		68,533	U
218	0303141A	Global Combat Support System	07	68,619		68,619	U
219	0303142A	SATCOM Ground Environment (SPACE)	07				U
220	0303150A	WWMCCS/Global Command and Control System	07	2,034		2,034	U

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223	0305172A	Combined Advanced Applications	07		1,100	1,100			U
224	0305179A	Integrated Broadcast Service (IBS)	07						U
225	0305204A	Tactical Unmanned Aerial Vehicles	07	8,218	9,433	9,433	7,492	7,492	U
226	0305206A	Airborne Reconnaissance Systems	07	11,799	5,080	5,080	15,000	15,000	U
227	0305208A	Distributed Common Ground/Surface Systems	07	32,284	24,700	24,700			U
228	0305219A	MQ-1C Gray Eagle UAS	07	13,470	9,574	9,574			U
229	0305232A	RQ-11 UAV	07	1,613	2,191	2,191			U
230	0305233A	RQ-7 UAV	07	4,597	12,773	12,773			U
231	0307665A	Biometrics Enabled Intelligence	07	8,854	2,537	2,537	6,036	6,036	U
232	0310349A	Win-T Increment 2 - Initial Networking	07	4,680	4,723	4,723			U
233	0708045A	End Item Industrial Preparedness Activities	07	59,891	60,877	60,877			U
234	1203142A	SATCOM Ground Environment (SPACE)	07		11,959	11,959			U
235	1208053A	Joint Tactical Ground System	07		10,228	10,228			U
9999	9999999999	Classified Programs		4,625	7,154	7,154			U
		Operational Systems Development		1,296,107	1,877,685	1,877,685	43,528	43,528	
236	0901560A	Continuing Resolution Programs	20		-1,151,993	-1,151,993	222,988	222,988	U
		Undistributed			-1,151,993	-1,151,993	222,988	222,988	
Total Research, Development, Test & Eval, Army				8,852,507	8,273,447	8,273,447	342,356	342,356	

R-119PB: FY 2019 President's Budget (Published Version), as of January 18, 2018 at 15:06:20

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Department of the Army  
 FY 2019 President's Budget  
 Exhibit R-1 FY 2019 President's Budget  
 Total Obligational Authority  
 (Dollars in Thousands)

18 Jan 2018

Appropriation: 2040A Research, Development, Test & Eval, Army

Line No	Program Element Number	Item	Act	FY 2018 Emergency Requests**	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency	S
223	0305172A	Combined Advanced Applications	07				1,100		1,100	U
224	0305179A	Integrated Broadcast Service (IBS)	07							U
225	0305204A	Tactical Unmanned Aerial Vehicles	07				16,925		16,925	U
226	0305206A	Airborne Reconnaissance Systems	07				20,080		20,080	U
227	0305208A	Distributed Common Ground/Surface Systems	07				24,700		24,700	U
228	0305219A	MQ-1C Gray Eagle UAS	07				9,574		9,574	U
229	0305232A	RQ-11 UAV	07				2,191		2,191	U
230	0305233A	RQ-7 UAV	07				12,773		12,773	U
231	0307665A	Biometrics Enabled Intelligence	07				8,573		8,573	U
232	0310349A	Win-T Increment 2 - Initial Networking	07				4,723		4,723	U
233	0708045A	End Item Industrial Preparedness Activities	07				60,877		60,877	U
234	1203142A	SATCOM Ground Environment (SPACE)	07				11,959		11,959	U
235	1208053A	Joint Tactical Ground System	07				10,228		10,228	U
9999	9999999999	Classified Programs					7,154		7,154	U
		Operational Systems Development					1,921,213		1,921,213	
236	0901560A	Continuing Resolution Programs	20				-929,005		-929,005	U
		Undistributed					-929,005		-929,005	
Total Research, Development, Test & Eval, Army				20,700	-20,700		8,636,503	-20,700	8,615,803	

R-119PB: FY 2019 President's Budget (Published Version), as of January 18, 2018 at 15:06:20

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Department of the Army  
 FY 2019 President's Budget  
 Exhibit R-1 FY 2019 President's Budget  
 Total Obligational Authority  
 (Dollars in Thousands)

18 Jan 2018

Appropriation: 2040A Research, Development, Test & Eval, Army

Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Se
223	0305172A	Combined Advanced Applications	07	1,500		1,500	U
224	0305179A	Integrated Broadcast Service (IBS)	07	450		450	U
225	0305204A	Tactical Unmanned Aerial Vehicles	07	6,000		6,000	U
226	0305206A	Airborne Reconnaissance Systems	07	12,416	14,000	26,416	U
227	0305208A	Distributed Common Ground/Surface Systems	07	38,667		38,667	U
228	0305219A	MQ-1C Gray Eagle UAS	07				U
229	0305232A	RQ-11 UAV	07	6,180		6,180	U
230	0305233A	RQ-7 UAV	07	12,863		12,863	U
231	0307665A	Biometrics Enabled Intelligence	07	4,310	2,214	6,524	U
232	0310349A	Win-T Increment 2 - Initial Networking	07				U
233	0708045A	End Item Industrial Preparedness Activities	07	53,958		53,958	U
234	1203142A	SATCOM Ground Environment (SPACE)	07	12,119		12,119	U
235	1208053A	Joint Tactical Ground System	07	7,400		7,400	U
9999	9999999999	Classified Programs		5,955		5,955	U
		Operational Systems Development		1,922,614	59,741	1,982,355	
236	0901560A	Continuing Resolution Programs	20				U
		Undistributed					
Total Research, Development, Test & Eval, Army				10,159,379	325,104	10,484,483	

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Army • Budget Estimates FY 2019 • RDT&E Program

**Program Element Table of Contents (by Budget Activity then Line Item Number)**

***Appropriation 2040: Research, Development, Test & Evaluation, Army***

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84	05	0604201A	Aircraft Avionics.....	1
85	05	0604270A	Electronic Warfare Development.....	24
86	05	0604290A	Mid-Tier Wideband Networking Vehicular Radio.....	49
87	05	0604321A	All Source Analysis System.....	56
88	05	0604328A	TRACTOR CAGE.....	71
89	05	0604601A	INFANTRY SUPPORT WEAPONS.....	72
90	05	0604604A	MEDIUM TACTICAL VEHICLES.....	169
91	05	0604611A	JAVELIN.....	179
92	05	0604622A	FAMILY OF HEAVY TACTICAL VEHICLES.....	186
93	05	0604633A	Air Traffic Control.....	217
94	05	0604641A	TACTICAL UNMANNED GROUND VEHICLE.....	226
95	05	0604642A	LIGHT TACTICAL WHEELED VEHICLES.....	234
96	05	0604645A	Armored Systems Modernization (ASM) - Eng Dev.....	245
97	05	0604710A	Night Vision Systems - Eng Dev.....	254
98	05	0604713A	Combat Feeding, Clothing, and Equipment.....	295
99	05	0604715A	Non-System Training Devices - Eng Dev.....	314

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***Appropriation 2040: Research, Development, Test & Evaluation, Army***

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102	05	0604746A	Automatic Test Equipment Development.....	392
103	05	0604760A	Distributive Interactive Simulations (DIS) - Eng Dev.....	415
104	05	0604768A	Brilliant Anti-Armor Submunition(BAT).....	437
105	05	0604780A	Combined Arms Tactical Trainer (CATT) Core.....	449
106	05	0604798A	Brigade Analysis, Integration and Evaluation.....	476
107	05	0604802A	Weapons and Munitions Engineering Development.....	542
108	05	0604804A	Logistics and Engineer Equipment - Eng Dev.....	656

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Air Defense Command, Control and Intelligence - Eng Dev	0604741A	100	05.....	342
Air Traffic Control	0604633A	93	05.....	217
Aircraft Avionics	0604201A	84	05.....	1
All Source Analysis System	0604321A	87	05.....	56
Armored Systems Modernization (ASM) - Eng Dev	0604645A	96	05.....	245
Automatic Test Equipment Development	0604746A	102	05.....	392
Brigade Analysis, Integration and Evaluation	0604798A	106	05.....	476
Brilliant Anti-Armor Submunition(BAT)	0604768A	104	05.....	437
Combat Feeding, Clothing, and Equipment	0604713A	98	05.....	295
Combined Arms Tactical Trainer (CATT) Core	0604780A	105	05.....	449
Constructive Simulation Systems Development	0604742A	101	05.....	374
Distributive Interactive Simulations (DIS) - Eng Dev	0604760A	103	05.....	415
Electronic Warfare Development	0604270A	85	05.....	24
FAMILY OF HEAVY TACTICAL VEHICLES	0604622A	92	05.....	186
INFANTRY SUPPORT WEAPONS	0604601A	89	05.....	72
JAVELIN	0604611A	91	05.....	179
LIGHT TACTICAL WHEELED VEHICLES	0604642A	95	05.....	234

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<b>Program Element Title</b>	<b>Program Element Number</b>	<b>Line #</b>	<b>BA</b>	<b>Page</b>
Logistics and Engineer Equipment - Eng Dev	0604804A	108	05.....	656
MEDIUM TACTICAL VEHICLES	0604604A	90	05.....	169
Mid-Tier Wideband Networking Vehicular Radio	0604290A	86	05.....	49
Night Vision Systems - Eng Dev	0604710A	97	05.....	254
Non-System Training Devices - Eng Dev	0604715A	99	05.....	314
TACTICAL UNMANNED GROUND VEHICLE	0604641A	94	05.....	226
TRACTOR CAGE	0604328A	88	05.....	71
Weapons and Munitions Engineering Development	0604802A	107	05.....	542

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**FY 2019 RDT&E, ARMY PROGRAM ELEMENT**  
**DESCRIPTIVE SUMMARIES**

**Introduction and Explanation of Contents**

1. **General.** The purpose of this document is to provide summary information concerning the Research, Development, Test and Evaluation, Army program. The descriptive summaries are comprised of R-2 (Army RDT&E Budget Item Justification – program element level), R-2A (Army RDT&E Budget Item Justification – project level), R-3 (Army RDT&E Cost Analysis), R-4 (Schedule Profile Detail) and R-5 (Termination Liability Funding for MDAPs) Exhibits, which provide narrative information on all RDT&E program elements and projects through FY 2019.
  
2. **Relationship of the FY 2019 Budget Submitted to Congress to the FY 2018 Budget Submitted to Congress.** This paragraph provides a list of program elements/projects that are major new starts, restructures, developmental transitions, and terminated programs. Explanations for these changes can be found in the narrative sections of the Program Element R-2A Exhibits.

**A. New Start Programs:**

<b>Budget Activity</b>	<b>OSDPE / Project</b>	<b>Project Title</b>
02	0602126A / XW8	TRACTOR JACK
02	0602787A / XV5	Medical Capabilities to Support Dispersed Ops
04	0604020A / CF1	CFT Advanced Development & Prototyping
04	0604113A / EX8	Future Tactical Unmanned Aircraft System (FTUAS)
06	0605898A / FJ2	Army SHARP RDTE
06	0606942A / FL2	Cyber Vulnerabilities Assessments and Evaluations
07	0305179A / EF4	Integrated Broadcast System
07	0305206A / EH7	Guardrail Common Sensor (GRCS) Payloads (MIP)
07	0305206A / EH2	EMARSS ADV DEV (MIP)

**B. Program Element/Project Restructures:**

<b>Budget Activity</b>	<b>Old OSDPE / Project: Title</b>	<b>New OSDPE / Project: Title</b>
02	0602105A / H84: Materials	0602105A / XW4: Manufacturing Science
02	0602270A / 906: Tactical Electronic Warfare Applied Research	0602270A / CYB: Applied Offensive Cyber
02	0602782A / 779: Command, Control And Platform Electronics Tech	0602782A / CY2: Applied Defensive Cyber
02	0602782A / H92: Communications Technology	0602782A / CY2: Applied Defensive Cyber
02	0602786A / 283: Airdrop Adv Tech	0602786A / XW5: Small Unit Expeditionary Maneuver Technology
02	0602786A / H99: Joint Service Combat Feeding Technology	0602786A / XW5: Small Unit Expeditionary Maneuver Technology
02	0602786A / VT4: Expeditionary Mobile Base Camp Technology	0602786A / XW5: Small Unit Expeditionary Maneuver Technology
03	0603001A / C07: Joint Service Combat Feeding Tech Demo	0603001A / XW6: Small Unit Expeditionary Maneuver
03	0603001A / VT5: Expeditionary Mobile Base Camp Demonstration	0603001A / XW6: Small Unit Expeditionary Maneuver
03	0603001A / 242: Airdrop Equipment	0603001A / XW6: Small Unit Expeditionary Maneuver
03	0603270A / K15: Advanced Comm Ecm Demo	0603270A / CY3: Offensive Cyber Demonstration
03	0603270A / K16: Non-Commo Ecm Tech Dem	0603270A / CY3: Offensive Cyber Demonstration
04	0603639A / EL7: Reduced Range Ammunition	0604802A / EP3: Reduced Range Ammunition - Small Caliber
04	0603639A / EL8: LIGHTWEIGHT CARTRIDGE CASE FOR SMALL CALIBER	0607131A / ER6: Direct Fire Technology
04	0603639A / EU1: Enhanced Lethality Cannon Munitions	0604802A / EU7: Enhanced Lethality Cannon Munitions
04	0603639A / EU1: Enhanced Lethality Cannon Munitions	0604802A / EU6: 155mm HE Rocket Assist Project Extended Range
04	0604120A / ED5: Assured Positioning, Navigation and Timing (PNT)	1206120A / FJ8: Assured Positioning, Navigation and Timing (PNT)
04	0604120A / EH8: DISMOUNTED	1206120A / FJ9: Dismounted A-PNT
04	0604120A / EH9: PSEUDOLITES	1206120A / FK1: Pseudolites
04	0604120A / EJ2: MOUNTED	1206120A / FK2: Mounted A-PNT
04	0604120A / EJ3: ANTI-JAM ANTENNA	1206120A / FK3: Anti-Jam Antenna
05	0210609A / ED8: Paladin Integrated Management (PIM)	0203743A / FF9: PIM Improvement Program
05	0604798A / FG7: Emerging Technology Initiatives	0604798A / FI3: Rapid Capability Development and Maturation
05	0604827A / S65: Platoon Power Generator	0604827A / EY3: Soldier Power Generator
05	0605053A / FB4: Common Robotic Systems	0605053A / FG8: Common Robotic Controller
07	0303028A / FG2: Counterintelligence & Human Intel Modernization	0606003A / FI9: Counterl Intel and Human Intel Modernization
07	0205402A / EF2: Integrated Base Defense	0605029A / EQ2: IntegGrdSecSurvRespC(IGSSR-C)
07	0205402A / EF2: Integrated Base Defense	0605033A / EQ3: Grnd-Based Opnl Surv Sys -Exped (GBOSS-E)
07	0303142A / 253: Dscs-Dcs (Phase II)	1203142A / FE1: Dscs-Dcs (Phase II)
07	0303142A / 456: MILSATCOM System Engineering	1203142A / FE2: MILSATCOM System Engineering
07	0303142A / EK8: Enroute Mission Command	1203142A / FE4: Enroute Mission Command

**C. Program Terminations:**

<b><u>Budget Activity</u></b>	<b><u>OSDPE / Project</u></b>	<b><u>OSDPE Title / Project Title</u></b>
01	0601103A / V72	University Research Initiatives / Minerva; project ends
01	0601104A / H50	University and Industry Research Centers / Network Sciences Cta; project ends
01	0601104A / H53	University and Industry Research Centers / Army High Performance Computing Research Center; project ends
01	0601104A / H54	University and Industry Research Centers / Micro-Autonomous Systems Technology (MAST) CTA; project ends
02	0602105A / H7G	Materials Technology / Nanomaterials Applied Research; project ends
02	0602120A / SA2	Sensors and Electronic Survivability / Biotechnology Applied Research; project ends
02	0602705A / H17	Electronics and Electronic Devices / Flexible Display Center; project ends
02	0602720A / 895	Environmental Quality Technology / Pollution Prevention; project ends
03	0603001A / 543	Warfighter Advanced Technology / Ammunition Logistics; project ends
03	0603015A / S28	Next Generation Training & Simulation Systems / Immersive Learning Environments; project ends
03	0603020A / DB1	TRACTOR ROSE / DDB1; project ends
03	0603606A / 683	Landmine Warfare and Barrier Advanced Technology / Area Denial Sensors; project ends
03	0603728A / 025	Environmental Quality Technology Demonstrations / Pollution Prevention Technology; project ends
04	0604115A / EX3	Technology Maturation Initiatives / Ground Vehicle Prototyping; project ends
05	0604290A / DW1	Mid-tier Networking Vehicular Radio (MNVR) / Mid-Tier Wideband Networking Vehicular Radio Mnv; project ends
05	0604321A / B41	All Source Analysis System / CI/HUMINT Software Products (MIP); project ends
05	0604321A / B51	All Source Analysis System / Machine - Foreign Language Translation System; project ends
05	0604818A / 334	Army Tactical Command & Control Hardware & Software / Common Software; project ends
06	0303260A / FA9	Defense Military Deception Initiative / Security Initiatives; project ends
06	0604759A / FA4	Major T&E Investment / Warrior Injury Assessment Manikin (WIAMan); transitions to procurement
07	0202429A / EP8	Aerostat Joint Project - COCOM Exercise / COCOM Exercise; project ends
07	0203740A / 484	Maneuver Control System / Maneuver Control System; project ends
07	0303142A / EA3	SATCOM Ground Environment (SPACE) / Transportable Tactical Cmd Comms (T2C2); transitions to procurement
07	0303150A / EA5	WWMCCS/Global Command and Control System / Strategic and Joint Mission Command; transitions to procurement
07	0305219A / MQ1	MQ-1 Gray Eagle UAV / MQ-1 Gray Eagle - Army UAV (MIP); project ends
07	0607140A / ES7	Emerging Technologies from NIE / Emerging Technologies from NIE; project ends
07	0607141A / DY1	Logistics Automation / Logistics Information Warehouse (LIW); project ends

- 3. Classification:** This document contains no classified data. Appropriately cleared individuals can obtain further information on Classified/Special Access Programs by contacting the Department of the Army (ASA(ALT)) Special Programs Office.

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / <i>Aircraft Avionics</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	54.915	30.153	32.293	-	32.293	25.582	25.103	27.610	29.558	0.000	225.214
C97: <i>ACFT Avionics</i>	-	0.798	20.915	16.748	-	16.748	7.187	5.824	5.470	3.228	0.000	60.170
EW7: <i>Degraded Visual Environment</i>	-	0.000	8.272	14.742	-	14.742	17.579	18.442	19.999	22.656	0.000	101.690
VU3: <i>Networking And Mission Planning</i>	-	54.117	0.966	0.803	-	0.803	0.816	0.837	2.141	3.674	0.000	63.354

**A. Mission Description and Budget Item Justification**

The Fiscal Year (FY) 2019 budget estimate request funds the development of Aircraft Avionics systems required to horizontally and vertically integrate the battlefield and the integration of those systems into Army aircraft. Tasks in this Program Element support research, development, and test efforts in the Engineering and Manufacturing Development phases of these systems.

The Doppler Global Positioning System Navigation Set (DGNS) Upgrade program completes system engineering trade studies to reduce space, weight, and power with the introduction of new navigation support capabilities such as inertial sensor, MIL-STD-1553 interface card, and Instrument Flight Rules map display. It also prepares Engineering Change Proposals (ECP) to the existing DGNS ASN-128D Line Replaceable Units (LRU) as a result of those trade studies. The DGNS upgrade continues with execution of Non-Recurring Engineering for Computer Display Unit (CDU) and Signal Data Converter LRU ECP packages. The ASN-128D CDU upgrade replaces the current CDU faceplate with a touch screen display, provides a moving navigation map capability and optimizes pilot interface to augment existing Instrument Flight Rules capability promoting safer flight operations. The CDU upgrade will support Assured-Position Navigation and Timing (A-PNT) operations in conjunction with additional system LRU upgrades, includes anti-jam antenna capabilities, and supports Department of Defense (DoD) and Army's requirement to maintain A-PNT throughout operations. This will require assessment and follow-on upgrade to the DGNS navigation system. The CDU upgrade will perform an assessment of A-PNT assurance levels to understand system performance and associated PNT capability gaps, and will evaluate candidate solutions to cover any identified gaps.

The Enhanced Aviation GATM Localizer Performance with Vertical Guidance (LPV) Embedded GPS Inertial (EGI) Navigation System (EAGLE) A-PNT integration program assesses current capabilities in identified operational PNT environment levels, tests identified upgrades to existing EGI hardware in order to accommodate A-PNT in identified operational environments, and incorporates M-Code. It supports DoD and Army's requirement to maintain A-PNT throughout operations and requires assessment and follow-on upgrade to the EGI navigation system. The EAGLE upgrade will perform an assessment of A-PNT assurance levels to understand system performance, associated PNT capability gaps, integrate anti-jam antenna capabilities, and evaluate candidate solutions to cover any identified gaps.

The Degraded Visual Environment (DVE) Increment I program increases survivability due to DVE brownout conditions encountered during takeoff and landing. The DVE Increment I program is equally applicable to training scenarios as well as tactical operations. DVE Increment I will combine sensor(s) technology with critical aircraft flight information (aircraft state data) to provide an initial capability that increases aircrew awareness through detection and warning of hazardous terrain and obstacles. DVE

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / <i>Aircraft Avionics</i>
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Increment I improves safety, reduces risk, and maximizes flexibility for Aviation units. DVE Increment I activities include development, system testing, qualification, and aircraft integration.

The DVE Quick Reaction Capability (QRC) is an Army Directed Requirement (DR) to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE QRC DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities pursued within the DVE Increment I program of record. The DVE QRC DR provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions.

The Aviation Data Exploitation Capability (ADEC) is an Army aviation automated information system program providing specific capabilities needed at the aviation unit level to implement and support improvements within aviation operations, safety, and training to increase operational effectiveness and situational awareness at all command echelons. ADEC provides a common and interoperable capability required to implement the DoD mandated Military Flight Operations Quality Assurance processes. ADEC will standardize flight scheduling/management, risk management, mission approval, and flight data analysis and visualization. ADEC provides interfaces to Centralized Aviation Flight Records System (CAFRS) to reduce data entry and the information technology footprint while enabling disconnected and split based operations.

The Improved Data Modem (IDM) provides digital connectivity among airborne and ground platforms and transmission of air-to-air target data between IDM equipped aircraft using existing radio and crypto equipment. IDM new software architecture will incorporate the ability to host IDM functionality on hardware that meets the minimum requirements to run the IDM Operating Flight Program. These efforts will include development and testing of that capability, as well as any documentation required to ensure Government Purpose rights to the new software.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	83.248	30.153	76.576	-	76.576
Current President's Budget	54.915	30.153	32.293	-	32.293
Total Adjustments	-28.333	0.000	-44.283	-	-44.283
• Congressional General Reductions	-0.029	-			
• Congressional Directed Reductions	-21.000	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-5.000	-			
• SBIR/STTR Transfer	-2.304	-			
• Adjustments to Budget Years	-	-	-44.283	-	-44.283

**Change Summary Explanation**

FY17 reflects a Congressional decrement of -\$21.000 million for excess DVE product development funding, a reprogramming of -\$5.000 million to settle a PM Advanced Scout Helicopter cancelled account contractor bill, and a decrement of -\$0.029 million Congressional general reduction for FFRDC.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army Date: February 2018

**Appropriation/Budget Activity**  
2040: *Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)*

**R-1 Program Element (Number/Name)**  
PE 0604201A / *Aircraft Avionics*

FY19 reflects multiple adjustments to funding as follows: HQDA realignments to other programs (-\$42.028 million), realignment of reimbursable manpower funding to direct manpower funding (-\$3.072 million), and realignment of funding to support Comms, Nav and Surveillance efforts (+\$0.803 million) and Aviation Network and Mission Planning efforts (+\$0.014 million).

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics				<b>Project (Number/Name)</b> C97 / ACFT Avionics			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
C97: ACFT Avionics	-	0.798	20.915	16.748	-	16.748	7.187	5.824	5.470	3.228	0.000	60.170
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Fiscal Year (FY) 2018 budget request funds the development of Aircraft Avionics systems required to horizontally and vertically integrate the battlefield and the integration of those systems into Army aircraft. Tasks in this Project support research, development, and test efforts in the Engineering and Manufacturing Development phases of these systems.

The Doppler Global Positioning System Navigation Set (DGNS) Upgrade program completes system engineering trade studies to reduce space, weight, and power with the introduction of new navigation support capabilities such as inertial sensor, MIL-STD-1553 interface card, and Instrument Flight Rules map display. It also prepares Engineering Change Proposals (ECP) to the existing DGNS ASN-128D Line Replaceable Units (LRU) as a result of those trade studies. The DGNS upgrade continues with execution of Non-Recurring Engineering for Computer Display Unit (CDU) and Signal Data Converter LRU ECP packages. The ASN-128D CDU upgrade replaces the current CDU faceplate with a touch screen display, provides a moving navigation map capability and optimizes pilot interface to augment existing Instrument Flight Rules capability promoting safer flight operations. The CDU upgrade will support Assured-Position Navigation and Timing (A-PNT) operations in conjunction with additional system LRU upgrades, includes anti-jam antenna capabilities, and supports Department of Defense (DoD) and Army's requirement to maintain A-PNT throughout operations. This will require assessment and follow-on upgrade to the DGNS navigation system. The CDU upgrade will perform an assessment of A-PNT assurance levels to understand system performance and associated PNT capability gaps, and will evaluate candidate solutions to cover any identified gaps.

The Enhanced Aviation GATM Localizer Performance with Vertical Guidance (LPV) Embedded Global Positioning System (GPS) Inertial (EGI) Navigation System (EAGLE) A-PNT integration program assesses current capabilities in identified operational PNT environment levels, tests identified upgrades to existing EGI hardware in order to accommodate A-PNT in identified operational environments, and incorporates M-Code. It supports DoD and Army's requirement to maintain A-PNT throughout operations and requires assessment and follow-on upgrade to the EGI navigation system. The EAGLE upgrade will perform an assessment of A-PNT assurance levels to understand system performance, associated PNT capability gaps, integrate anti-jam antenna capabilities, and evaluate candidate solutions to cover any identified gaps.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> DGNS / A-PNT Assessment	0.399	6.310	8.081
<b>Description:</b> The DGNS Upgrade program completes system engineering trade studies to reduce space, weight, and power with the introduction of new navigation support capabilities such as inertial sensor, MIL-STD-1553 interface card, and Instrument Flight Rules (IFR) map display. It also prepares ECPs to the existing DGNS ASN-128D LRU as a result of those trade studies. The DGNS upgrade continues with execution of Non-Recurring Engineering for CDU and Signal Data Converter LRU ECP packages. The ASN-128D CDU Upgrade replaces the current CDU faceplate with a touch screen display, provides a moving navigation map			



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> C97 / ACFT Avionics		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>capability and optimized pilot interface to augment existing IFR capability and promote safer flight operations. It also enables CDU support for A-PNT operations in conjunction with additional system LRU upgrades, including anti-jam antenna capabilities.</p> <p><b>FY 2018 Plans:</b> Complete assessments and feasibility studies performed on the DGNS CDU to determine upgrades needed to meet A-PNT requirements and begin executing hardware and software upgrades identified in the completed assessment. Begin software modifications to legacy GPS receiver cards to include Resiliency Software Assurance Modification (RSAM) and continues GPS anti-jam antenna development and integration.</p> <p><b>FY 2019 Plans:</b> Complete software modifications to legacy GPS receiver cards to include RSAM and complete GPS anti-jam antenna development and integration.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> The majority of the non-recurring engineering work for RSAM and GPS anti-jam antenna development will occur in FY 2018; the funding in FY 2019 increases due to contractor labor associated with meeting DO-178C Level B Software Documentation requirements, which will increase significantly as development efforts culminate.</p>				
<p><b>Title:</b> EAGLE Navigation System A-PNT Integration</p> <p><b>Description:</b> The EAGLE Navigation System A-PNT integration program assesses current capabilities in identified operational PNT environment levels and tests identified upgrades to existing EGI hardware to accommodate A-PNT in identified operational environments.</p> <p><b>FY 2018 Plans:</b> Complete assessments and feasibility studies performed on the EGI and EAGLE equipment to determine upgrades needed to meet A-PNT requirements, begin executing hardware and software upgrades identified in the completed assessment, and begin to incorporate M-Code. Continue software modifications to legacy GPS receiver cards to include RSAM and continues GPS anti-jam antenna development and integration.</p> <p><b>FY 2019 Plans:</b> Complete software modifications to legacy GPS receiver cards, continue M-Code integration into the EAGLE, and complete the development and integration of a GPS anti-jam antenna.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b></p>		0.399	14.605	8.667

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> C97 / ACFT Avionics
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**B. Accomplishments/Planned Programs (\$ in Millions)**

The majority of the non-recurring engineering work for M-Code integration, RSAM, and GPS anti-jam antenna development will occur in FY 2018; the funding in FY 2019 decreases due to the majority of the work being passed through the prime to the GPS card developer for M-Code Integration resulting in front loaded funding awarded primarily in FY18.	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Accomplishments/Planned Programs Subtotals</b>	0.798	20.915	16.748

**C. Other Program Funding Summary (\$ in Millions)**

<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• AA0723: COMMS, NAV Surveillance	76.960	170.339	161.969	-	161.969	136.972	151.556	189.090	185.259	Continuing	Continuing
• AA0704: GATM Rotary Wing	45.302	37.403	26.848	-	26.848	41.433	35.306	16.336	15.795	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

This project is comprised of multiple systems supporting aircraft avionics. While the detailed acquisition strategy varies from program to program, the general strategy is for each individual program to complete the development and testing efforts in coordination with the aircraft platforms on integration issues, use the various contracts of the aircraft platforms original equipment manufacturers on integration efforts, and utilize the Aviation & Missile Research, Development, and Engineering Center for software development. This requires the use of various contract methods and types to accomplish the aircraft avionics development efforts. All required acquisition program documentation is prepared.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> C97 / ACFT Avionics
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PM Services (EAGLE)	Various	PM AME/AMRDEC SED : Redstone Arsenal, AL	-	0.007	Oct 2016	0.583	Oct 2017	0.212	Mar 2019	-		0.212	0.000	0.802	-
PM Services (DGNS Upgrade/ DGNS A-PNT)	Various	PM AME/AMRDEC SED : Redstone Arsenal, AL	0.619	0.007	Oct 2016	0.577	Oct 2017	0.212	Mar 2019	-		0.212	0.000	1.415	-
<b>Subtotal</b>			0.619	0.014		1.160		0.424		-		0.424	0.000	2.217	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DGNS A-PNT Assessment and Upgrade	SS/CPFF	BAE Systems : Wayne, NJ	-	-		5.527	Feb 2018	7.544	Feb 2019	-		7.544	Continuing	Continuing	Continuing
EGI/EAGLE A-PNT Assessment and Upgrade/ M-Code Integration	SS/CPFF	Honeywell : Clearwater, FL	-	-		14.028	Feb 2018	7.355	Feb 2019	-		7.355	Continuing	Continuing	Continuing
DGNS Anti-Jam Antenna Development	SS/CPFF	Mayflower Communications, Inc. : Bedford, MA	0.589	0.392	Aug 2017	0.200	Jan 2018	0.075	Jan 2019	-		0.075	0.000	1.256	-
EGI Anti-Jam Antenna Development	SS/CPFF	Mayflower Communications, Inc. : Bedford, MA	-	0.392	Aug 2017	-		0.100	Jan 2019	-		0.100	0.000	0.492	-
<b>Subtotal</b>			0.589	0.784		19.755		15.074		-		15.074	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EAGLE M-Code / EGI RSAM Flight Test Support	MIPR	AMRDEC Aviation Engineering Directorate : Redstone Arsenal, AL	-	-		-		0.625	Nov 2018	-		0.625	0.000	0.625	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> C97 / ACFT Avionics
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DGNS RSAM Flight Test Support	MIPR	AMRDEC Aviation Engineering Directorate : Redstone Arsenal, AL	-	-		-		0.125	Nov 2018	-		0.125	0.000	0.125	-
<b>Subtotal</b>			-	-		-		0.750		-		0.750	0.000	0.750	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EAGLE M-Code / EGI RSAM Airworthiness Qualification Testing	Various	Redstone Test Center : Redstone Arsenal, AL	-	-		-		0.375	Nov 2018	-		0.375	0.000	0.375	-
DGNS RSAM Airworthiness Qualification Testing	Various	Redstone Test Center : Redstone Arsenal, AL	-	-		-		0.125	Nov 2018	-		0.125	0.000	0.125	-
<b>Subtotal</b>			-	-		-		0.500		-		0.500	0.000	0.500	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
<b>Project Cost Totals</b>		1.208	0.798	20.915	16.748	-	16.748	Continuing	Continuing	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> C97 / ACFT Avionics
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Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
DGNS AN/ASN-128D A-PNT Assessment and Upgrade																												
DGNS Anti-Jam Antenna Development																												
EGI/EAGLE A-PNT Assessment and Upgrade/ M-Code Integration																												
EGI/EAGLE Anti-Jam Antenna Development																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / <i>Aircraft Avionics</i>	<b>Project (Number/Name)</b> C97 / <i>ACFT Avionics</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
DGNS AN/ASN-128D A-PNT Assessment and Upgrade	2	2018	4	2020
DGNS Anti-Jam Antenna Development	4	2016	4	2019
EGI/EAGLE A-PNT Assessment and Upgrade/ M-Code Integration	2	2018	2	2021
EGI/EAGLE Anti-Jam Antenna Development	4	2016	4	2019
AMF-A Antenna Development and Co-Site Analysis	2	2011	4	2016

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> EW7 / Degraded Visual Environment
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
EW7: <i>Degraded Visual Environment</i>	-	0.000	8.272	14.742	-	14.742	17.579	18.442	19.999	22.656	0.000	101.690
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Funding for the Degraded Visual Environment (DVE) program was previously included in PE 0604201A, Aircraft Avionics/Project VU3, Networking and Mission Planning.

**A. Mission Description and Budget Item Justification**

The Fiscal Year (FY) 2019 budget request funds the Degraded Visual Environment (DVE) Quick Reaction Capability (QRC) Directed Requirement (DR) and the DVE Increment I program. DVE QRC DR activity includes the development, system testing, qualification, integration, and installation of a DVE system on Army aircraft to support an operational test event.

The DVE Quick Reaction Capability (QRC) is an Army Directed Requirement (DR) to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE QRC DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities pursued within the DVE Increment I program of record. The DVE QRC DR provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions.

The Degraded Visual Environment (DVE) Increment I program increases survivability due to DVE brownout conditions encountered during takeoff and landing. The DVE Increment I program is equally applicable to training scenarios as well as tactical operations. DVE Increment I will combine sensor(s) technology with critical aircraft flight information (aircraft state data) to provide an initial capability that increases aircrew awareness through detection and warning of hazardous terrain and obstacles. DVE Increment I improves safety, reduces risk, and maximizes flexibility for Aviation units. DVE Increment I activities include development, system testing, qualification, and aircraft integration.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019
<b>Title:</b> DVE	-	8.272	14.742
<b>Description:</b> The Degraded Visual Environment (DVE) Increment I program increases survivability due to DVE brownout conditions encountered during takeoff and landing. The DVE Increment I program is equally applicable to training scenarios as well as tactical operations. DVE Increment I will combine sensor(s) technology with critical aircraft flight information (aircraft state data) to provide an initial capability that increases aircrew awareness through detection and warning of hazardous terrain and obstacles. DVE Increment I improves safety, reduces risk, and maximizes flexibility for Aviation units. DVE Increment I activities include development, system testing, qualification, and aircraft integration.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> EW7 / Degraded Visual Environment

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>The DVE Quick Reaction Capability (QRC) is an Army Directed Requirement (DR) to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE QRC DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities pursued within the DVE Increment I program of record. The DVE QRC DR provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions.</p> <p><b>FY 2018 Plans:</b> Develop program documentation, perform system modeling and simulation activities, and continue the development of integration Modification Work Order procedures for integration onto the UH/HH-60M and CH-47F.</p> <p><b>FY 2019 Plans:</b> Develop program documentation, perform system modeling and simulation activities, conduct trade studies and develop software to interface system with UH-60/HH-60M and CH-47F. Continue the development of integration Modification Work Order procedures for integration onto the UH/HH-60M and CH-47F.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> DVE funding increase is due to 2019 Milestone B Decision with follow on development contract award.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	-	8.272	14.742

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• A00713: Degraded Visual Environmnet	-	-	30.000	-	30.000	-	-	-	-	0.000	30.000

**Remarks**

**D. Acquisition Strategy**

The DVE QRC DR acquisition strategy is to leverage an existing contract competitively awarded by the Technology Applications Program Office. An Other Government Agency will perform the installation of the DVE QRC DR system into the designated aircraft. A disposition analysis of the DVE QRC DR will inform the DVE Increment I acquisition strategy. The DVE Increment I acquisition strategy is to leverage the DVE QRC DR materiel solution for installation onto additional aircraft.

**E. Performance Metrics**

N/A



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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604201A / Aircraft Avionics				EW7 / Degraded Visual Environment								
<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
PM Support	Various	Various : Various	-	-		6.100		-		-		-	Continuing	Continuing	Continuing	
<b>Subtotal</b>			-	-		6.100		-		-		-	Continuing	Continuing	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Develop and qualify the software and hardware for DVE	Various	Various : Various	-	-		-		11.238	Jul 2019	-		11.238	Continuing	Continuing	Continuing	
<b>Subtotal</b>			-	-		-		11.238		-		11.238	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
System Engineering, Logistics and Technical Support	Various	Various : Various	-	-		2.172	Jun 2018	3.145	Jul 2019	-		3.145	Continuing	Continuing	Continuing	
<b>Subtotal</b>			-	-		2.172		3.145		-		3.145	Continuing	Continuing	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
DVE	Various	Various : Various	-	-		-		0.359	Jul 2019	-		0.359	0.000	0.359	-	
<b>Subtotal</b>			-	-		-		0.359		-		0.359	0.000	0.359	N/A	
<b>Project Cost Totals</b>			-	-		8.272		14.742		-		14.742	Continuing	Continuing	N/A	

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / <i>Aircraft Avionics</i>	<b>Project (Number/Name)</b> EW7 / <i>Degraded Visual Environment</i>
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
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**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> EW7 / Degraded Visual Environment
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Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Degraded Visual Environment Increment I (DVE INC I)																																
Milestone B (DVE INC I)																																
Milestone C (DVE INC I)																																
Degraded Visual Environment Quick Reaction Capability (DVE QRC)																																
Critical Design Review																																
Operational Test																																
Production Decision																																
Degraded Visual Environment Increment II (DVE INC II)																																

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> EW7 / Degraded Visual Environment
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Degraded Visual Environment Increment I (DVE INC I)	1	2018	4	2022
Milestone B (DVE INC I)	2	2019	2	2019
Milestone C (DVE INC I)	3	2022	3	2022
Degraded Visual Environment Quick Reaction Capability (DVE QRC)	3	2017	3	2019
Critical Design Review	2	2018	2	2018
Operational Test	2	2019	2	2019
Production Decision	3	2019	3	2019
Degraded Visual Environment Increment II (DVE INC II)	1	2023	4	2023

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> VU3 / Networking And Mission Planning
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
VU3: <i>Networking And Mission Planning</i>	-	54.117	0.966	0.803	-	0.803	0.816	0.837	2.141	3.674	0.000	63.354
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Funding for the Degraded Visual Environment (DVE) program has been moved to PE 0604201A, Aircraft Avionics/Project EW7, Degraded Visual Environment, beginning in FY18.

**A. Mission Description and Budget Item Justification**

The Fiscal Year (FY) 2019 budget estimate submission request funds the development of Networking and Mission Planning systems required to horizontally and vertically integrate the battlefield and the integration of those systems into Army aircraft. Tasks in this Program Element Support research, development, and test efforts in the Engineering and Manufacturing Development phases of these systems.

The DVE Quick Reaction Capability (QRC) is an Army Directed Requirement (DR) to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE QRC DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities pursued within the DVE Increment I program of record. The DVE QRC DR provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions.

The Degraded Visual Environment (DVE) Increment I program increases survivability due to DVE brownout conditions encountered during takeoff and landing. The DVE Increment I program is equally applicable to training scenarios as well as tactical operations. DVE Increment I will combine sensor(s) technology with critical aircraft flight information (aircraft state data) to provide an initial capability that increases aircrew awareness through detection and warning of hazardous terrain and obstacles. DVE Increment I improves safety, reduces risk, and maximizes flexibility for Aviation units. DVE Increment I activities include development, system testing, qualification, and aircraft integration.

The Aviation Data Exploitation Capability (ADEC) is an Army aviation automated information system program providing specific capabilities needed at the aviation unit level to implement and support improvements within aviation operations, safety, and training to increase operational effectiveness and situational awareness at all command echelons. ADEC provides a common and interoperable capability required to implement the DoD mandated Military Flight Operations Quality Assurance processes. ADEC will standardize flight scheduling/management, risk management, mission approval, and flight data analysis and visualization. ADEC provides interfaces to Centralized Aviation Flight Records System (CAFRS) to reduce data entry and the information technology footprint while enabling disconnected and split based operations.

The Improved Data Modem (IDM) provides digital connectivity among airborne and ground platforms and transmission of air-to-air target data between IDM equipped aircraft using existing radio and crypto equipment. IDM new software architecture will incorporate the ability to host IDM functionality on hardware that meets the

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> VU3 / Networking And Mission Planning		
minimum requirements to run the IDM Operating Flight Program. These efforts will include development and testing of that capability, as well as any documentation required to ensure Government Purpose rights to the new software.				
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p><b>Title:</b> DVE</p> <p><b>Description:</b> The DVE Quick Reaction Capability (QRC) is an Army Directed Requirement (DR) to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE QRC DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities pursued within the DVE Increment I program of record. The DVE QRC DR provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions.</p> <p>The Degraded Visual Environment (DVE) Increment I program increases survivability due to DVE brownout conditions encountered during takeoff and landing. The DVE Increment I program is equally applicable to training scenarios as well as tactical operations. DVE Increment I will combine sensor(s) technology with critical aircraft flight information (aircraft state data) to provide an initial capability that increases aircrew awareness through detection and warning of hazardous terrain and obstacles. DVE Increment I improves safety, reduces risk, and maximizes flexibility for Aviation units. DVE Increment I activities include development, system testing, qualification, and aircraft integration.</p>		49.183	-	-
<p><b>Title:</b> Aviation Data Exploitation Capability (ADEC)</p> <p><b>Description:</b> The ADEC is an Army aviation automated information system program providing specific capabilities needed at the aviation unit level to implement and support improvements within aviation operations, safety, and training to increase operational effectiveness and situational awareness at all command echelons. ADEC provides a common and interoperable capability required to implement the DoD mandated Military Flight Operations Quality Assurance processes. ADEC will standardize flight scheduling/management, risk management, mission approval, and flight data analysis and visualization. ADEC provides interfaces to CAFRS to reduce data entry and the information technology footprint while enabling disconnected and split based operations.</p>		4.934	-	-
<p><b>Title:</b> Improved Data Modem</p> <p><b>Description:</b> The Improved Data Modem (IDM) provides digital connectivity among airborne and ground platforms and transmission of air-to-air target data between IDM equipped aircraft using existing radio and crypto equipment.</p> <p><b>FY 2018 Plans:</b> Develop new software architecture that will incorporate the ability to host IDM functionality on any hardware that meets the minimum requirements to run the IDM Operating Flight Program. Efforts include the development and testing of that capability, as well as any documentation required to ensure Government Purpose rights to the new software.</p> <p><b>FY 2019 Plans:</b></p>		-	0.966	0.803

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> VU3 / Networking And Mission Planning
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019
Continue development of new software architecture that will incorporate the ability to host IDM functionality on any hardware that meets the minimum requirements to run the IDM Operating Flight Program. Efforts include the development and testing of that capability, as well as any documentation required to ensure Government Purpose rights to the new software.			
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> IDM's decrease in RDTE from FY18 to FY19 can be attributed to the collaborative efforts between ANMP and other stakeholders. This collaboration has led to the software architectural refinement, resulting in a forecasted decrease in cost due for IDM.			
<b>Accomplishments/Planned Programs Subtotals</b>	54.117	0.966	0.803

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• AA0712: Network And Mission Plan	74.752	142.102	123.614	-	123.614	98.605	96.165	93.961	94.031	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**  
This project is comprised of multiple systems supporting aircraft avionics. While the detailed acquisition strategy varies from program to program, the general strategy is for each individual program to complete the development and testing efforts in coordination with the aircraft platforms on integration issues, use the various contracts of the aircraft platforms original equipment manufacturers on integration efforts, and utilize the Aviation & Missile Research, Development, and Engineering Center for software development. The DVE QRC DR acquisition strategy is to leverage an existing contract competitively awarded by the Technology Applications Program Office. An Other Government Agency will perform the installation of the DVE QRC DR system into the designated aircraft. A disposition analysis of the DVE QRC DR will inform the DVE Increment I acquisition strategy. The DVE Increment I acquisition strategy is to leverage the DVE QRC DR materiel solution for installation onto additional aircraft.

**E. Performance Metrics**  
N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> VU3 / Networking And Mission Planning
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PM Support (DVE)	Various	Program Manager DVE/BORES : Redstone Arsenal, AL	6.958	12.173	Oct 2016	-		-		-		-	0.000	19.131	-
System Engineering, Logistic, and Technical Support (IDM)	Various	PM ANMP : Redstone Arsenal, AL	-	-		0.053	Oct 2017	0.036	Oct 2018	-		0.036	0.000	0.089	-
<b>Subtotal</b>			6.958	12.173		0.053		0.036		-		0.036	0.000	19.220	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Develop and qualify the software and hardware for DVE	C/Various	Various : Various	8.938	31.266	Mar 2017	-		-		-		-	0.000	40.204	-
Qualify ADEC software and hardware	Various	Aviation Missile Research Development Engineering Center (AMRDEC) : Redstone Arsenal, AL	13.086	4.302	May 2017	-		-		-		-	0.000	17.388	-
Develop software for IDM	C/Various	Aviation Missile Research Development Engineering Center (AMRDEC) : Redstone Arsenal, AL	-	-		0.913	Feb 2018	0.767	Mar 2019	-		0.767	Continuing	Continuing	Continuing
<b>Subtotal</b>			22.024	35.568		0.913		0.767		-		0.767	Continuing	Continuing	N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> VU3 / Networking And Mission Planning
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Engineering, Logistics, and Technical Support (DVE)	Various	Various : Various	6.343	4.988	Sep 2017	-		-		-		-	0.000	11.331	-
System Engineering, Logistics, and Technical Support (ADEC)	Various	Army Test & Evaluation (ATEC), Aberdeen, MD; AMRDEC : Redstone Arsenal, AL	1.193	-		-		-		-		-	0.000	1.193	-
<b>Subtotal</b>			7.536	4.988		-		-		-		-	0.000	12.524	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DVE	Various	Various : Various	36.909	0.756	Sep 2017	-		-		-		-	0.000	37.665	-
ADEC	Various	Army Test & Evaluation Command (ATEC), Aberdeen MD; AMRDEC : Redstone Arsenal, AL	3.957	0.632	Jul 2017	-		-		-		-	0.000	4.589	-
<b>Subtotal</b>			40.866	1.388		-		-		-		-	0.000	42.254	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	77.384	54.117	0.966	0.803	-	0.803	Continuing	Continuing	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> VU3 / Networking And Mission Planning
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Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Degraded Visual Environment (DVE)					1																							
Develop hardware and software (ADEC)																												
Limited Deployment Decision (ADEC)																												
Develop software (IDM)																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> VU3 / Networking And Mission Planning
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Degraded Visual Environment (DVE)	4	2011	4	2017
Develop hardware and software (ADEC)	2	2011	1	2018
Limited Deployment Decision (ADEC)	2	2018	2	2018
Develop software (IDM)	1	2018	4	2023

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	33.419	71.671	78.699	-	78.699	88.746	63.780	37.514	18.265	0.000	392.094
<i>DX5: Electronic Warfare And Management Tool</i>	-	20.704	33.120	20.187	-	20.187	23.541	8.280	6.984	2.023	0.000	114.839
<i>DX6: Multi-Function Electronic Warfare (MFEW)</i>	-	1.359	24.310	44.611	-	44.611	47.964	41.241	22.802	13.587	0.000	195.874
<i>ET7: Radio Frequency Interference Mitigation</i>	-	3.992	4.454	6.247	-	6.247	5.759	4.472	2.607	2.655	0.000	30.186
<i>VS6: Integrated Electronic Warfare Systems</i>	-	7.364	9.787	7.654	-	7.654	11.482	9.787	5.121	0.000	0.000	51.195

**A. Mission Description and Budget Item Justification**

This program element (PE) encompasses engineering and manufacturing development for tactical Electronic Warfare (EW). The Integrated Electronic Warfare System (IEW) is a capability set that integrates electronic attack, protect and support functions to dramatically improve the ability to seize, retain, and exploit an advantage within the electromagnetic spectrum (EMS). It is based on a modular, scalable and open architecture to allow Army Brigade Combat Team (BCT) and Joint Force Commander's to tailor capability responses against a variety of EW threats/scenarios.

The IEWS capability set is structured along four program lines of effort: 1) Project DX5 Electronic Warfare Planning and Management Tools (EWPMT), 2) Project DX6 Multi-Function EW (MFEW), 3) Project VS6 Counter Radio-Controlled Improvised Explosive Devices (RCIED) Electronic Warfare (CREW) which provides current defensive electronic attack capability, and 4) Project ET7 Radio Frequency Interference Mitigation (RIM) which resolves radio frequency interference and electromagnetic fratricide and enables electronic warfare and communications compatibility.

Project DX5 - EWPMT will provide the Electronic Warfare Officer (EWO) planning capabilities to coordinate, manage, and deconflict the use of the Electromagnetic Spectrum and synchronize spectrum operations within the Cyber Electromagnetic Activities (CEMA) cell. EWPMT will integrate data elements from Mission Command, Intelligence, and Fires to achieve a Common Operating Picture (COP) of the Electromagnetic Operational Environment.

Project DX6 - The Multi-Function EW (MFEW) is a capability set that will provide the BCT Commander with an organic Electronic Attack (EA) and Electronic Warfare Support (ES) capability. MFEW variants empower Commanders to shape the Electromagnetic Spectrum (EMS) to their advantage. MFEW will provide commanders from BCT to CORPS with an organic EW capability that dramatically improves a land force's ability to seize, retain, and exploit an advantage within the EMS in order to execute successful unified land operations. These capabilities give the commander a competitive advantage by denying, degrading the enemy's ability to conduct Command and Control (C2), Intelligence, Surveillance and Reconnaissance (ISR), and targeting; and allows the commander to optimize effects within the EMS at the time and place of their choosing. These systems are networked with a C2 system that enables remote operation and dynamic tasking/reprogramming.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>
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Project ET7 - Radio Frequency Interference Mitigation (RIM) is a cross cutting capability to centrally manage and provide oversight to identify, define, test, and coordinate development of Radio Frequency (RF) interference mitigation material solutions to resolve mutual RF interference and electromagnetic fratricide for Spectrum Dependent Systems (SDS).

Project VS6 - Counter Radio Controlled Improvised Explosive Device (RCIED) Electronic Warfare (CREW) provides for protection for ground forces operating in vehicle convoys, single vehicle operations and fixed locations in all theatres of operations. It is programmable to migrate with the evolving threat and provides non-lethal capabilities which enable freedom of movement across depth/breadth of the operational environment.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	37.242	71.671	81.511	-	81.511
Current President's Budget	33.419	71.671	78.699	-	78.699
Total Adjustments	-3.823	0.000	-2.812	-	-2.812
• Congressional General Reductions	-0.015	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.208	-			
• Adjustments to Budget Years	-	-	-2.812	-	-2.812
• RAA not appropriated	-2.600	-	-	-	-

**Change Summary Explanation**

In FY 2019, \$.947 million was realigned to Operations and Maintenance, Army (OMA) for manpower.  
The FY 2019 funding request was reduced by \$1.865 million to account for the availability of prior year execution balances.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>				<b>Project (Number/Name)</b> DX5 / <i>Electronic Warfare And Management Tool</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
<i>DX5: Electronic Warfare And Management Tool</i>	-	20.704	33.120	20.187	-	20.187	23.541	8.280	6.984	2.023	0.000	114.839
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Electronic Warfare Planning and Management Tool (EWPMT) will provide the Commander, his staff (Electronic Warfare Officer (EWO) and Spectrum Manager), and the Cyber Electromagnetic Activities (CEMA) working group/cell the ability to control and manage the Electromagnetic Spectrum (EMS). EWPMT will provide: capabilities to plan, coordinate, manage, and de-conflict Electronic Warfare (EW) activities, the ability to employ assets to conduct offensive and defensive Electronic Attack, EW targeting, enable maneuver through CEMA operations and synchronize EW, Spectrum Management Operations (SMO) and CEMA across Intelligence, Operations, and Signals. EWPMT will integrate essential data elements from Mission Command, Intelligence, Fires, Signals to successfully execute a Multi-Domain battle and meet the Commander's needs and desired effects.

Justification:  
FY 2019 funds in the amount of \$20.187 million will continue Capability Drop 3 (CD3) development, test and support activities, as well as begin CD4 initial development for the EWPMT program.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> EWPMT	20.704	33.120	20.187
<b>Description:</b> EWPMT is a suite of software tools and applications that will allow the Commander and staff a mission command capability to plan, coordinate, manage, and de-conflict unit EW and spectrum management activities.			
<b>FY 2018 Plans:</b> Complete CD2 development, test and support activities Award CD3 development, test and support activities			
<b>FY 2019 Plans:</b> Continue CD3 development, test and support activities Award CD4 development, test and support activities			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> A decrease of \$12,933K was due to a higher Development cost in FY18 due to the CD3 Cyber Situational Understanding development.			
<b>Accomplishments/Planned Programs Subtotals</b>	20.704	33.120	20.187

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX5 / <i>Electronic Warfare And Management Tool</i>

**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Cost To	
			Base	OCO	Total					Complete	Total Cost
• K00002: <i>K00002 - EW Planning &amp; Management Tools (EWPMT)</i>	3.235	5.805	5.947	-	5.947	7.846	8.145	1.000	20.000	Continuing	Continuing

**Remarks**  
EWPMT Fielding Support which includes New Equipment Training (NET); delta training; Interim Contractor Support (ICS); and SETA Support.

**D. Acquisition Strategy**

EWPMT is a Major Automated Information System (MAIS) that will follow an evolutionary acquisition strategy using an Incrementally Deployed Software Intensive Program for rapid development and continuous product improvements. The overall strategy is to deploy software Capability Drops (CDs) to allow an incremental merger of the Electronic Warfare and Spectrum Management software tools.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX5 / <i>Electronic Warfare And Management Tool</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PMO Staff/Travel	Various	PM Electronic Warfare & Cyber : Aberdeen Proving Ground, MD	7.868	2.708	Dec 2016	2.159	Dec 2017	-		-		-	0.000	12.735	-
<b>Subtotal</b>			7.868	2.708		2.159		-		-		-	0.000	12.735	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EMD Contract - EWPMT CD1	C/IDIQ	Raytheon : Fort Wayne, IN	18.200	-		-		-		-		-	0.000	18.200	18.200
EMD Contract - EWPMT CD2	C/IDIQ	Raytheon : Fort Wayne, IN	6.020	12.232	Feb 2017	6.107	Dec 2017	-		-		-	0.000	24.359	24.359
EMD Contract - EWPMT CD3	C/IDIQ	Raytheon : Fort Wayne, IN	-	-		18.020	Apr 2018	13.080	Jan 2019	-		13.080	0.000	31.100	31.100
EMD Contract - EWPMT CD4	C/IDIQ	Raytheon : Fort Wayne, IN	-	-		-		1.869	Jul 2019	-		1.869	15.031	16.900	16.900
<b>Subtotal</b>			24.220	12.232		24.127		14.949		-		14.949	15.031	90.559	N/A

**Remarks**

FY2019 funds in the amount of \$13.080 million will continue CD3 development on the CD3 Task Order to be awarded April 2018.  
 FY2019 funds in the amount of \$1.869 million will begin CD4 initial development on the CD4 Task Order to be awarded July 2019.

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EWPMT Technical and Engineering Support	Allot	Various : Various	16.783	5.038	Dec 2016	3.152	Dec 2017	3.918	Dec 2018	-		3.918	Continuing	Continuing	Continuing
<b>Subtotal</b>			16.783	5.038		3.152		3.918		-		3.918	Continuing	Continuing	N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX5 / <i>Electronic Warfare And Management Tool</i>
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

**Remarks**  
Increase in cost in FY19 account for overlap of CD3 and CD4 development contracts requiring additional manpower.

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EWPMT Test support	MIPR	Various : Various	2.757	0.726	Aug 2017	3.682	Dec 2017	1.320	Mar 2019	-		1.320	Continuing	Continuing	Continuing
<b>Subtotal</b>			2.757	0.726		3.682		1.320		-		1.320	Continuing	Continuing	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	51.628	20.704	33.120	20.187	-	20.187	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX5 / <i>Electronic Warfare And Management Tool</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
EWPMT Contract																													
CD1 Fielding																													
Initial Operational Capability (IOC)	▲ 1																												
Development and Test of CD2																													
Test CD2 (Limited User Test)																													
Limited Deployment Decision of CD2																	▲ 2												
Development and Test of CD3																													
Development and Test of CD4																													

**UNCLASSIFIED**

<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX5 / <i>Electronic Warfare And Management Tool</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
EWPMT Contract	1	2014	4	2022
Development and Test of CD 1	4	2014	3	2016
Test CD 1 (Government Confidence test)	2	2016	2	2016
CD1 Fielding	4	2016	3	2018
Initial Operational Capability (IOC)	1	2017	1	2017
Development and Test of CD2	4	2016	4	2018
Test CD2 (Limited User Test)	3	2018	3	2018
Limited Deployment Decision of CD2	2	2019	2	2019
Development and Test of CD3	3	2018	3	2020
Development and Test of CD4	4	2019	2	2022

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>				<b>Project (Number/Name)</b> DX6 / <i>Multi-Function Electronic Warfare (MFEW)</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
DX6: <i>Multi-Function Electronic Warfare (MFEW)</i>	-	1.359	24.310	44.611	-	44.611	47.964	41.241	22.802	13.587	0.000	195.874
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Multi-Function Electronic Warfare (MFEW) is a capability set that will provide the BCT Commander with an organic offensive Electronic Attack (EA) and Electronic Warfare Support (ES) capability. MFEW variants empower Commanders to shape the Electromagnetic Spectrum (EMS) to their advantage. MFEW will provide commanders with an organic EW capability that dramatically improves a land force's ability to seize, retain, and exploit an advantage within the EMS in order to execute successful unified land operations. These capabilities give the commander a competitive advantage by denying, degrading the enemy's ability to conduct Command and Control (C2), Intelligence, Surveillance and Reconnaissance (ISR), and targeting, and allows the commander to optimize effects within the EMS at the time and place of their choosing. These systems are networked with a C2 system to enable remote operation and dynamic tasking/reprogramming.

MFEW-Air is an airborne payload to be mounted on both manned and unmanned aerial platforms. MFEW-Air is comprised of three variants: Air Large (Class IV Unmanned Aerial Vehicle), Air Small (Class III Unmanned Aerial Vehicle), and manned rotary wing payloads. MFEW-Air will retain the capability to operate independently or integrated with EW systems providing a layered EW approach. This will provide the Commander the ability to detect, identify (ID), locate and place effects on emitters.

Justification:  
FY 2019 Base dollars in the amount of \$44.611 million will support MFEW development activities.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Multi-Function EW (MFEW) Air	1.359	20.259	39.898
<b>Description:</b> MFEW-Air is an airborne Electronic Warfare payload to be integrated onto an Unmanned and manned Aerial Vehicle to provide offensive Electronic Attack (EA) and Electronic Warfare Support (ES) capability to the BCT.			
<b>FY 2018 Plans:</b> MS B decision and Engineering & Manufacturing Development (EMD) activities.			
<b>FY 2019 Plans:</b> MFEW Air Development and Test activities			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX6 / <i>Multi-Function Electronic Warfare (MFEW)</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Increase due to ramp up in Milestone B and EMD activities.				
<b>Title:</b> Other Multi-Function EW (MFEW) variants		-	4.051	4.713
<b>Description:</b> Other MFEW variants risk reduction activities to include regulatory and statutory documentation development.				
<b>FY 2018 Plans:</b> Develop required statutory/regulatory documentation and Request for Proposal (RFP) to support a Milestone decision and EMD activities.				
<b>FY 2019 Plans:</b> Complete documentation for MS B decision and conduct EMD activities.				
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase due to a ramp up of Pre Milestone and EMD activities.				
<b>Accomplishments/Planned Programs Subtotals</b>		1.359	24.310	44.611
<b>C. Other Program Funding Summary (\$ in Millions)</b> N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b> The Multi-Function EW (MFEW) is a capability set that will provide the BCT Commander with an organic offensive Electronic Attack (EA), and Electronic Warfare Support (ES), and Defensive Electronic Attack (DEA) capability. Initially, an air large variant payload will be developed. MFEW will deliver scalable non-lethal effects to support Unified Land Operations and protect personnel, equipment and facilities.  A competitive contract award is planned for MFEW-Air.				
<b>E. Performance Metrics</b> N/A				

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX6 / <i>Multi-Function Electronic Warfare (MFEW)</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Office Support - MFEW Air	TBD	PM Electronic Warfare & Cyber : Aberdeen Proving Ground, MD	-	0.139	Jul 2017	0.936	Jan 2018	0.480	Jan 2019	-		0.480	0.000	1.555	-
Program Management Office Support - Other MFEW Variants	TBD	PM Electronic Warfare & Cyber : Aberdeen Proving Ground, MD	-	-		0.206	Jan 2018	-		-		-	0.000	0.206	-
<b>Subtotal</b>			-	0.139		1.142		0.480		-		0.480	0.000	1.761	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MFEW Development Contract	C/TBD	PM Electronic Warfare & Cyber : Aberdeen Proving Ground, MD	-	-		10.198	Jun 2018	29.508	Jun 2019	-		29.508	0.000	39.706	-
Command and Control Development Contract	MIPR	National Security Agency/Cross Access Geolocation (NSA/XAG) : Ft. Meade, MD	-	0.800	Jul 2017	3.450	Jan 2018	5.425	Jan 2019	-		5.425	0.000	9.675	-
<b>Subtotal</b>			-	0.800		13.648		34.933		-		34.933	0.000	49.381	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Contractor Engineering - MFEW Air	TBD	TBD : Aberdeen Proving Ground, MD	-	-		2.125	Jan 2018	3.225	Jan 2019	-		3.225	0.000	5.350	-
Government Engineering - MFEW Air	MIPR	TBD : Aberdeen Proving Ground, MD	-	0.220	May 2017	2.725	Jan 2018	-		-		-	0.000	2.945	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX6 / <i>Multi-Function Electronic Warfare (MFEW)</i>
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<b>Support (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Technical Support (FFRDC) - MFEW Air	TBD	TBD : Aberdeen Proving Ground, MD	-	0.200	May 2017	0.825	Jan 2018	2.220	Jan 2019	-		2.220	0.000	3.245	-
Contractor Engineering - Other MFEW Variants	TBD	TBD : Aberdeen Proving Ground, MD	-	-		2.088	Jan 2018	-		-		-	0.000	2.088	-
Government Engineering - Other MFEW Variants	MIPR	TBD : Aberdeen Proving Ground, MD	-	-		1.507	Jan 2018	2.960	Jan 2019	-		2.960	0.000	4.467	-
Technical Support - Other MFEW Variants	TBD	TBD : Aberdeen Proving Ground, MD	-	-		0.250	Jan 2018	0.793	Jan 2019	-		0.793	0.000	1.043	-
<b>Subtotal</b>			-	0.420		9.520		9.198		-		9.198	0.000	19.138	N/A

	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	-	1.359	24.310	44.611	-	44.611	0.000	70.280	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX6 / <i>Multi-Function Electronic Warfare (MFEW)</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
MS B Documentation Preparation (Air)																												
Request For Proposal (RFP) Decision Point (Air)					▲ 1																							
Milestone B (Air)									▲ 2																			
MFEW Development (Air)																												
Developmental Test (DT)/Flight Testing (Air)																												
Milestone C (Air)													▲ 3															
Operational Assessment (OA) (Air)													■															
IOTE (Air)																	■											
MFEW Development (Other Variants)																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX6 / <i>Multi-Function Electronic Warfare (MFEW)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MS B Documentation Preparation (Air)	3	2017	3	2018
Request For Proposal (RFP) Decision Point (Air)	1	2018	1	2018
Milestone B (Air)	3	2018	3	2018
MFEW Development (Air)	3	2018	4	2020
Developmental Test (DT)/Flight Testing (Air)	4	2019	1	2022
Milestone C (Air)	4	2020	4	2020
Operational Assessment (OA) (Air)	3	2020	3	2020
IOTE (Air)	1	2021	1	2021
MFEW Development (Other Variants)	3	2018	4	2022

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>				<b>Project (Number/Name)</b> ET7 / <i>Radio Frequency Interference Mitigation</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
<i>ET7: Radio Frequency Interference Mitigation</i>	-	3.992	4.454	6.247	-	6.247	5.759	4.472	2.607	2.655	0.000	30.186
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Radio Frequency Interference Mitigation (RIM) is a cross cutting capability to centrally manage and provide oversight to identify, define, test, and coordinate development of Radio Frequency (RF) interference mitigation material solutions to resolve mutual RF interference and electromagnetic fratricide for Spectrum Dependent Systems (SDS).

Centralized management of RIM offers a holistic approach for identification, system of systems engineering, developmental testing, and maturing of RIM solutions to address current and evolving RF interference issues. User and acquisition communities will synchronize, integrate, and codify RIM requirements to facilitate the cross cutting approach necessary for the efficient procurement of common RIM products. This approach will eliminate the need for separate hardware and platform integration research and development efforts for SDS and platforms. An integrated approach will eliminate the need for separate hardware and platform integration research and development efforts for SDS and platform Program Managers. RIM products are intended to preserve the investment that the Army has made in current Electronic Warfare (EW) and Mission Command Transport SDS and provide a strategy for future efforts for new SDS development with integrated RIM solutions.

**Justification:**

FY 2019 Base funds in the amount of \$6.247 million will provide engineering support activities to continue the development of Interference Cancellation (IC) Light technology and develop the IC Algorithm technology to mitigate interference between Force Protection and Communication systems.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> RF Interference Mitigation	3.992	4.454	6.247
<b>Description:</b> RIM is a System of Systems Enterprise approach that will allow Spectrum Dependent Systems to co-exist with Force Protection assets.			
<b>FY 2018 Plans:</b> Continue IC Light development, award IC Algorithm development, and provide engineering support.			
<b>FY 2019 Plans:</b> Continue IC Light development, continue IC Algorithm development, and provide engineering support.			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> ET7 / <i>Radio Frequency Interference Mitigation</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
An increase of \$1.958 million in FY 2019 is to produce 30 IC Light test assets.			
<b>Accomplishments/Planned Programs Subtotals</b>	3.992	4.454	6.247

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Radio Frequency (RF) Interference Mitigation (RIM) will follow a System of Systems, enterprise strategy to develop and test hardware solutions such as tunable filters, Interference Cancellers (IC) to address RF interference on Army platforms. Designated platforms will procure, integrate and test RIM solutions with their association spectrum dependent systems.

The RIM acquisition strategy shifted focus from tunable filter technology to IC technology. The decision to shift focus from tunable filters to IC technology was a direct result of the S&T community accelerating the technical maturity. IC technology will enhance the warfighters ability to utilize the spectrum compared to tunable filter technology.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604270A / <i>Electronic Warfare Development</i>				ET7 / <i>Radio Frequency Interference Mitigation</i>							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	MIPR	PM Electronic Warfare & Cyber : APG, MD	-	0.298	Jan 2017	0.323	Dec 2017	-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	0.298		0.323		-		-		-	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Development Models	TBD	TBD : TBD	-	2.238	Jun 2017	2.895	Dec 2017	5.011	Dec 2018	-		5.011	Continuing	Continuing	-
<b>Subtotal</b>			-	2.238		2.895		5.011		-		5.011	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	Allot	Various : Various	-	1.456	Mar 2017	1.236	Dec 2017	1.236	Dec 2018	-		1.236	Continuing	Continuing	-
<b>Subtotal</b>			-	1.456		1.236		1.236		-		1.236	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			-	3.992		4.454		6.247		-		6.247	Continuing	Continuing	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> ET7 / <i>Radio Frequency Interference Mitigation</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Development for Interference Cancellation (IC)																												
Developmental Testing (DT) for IC																												
Development for IC Algorithm																												
Developmental Testing for IC Algorithm																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> ET7 / <i>Radio Frequency Interference Mitigation</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Development for Interference Cancellation (IC)	1	2018	2	2019
Developmental Testing (DT) for IC	3	2019	4	2019
Development for IC Algorithm	1	2019	3	2020
Developmental Testing for IC Algorithm	3	2020	4	2020

**UNCLASSIFIED**

**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> VS6 / <i>Integrated Electronic Warfare Systems</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
<i>VS6: Integrated Electronic Warfare Systems</i>	-	7.364	9.787	7.654	-	7.654	11.482	9.787	5.121	0.000	0.000	51.195
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Counter Radio Controlled Improvised Explosive Device (RCIED) Electronic Warfare (CREW) provides for protection for ground forces operating in vehicle convoys, single vehicle operations and fixed locations in all theatres of operations. It is programmable to migrate with the evolving threat and provides non-lethal capabilities which enable freedom of movement across depth/breadth of the operational environment.

Justification: FY 2019 Base dollars in the amount of \$7.654 million continues to support the development of CREW Relevancy technologies.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019
<b>Title:</b> IEWS	7.364	9.787	7.654
<b>Description:</b> The IEW System (IEWS) Systems of Systems (SoS) will consist of Electronic Warfare Planning and Management Tool (EWPMT), Multi-Function EW (MFEW), and Defensive Electronic Attack (DEA).			
<b>FY 2018 Plans:</b> CREW Relevancy: Continue the development and testing of HW/SW solutions for CREW-2 Duke, specifically, development for the Secondary Unit system upgrade.			
<b>FY 2019 Plans:</b> Complete Secondary Unit HW upgrade and continue SW development.			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Ramp down of Secondary Unit system upgrade.			
<b>Accomplishments/Planned Programs Subtotals</b>	7.364	9.787	7.654

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604270A / <i>Electronic Warfare Development</i>	Project (Number/Name) VS6 / <i>Integrated Electronic Warfare Systems</i>

**D. Acquisition Strategy**

CREW Relevancy will provide for the continued growth and conduct of research, development and testing against emerging Radio Controlled Improvised Explosive Device (RCIED) threats. Continuing research, development and testing will allow the technology to remain relevant and responsive to all approved user requirements.

Award five year indefinite delivery indefinite quantity (ID/IQ) contract enables maximum flexibility as technology matures and as the RCIED threat changes. Cost Plus Fixed Fee (CPFF) ID/IQ Task Orders will be awarded throughout the five year effort to address the developing threat with system improvements.

**E. Performance Metrics**

N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> VS6 / <i>Integrated Electronic Warfare Systems</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PMO Staff/Travel for EWPMT	Allot	PM Electronic Warfare & Cyber : Aberdeen Proving Ground, MD	4.956	-		-		-		-		-	0.000	4.956	-
Program and Technical Assistance support	C/CPFF	TBD : Aberdeen Proving Ground, MD	3.789	-		-		-		-		-	0.000	3.789	-
PMO Staff/Travel for CREW	Allot	PM Electronic Warfare & Cyber : Aberdeen Proving Ground, MD	1.659	0.675	Oct 2016	1.070	Jan 2018	0.700	Dec 2018	-		0.700	0.000	4.104	-
<b>Subtotal</b>			10.404	0.675		1.070		0.700		-		0.700	0.000	12.849	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EMD Contract - EWPMT	C/CPIF	SOTERA Defense Solutions Herndon, VA : RAYTHEON Fort Wayne, IN	38.318	-		-		-		-		-	0.000	38.318	-
IEWS Engineering and Development	MIPR	I2WD : Aberdeen MD	5.557	-		-		-		-		-	0.000	5.557	-
Risk Reduction Studies for MFEW	MIPR	Various : Various	7.969	-		-		-		-		-	0.000	7.969	-
Develop CREW H/W and S/W solutions	C/CPFF	SRC, Inc. : Syracuse, NY	7.632	4.062	Feb 2017	5.667	Feb 2018	4.306	Feb 2019	-		4.306	0.000	21.667	-
<b>Subtotal</b>			59.476	4.062		5.667		4.306		-		4.306	0.000	73.511	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> VS6 / <i>Integrated Electronic Warfare Systems</i>
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MFEW Technical/ Engineering Support - Contractor	C/CPFF	GTRI : Atlanta, GA	2.046	-		-		-		-		-	0.000	2.046	-
Government Engineering Support	MIPR	CERDEC : Aberdeen Proving Ground, MD	4.169	-		-		-		-		-	0.000	4.169	-
EWPMT Architecture Study	MIPR	Various : Various	1.194	-		-		-		-		-	0.000	1.194	-
CREW Engineering support	C/CPFF	Various : Various	1.929	1.278	Nov 2016	0.900	Jan 2018	1.230	Jan 2019	-		1.230	0.000	5.337	-
CREW Government Engineering support	MIPR	Various : Various	2.186	0.538	Nov 2016	0.650	Jan 2018	0.638	Jan 2019	-		0.638	0.000	4.012	-
<b>Subtotal</b>			11.524	1.816		1.550		1.868		-		1.868	0.000	16.758	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EWPMT Test support	MIPR	Various : TBD	1.096	-		-		-		-		-	0.000	1.096	-
Operational Assessment (OA) of DV4 systems	MIPR	Yuma Proving Ground : Yuma, AZ	1.950	-		-		-		-		-	0.000	1.950	-
Continuous evaluation of CREW Technologies	MIPR	Yuma Proving Ground Yuma, AZ : YPG, AZ	0.515	0.811	Mar 2017	1.500	Mar 2018	0.780	Mar 2019	-		0.780	0.000	3.606	-
<b>Subtotal</b>			3.561	0.811		1.500		0.780		-		0.780	0.000	6.652	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
<b>Project Cost Totals</b>		84.965	7.364	9.787	7.654	-	7.654	0.000	109.770	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> VS6 / <i>Integrated Electronic Warfare Systems</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Force Protection, Technique Development, and SAASM																												
Secondary Unit Development																												
Improved Interoperability with Comms Systems and Antenna Development																												
Force Protection Assessment			▲ 1																									
Implemented Technique Assessment							▲ 2																					
Secondary Unit-Hardware Assessment											▲ 3																	
Secondary Unit-Software and Implemented Techniques Assessment															▲ 4													
CREW/Comms Interoperability Assessment																							▲ 5					

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> VS6 / <i>Integrated Electronic Warfare Systems</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CREW Relevancy Development Contract Award	2	2016	2	2016
Force Protection, Technique Development, and SAASM	2	2016	2	2018
Secondary Unit Development	2	2018	1	2021
Improved Interoperability with Comms Systems and Antenna Development	1	2021	2	2021
Force Protection Assessment	3	2017	3	2017
Implemented Technique Assessment	3	2018	3	2018
Secondary Unit-Hardware Assessment	3	2019	3	2019
Secondary Unit-Software and Implemented Techniques Assessment	3	2020	3	2020
CREW/Comms Interoperability Assessment	3	2021	3	2021

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	<b>R-1 Program Element (Number/Name)</b> PE 0604290A / Mid-Tier Wideband Networking Vehicular Radio
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	9.363	10.589	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	19.952
DW1: Mid-Tier Wideband Networking Vehicular Radio Mnv	-	9.363	10.589	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	19.952

**Note**

There is currently no funding allocated to MNVR in FY2019.

**A. Mission Description and Budget Item Justification**

The Mid-tier Networking Vehicular Radio (MNVR) enables the extension of data services within the tactical network through seamless integration of the upper and lower tiers; providing software-defined, multi-channel networking radios for a wide variety of Army tactical vehicles to meet the Army's requirement for the Mid-tier Wideband Networking (MWN) capability. The MNVR provides self-forming and self-healing communication networks from the brigade to the platoon level throughout the full range of military operations.

The MNVR, a modified Non-Developmental Item (NDI), supports Army Mission Command operational requirements with a multi-channel, Type 1 (supporting multiple independent levels of security), vehicular mounted radio hosting networking waveforms. The MNVR narrows the data capability gap at the Brigade Combat Team (BCT) company level and provides the capability to build a data extension to the lowest echelons, and then enables the extension of services from the Forward Operating Base (FOB) to the platform. MNVR provides a dynamic, scalable, On-the-Move (OTM) network architecture, connecting the Soldier to the Mission Command (MC) Network and enhances capability to exchange voice and data simultaneously and faster than current systems. The advanced network waveforms provide rapid distribution of data and imagery with increased information assurance protection and automatic routing across complex terrain. The system operates Internet Protocol (IP) based networking waveforms offering increased data throughput through self-forming, self-healing, managed communication networks. Its route and retransmit functionality links waveforms in different frequency bands, within the 2 Megahertz (MHz) to 2 Gigahertz (GHz) range, to form one cohesive network. MNVR nomenclature has been designated as AN/VRC-118(V)1.

A single award contract was awarded on 24 September 2013, Indefinite Delivery Indefinite Quantity (IDIQ), firm fixed price, 3-year ordering period. Production of 232 radios for Test & Evaluation and certification purposes was completed in 3QFY 2014. On 3 Oct 2016, Defense Acquisition Executive (DAE) published a MNVR MS C Acquisition Decision Memorandum.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604290A / <i>Mid-Tier Wideband Networking Vehicular Radio</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	12.172	10.589	5.401	-	5.401
Current President's Budget	9.363	10.589	0.000	-	0.000
Total Adjustments	-2.809	0.000	-5.401	-	-5.401
• Congressional General Reductions	-0.006	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-2.341	-			
• SBIR/STTR Transfer	-0.462	-			
• Adjustments to Budget Years	-	-	-5.401	-	-5.401

**Change Summary Explanation**

FY 2017 Reduction in funding: FFRDC adjustment and SBIR/STTR Transfers

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604290A / <i>Mid-Tier Wideband Networking Vehicular Radio</i>				<b>Project (Number/Name)</b> DW1 / <i>Mid-Tier Wideband Networking Vehicular Radio Mnvr</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
DW1: <i>Mid-Tier Wideband Networking Vehicular Radio Mnvr</i>	-	9.363	10.589	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	19.952
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Mid-tier Networking Vehicular Radio (MNVR) enables the extension of data services within the tactical network through seamless integration of the upper and lower tiers; providing software-defined, multi-channel networking radios for a wide variety of Army tactical vehicles to meet the Army's requirement for the Mid-tier Wideband Networking (MWN) capability. The MNVR provides self-forming and self-healing communication networks from the brigade to the platoon level throughout the full range of military operations.

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A single award contract was awarded on 24 September 2013, Indefinite Delivery Indefinite Quantity (IDIQ), firm fixed price, 3-year ordering period. Production of 232 radios for Test & Evaluation and certification purposes was completed in 3QFY 2014. On 3 Oct 2016, Defense Acquisition Executive (DAE) published a MNVR MS C Acquisition Decision Memorandum.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Mid-tier Networking Vehicular Radio (MNVR)	9.363	10.589	-
<b>Description:</b> RDTE funding supports efforts to test and certify industry solutions for a modified NDI radio; contract management, and test & certification efforts.			
<b>FY 2018 Plans:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604290A / <i>Mid-Tier Wideband Networking Vehicular Radio</i>	<b>Project (Number/Name)</b> DW1 / <i>Mid-Tier Wideband Networking Vehicular Radio Mnvr</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019
FY2018 supports system test and evaluation efforts to execute the modified NDI strategy for the mid-tier networking vehicular radio capability; focus is on development of a Request for Proposal (RFP) release for follow on contract award; conduct Source Selection Performance Demonstration test, and engineering Contract Support.			
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> There is currently no funding allocated to MNVR in FY 2019.			
<b>Accomplishments/Planned Programs Subtotals</b>	9.363	10.589	-

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2019</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
			<u>Base</u>	<u>OCO</u>	<u>Total</u>						
• B51001: <i>Mid-tier Networking Vehicular Radio (MNVR)</i>	25.017	25.100	0.000	-	0.000	-	-	-	-	0.000	50.117

**Remarks**  
There is currently no funding allocated to MNVR in FY2019.

**D. Acquisition Strategy**  
The MNVR is a modified NDI industry solution for a multi-channel vehicular radio hosting networking waveforms. This modified NDI approach takes advantage of competitively priced, mature and producible technology that meets technical specifications.

An Acquisition Decision Memorandum (ADM) was signed on 20 September 2013 by the Defense Acquisition Executive (DAE), approving a Materiel Development Decision (MDD). The ADM designated MNVR as an ACAT 1D Special Interest Program under the continued oversight of the DAE. The ADM also approved the award of a competitive contract, and authorized the procurement of up to 232 modified NDI radios for Test & Evaluation, Platform Integration and Certification purposes in order to inform a MS C decision. On 3 Oct 2016, Defense Acquisition Executive (ADM) published a MNVR MS C Acquisition Decision Memorandum. In Nov 2017, the DAE rescinded the Special Interest designation, as well as the ACAT ID designation. The Army will determine the ACAT designation and MDA at a later date.

**E. Performance Metrics**  
N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604290A / Mid-Tier Wideband Networking Vehicular Radio	<b>Project (Number/Name)</b> DW1 / Mid-Tier Wideband Networking Vehicular Radio Mnvr
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services - PMO	Various	Aberdeen Proving Ground : Maryland	36.529	-		0.385		-		-		-	5.912	42.826	-
Management Services - Engineering Contractor Support	Various	Various : Various	-	2.718		2.675		-		-		-	0.000	5.393	-
<b>Subtotal</b>			36.529	2.718		3.060		-		-		-	5.912	48.219	N/A

**Remarks**  
There is currently no funding allocated to MNVR in FY2019.

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Systems Test and Evaluation	Various	Multiple : Various	39.050	4.981		-		-		-		-	0.000	44.031	-
Dynamic Network Connectivity	TBD	To Be Determined : To Be Determined	-	1.664		1.873		-		-		-	0.000	3.537	-
Source Selection Performance Demonstration (SSPDS) Tests	Various	Multiple : Various	14.301	-		5.656		-		-		-	0.000	19.957	-
<b>Subtotal</b>			53.351	6.645		7.529		-		-		-	0.000	67.525	N/A

**Remarks**  
There is currently no funding allocated to MNVR in FY2019.

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		89.880	9.363	10.589	-	-	5.912	115.744	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604290A / <i>Mid-Tier Wideband Networking Vehicular Radio</i>	<b>Project (Number/Name)</b> DW1 / <i>Mid-Tier Wideband Networking Vehicular Radio Mnvr</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Low Rate Initial Production (LRIP) / Limited Deployment	LRIP/LD																											
LOG Demonstration	LOG Demo																											
Initial Operating Capability (IOC)	IOC																											
Program Closeout	Program Closeout																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604290A / <i>Mid-Tier Wideband Networking Vehicular Radio</i>	<b>Project (Number/Name)</b> DW1 / <i>Mid-Tier Wideband Networking Vehicular Radio Mnvr</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
First Production Delivery	4	2013	4	2014
Demonstration at NIE 14.2	2	2014	3	2014
Developmental Test (Govt Integration Test) 1	1	2015	1	2015
Limited User Test (LUT) at NIE 15.2	3	2015	3	2015
Logistics Demonstration	4	2015	4	2015
Government Regression Testing (GRT) 1.2	1	2016	2	2016
Mission Command Network Refinement (MCNR) at NIE 16.2	3	2016	3	2016
Low Rate Initial Production (LRIP) / Limited Deployment	4	2016	4	2017
LOG Demonstration	2	2017	2	2017
Initial Operating Capability (IOC)	3	2017	4	2017
Program Closeout	2	2018	4	2018

**Note**

06 May 2013: Joint Requirements Review Council (JROC) approved the MNVR Capability Production Document (CPD)  
 09 May 2013: Defense Acquisition Executive (DAE) changed basis of the program from Directed Requirement to the MNVR CPD  
 - Directed that MNVR would not field until all MS C requirements met. Delayed fielding from Capability Set (CS) 15 to CS 17  
 20 Sept 2013: DAE signs MNVR Milestone Decision Document (MDD)  
 24 Sept 2013: Army Contracting Command (ACC) awards MNVR contract to Harris Corporation; executed delivery order of 232 radios.  
 May 2015: MNVR conducted a successful LUT at Network Integration Evaluation (NIE) 15.2 in preparation for MS C.  
 May 2016: MNVR participated in the MCNR assessment at NIE 16.2 where the Army validated the mid-tier requirement, recommending to proceed to MS C, and the ARMY postponed IOT&E from FY 2017 to FY 2020.  
 Oct 2016: MS C Achieved. On 3 Oct 2016, Defense Acquisition Executive (ADM) published a MNVR MS C Acquisition Decision Memorandum.  
 Aug 2017: There is currently no funding allocated to MNVR in FY2019 and out.

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	<b>R-1 Program Element (Number/Name)</b> PE 0604321A / All Source Analysis System
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	11.958	4.774	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	16.732
B41: CI/HUMINT Software Products (MIP)	-	2.782	3.274	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.056
B51: Machine - Foreign Language Translation System	-	9.176	1.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	10.676

**A. Mission Description and Budget Item Justification**

The All Source Analysis System (ASAS) provided US Army commanders at all echelons from battalion to Army Service Component Command (ASCC) with automated support to the management and planning, processing and analysis, and dissemination of intelligence, counterintelligence, and electronic warfare. ASAS provided the means to enhance the commander's timely and comprehensive understanding of enemy deployments, capabilities, and potential courses of action. The system used standard joint and Army protocols and message formats to interface with selected National, joint, theater, and tactical intelligence, surveillance, and reconnaissance systems and preprocessors and Army, joint, and coalition battle command systems. The ASAS Family of Systems migrated into the Distributed Common Ground System-Army (DCGS-A) program and the Army is using it as the initial platform to provide accelerated DCGS-A capabilities to the force.

The Counterintelligence (CI) and Human Intelligence (HUMINT) Automated Reporting and Collection System (CHARCS) is the Army's CI and HUMINT tactical collection and reporting system. CHARCS provides automation support for information collection, reporting, investigations, source & interrogation operations and document exploitation. The CHARCS automation architecture extends from the individual HUMINT team soldier or CI agent to the Corps Analysis and Control Element (ACE). CHARCS reports digital data such as maps, overlays, images, video, biometrics, scanned documents and audio files. These media are transmitted through secure networks and interfaces with the DCGS-A for detailed analysis and creation of finished intelligence products. Collection and reporting teams at Military Intelligence (MI) battalions and their operational managers are equipped with one of two CHARCS systems. The first is the AN/PYQ-8 Individual Tactical Reporting Tool (ITRT) which provides collection and processing devices for individual HUMINT team member or CI agents. The second is the AN/PYQ-3 CI/HUMINT Automated Tool Set (CHATS) which provides the team leader tools to process and manage team-collected information and a robust set of devices such as printers, scanners, cameras and audio recorders to assist the collection mission. Each CHATS has an associated Mission Support Peripheral Sets and Kits (MS-PSK) or Collection Peripheral Sets and Kits (C-PSK).

The Machine Foreign Language Translation System (MFLTS) develops, fields, and sustains a basic automated foreign speech and text translation capability for Army tactical systems to augment and compliment limited human linguistic resources. These integrated automated translation capabilities will be applicable across three different system configurations; a hand-held/wearable portable device, a laptop/mobile device, and in a networked/web-enabled system. The software modules will translate English from a prioritized list of languages in a prioritized collection of domains (e.g. medical, intelligence, base security). MFLTS is interoperable with Commercial Off-The-Shelf (COTS) and Government Off-The-Shelf (GOTS) automation equipment to include the Distributed Common Ground System-Army (DCGS-A) and Nett Warrior, and will be interoperable with a future version of the CI/HUMINT Automated Reporting and Collection System (CHARCS).

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604321A / <i>All Source Analysis System</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	3.958	4.774	7.839	-	7.839
Current President's Budget	11.958	4.774	0.000	-	0.000
Total Adjustments	8.000	0.000	-7.839	-	-7.839
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	8.000	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-7.839	-	-7.839

**Change Summary Explanation**

In FY 2019 this program will transition to sustainment.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604321A / All Source Analysis System				Project (Number/Name) B41 / CI/HUMINT Software Products (MIP)			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
B41: CI/HUMINT Software Products (MIP)	-	2.782	3.274	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.056
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Counterintelligence (CI) and Human Intelligence (HUMINT) Automated Reporting and Collection System (CHARCS) is the Army's CI and HUMINT tactical collection and reporting system. CHARCS provides automation support for information collection, reporting, investigations, source & interrogation operations and document exploitation. The CHARCS automation architecture extends from the individual HUMINT team soldier or CI agent to the Corps. CHARCS reports digital data such as maps, overlays, images, video, biometrics, scanned documents and audio files. These media are transmitted through secure networks and interfaces with the Distributed Common Ground System-Army (DCGS-A) for detailed analysis and creation of finished intelligence products. Collection and reporting teams at Military Intelligence (MI) battalions and their operational managers are equipped with one of two CHARCS systems. The first is the AN/PYQ-8 Individual Tactical Reporting Tool (ITRT) which provides collection and processing devices for individual HUMINT team member or CI agents. The second is the AN/PYQ-3 CI/HUMINT Automated Tool Set (CHATS) which provides the team leader and Operational Management Team (OMT) tools to process and manage team-collected information and a robust set of devices such as printers, scanners, and cameras to assist the collection mission. Each CHATS has an associated Mission Support Peripheral Sets and Kits (MS-PSK) or Collection Peripheral Sets and Kits (C-PSK). Phasing in of the Mobile Hand Held (M H/H), to displace the C-PSK, will begin in FY 2018.

The C-PSK provides specialized collection component capabilities to support CI/HUMINT collection missions. C-PSK capabilities are commercial-off-the-shelf (COTS) technologies and include video and camera equipment, global positioning system (GPS), voice recording device and infrared strobe lights. Phasing in of the Mobile Hand Held, to displace the C-PSK, will begin in FY 2018. The MS-PSK provides specialized collection component capabilities to support CI/HUMINT collection missions at the OMT. MS-PSK capabilities are COTS technologies and include night vision photography & video, captured materiel tracking, Credibility Assessment Capability, Digital Media Forensics software, and Document Exploitation software.

FY 2018 Base amount of \$3.274 million will fund efforts for the development of a single CI/HUMINT software baseline in coordination with DCGS-A, software testing, software support to the Mobile Handheld (M H/H), and system engineering management support.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019
<b>Title:</b> Development and Integration toward a single CI/HUMINT Software baseline; software testing of v1.0.4.2; software baseline enhancement and testing of v1.0.4.2.2 and v1.0.4.4; increased SW perf. cap.	2.782	3.274	-
<b>Description:</b> Development and Integration toward a single CI/HUMINT Software baseline; software testing of v1.0.4.2; software baseline enhancement and testing of v1.0.4.2.2 and v1.0.4.4; increased software (SW) performance capability; Hardware (HW) integration testing of CHARCS SW. Integration of Exploitation software onto MHH.			
<b>FY 2018 Plans:</b>			

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604321A / All Source Analysis System	<b>Project (Number/Name)</b> B41 / CI/HUMINT Software Products (MIP)
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019
Will continue efforts for development of a single CI/HUMINT software baseline in coordination with DCGS-A. Will continue software baseline enhancement and testing for v1.0.4.4. Will initiate integration of exploitation software onto Mobile Hand Held platform. Will provide system engineering management support.			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> In FY 2019 this program will transition to sustainment.			
<b>Accomplishments/Planned Programs Subtotals</b>	2.782	3.274	-

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• BK5275: CI HUMINT Auto Reprting and Coll(CHARCS)	14.891	22.275	0.296	-	0.296	-	-	-	-	0.000	37.462

**Remarks**

**D. Acquisition Strategy**  
Program capability documentation was updated to include Capabilities Development Document (CDD) Increment 2 requirements in CHARCS Capabilities Production Document (CPD) Increment 1, Revision 1, which was signed 6 September 2012. CHARCS is a post-Milestone C program. CHARCS is leveraging Communications Electronic Command Software Engineering Center (CECOM SEC) to increase current capabilities and provide an increased performance capability version of the CHARCS software. CHARCS will conduct testing of the Nett Warrior End User device. CHARCS software requires development to keep pace with incremental technology improvements, Defense Intelligence Agency compliance, and to meet AROC approved requirements documented in the CHARCS CPD Increment 1, Revision 1. CHARCS is continuously evaluating and assessing existing Commercial-off-the-shelf (COTS) and Government-off-the-shelf (GOTS) that support CHARCS CPD Increment 1, Revision 1.

**E. Performance Metrics**  
N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604321A / All Source Analysis System	<b>Project (Number/Name)</b> B41 / CI/HUMINT Software Products (MIP)
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PD CHARCS PMO Government Engineering Direct Support	Allot	PD CHARCS : APG, MD	4.332	0.098	Oct 2016	0.150		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			4.332	0.098		0.150		-		-		-	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Single CI&HUMINT SW Baseline	MIPR	DCGS-A : APG, MD	0.644	-		-		-		-		-	Continuing	Continuing	Continuing
CI/HUMINT Single SW Baseline	C/CPFF	Booz Allen : APG, MD	2.400	2.453	Jun 2017	2.774		-		-		-	Continuing	Continuing	Continuing
CHARCS Software Development	MIPR	CECOM Software Engineering Center : Various Locations	16.119	-		-		-		-		-	Continuing	Continuing	Continuing
CHARCS Software Management/Development	MIPR	DCGS-A : APG, MD	1.044	-		-		-		-		-	Continuing	Continuing	Continuing
CHARC Software Development	MIPR	DCGS-A : APG, MD	0.520	-		-		-		-		-	Continuing	Continuing	Continuing
DOMEX Tools	MIPR	National Ground Intelligence Center : Charlottesville, VA	8.100	-		-		-		-		-	Continuing	Continuing	Continuing
Program Management and Tech Support	C/CPFF	Millennium : APG, MD	0.200	-		-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			29.027	2.453		2.774		-		-		-	Continuing	Continuing	N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604321A / All Source Analysis System	<b>Project (Number/Name)</b> B41 / CI/HUMINT Software Products (MIP)
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Software Engineering & Testing Services - PD CHARCS PMO SETA	C/CPFF	Booz Allen Hamilton : APG, MD	0.957	0.131	Feb 2017	0.150		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			0.957	0.131		0.150		-		-		-	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CTSF: Army Interoperability Certification (AIC), Common Operating environment (COE) compliance	MIPR	CECOM SEC : Ft Huachuca, AZ	0.295	0.100	Jan 2017	0.100		-		-		-	Continuing	Continuing	Continuing
Reliability, Availability, Maintainability (RAM)	MIPR	EPG : Ft Huachuca, AZ	0.100	-		-		-		-		-	Continuing	Continuing	Continuing
Quality Assurance	MIPR	CECOM SEC : Ft Huachuca, AZ	0.100	-		-		-		-		-	Continuing	Continuing	Continuing
Test Support and Interoperability	MIPR	CTSF, : Ft. Hood, TX	0.612	-		-		-		-		-	Continuing	Continuing	Continuing
Test Support and Interoperability	MIPR	US Army EPG : Ft Huachuca, AZ	0.600	-		-		-		-		-	Continuing	Continuing	Continuing
Operational Test / Security Accreditation Testing / HW Integration Testing	MIPR	ATEC : Multiple	0.436	-		-		-		-		-	Continuing	Continuing	Continuing
Security Accreditation Collateral	MIPR	CECOM : Ft. Monmouth, NJ	0.381	-		-		-		-		-	Continuing	Continuing	Continuing
Safety release	MIPR	CECOM : Ft. Monmouth, NJ	0.035	-		-		-		-		-	Continuing	Continuing	Continuing
Test of Nett Warrior EUD	C/TBD	TBD : TBD	-	-		0.100		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			2.559	0.100		0.200		-		-		-	Continuing	Continuing	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date: February 2018</b>		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604321A / All Source Analysis System		<b>Project (Number/Name)</b> B41 / CI/HUMINT Software Products (MIP)	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
v1.0.4.2 Software Release (SR), Fielding & Sustainment	[Redacted]				[Redacted]																							
v1.0.4.2.2 Software Baseline Enhancement & Testing	[Redacted]				[Redacted]																							
v1.0.4.2.2 Software Release (SR), Fielding & Sustainment	[Redacted]				[Redacted]																							

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604321A / <i>All Source Analysis System</i>	<b>Project (Number/Name)</b> B41 / <i>CI/HUMINT Software Products (MIP)</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
v1.0.4.2 Developmental Test (DT)	4	2015	4	2015
v1.0.4.2 Operational Test (OT)	4	2015	4	2015
v1.0.4.1.1 Software Release (SR), Fielding & Sustainment	1	2015	4	2015
v1.0.4.2 Software Release (SR), Fielding & Sustainment	4	2015	4	2017
v1.0.4.2.2 Software Baseline Enhancement & Testing	4	2015	3	2017
v1.0.4.2.2 Software Release (SR), Fielding & Sustainment	3	2017	4	2018

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604321A / All Source Analysis System				<b>Project (Number/Name)</b> B51 / Machine - Foreign Language Translation System			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
B51: Machine - Foreign Language Translation System	-	9.176	1.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	10.676
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Machine Foreign Language Translation System (MFLTS) develops, fields, and sustains a basic automated foreign speech and text translation capability for Army tactical systems to augment and compliment limited human linguistic resources. These integrated automated translation capabilities will be applicable across three different system configurations; a hand-held/wearable portable device, a laptop/mobile device, and in a networked/web-enabled system. The software modules will translate English from a prioritized list of languages in a prioritized collection of domains (e.g. medical, intelligence, base security). MFLTS is interoperable with Commercial Off-The-Shelf (COTS) and Government Off-The-Shelf (GOTS) automation equipment to include the Distributed Common Ground System-Army (DCGS-A) and Nett Warrior, and will be interoperable with a future version of the CI/HUMINT Automated Reporting and Collection System (CHARCS).

FY18 base dollars in the amount of \$1.500 million provides for the program office support to the development and collection of prioritized Speech to Speech (S2S) and Text to Text (T2T) languages and domains.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p><b>Title:</b> Product Development and Engineering Support</p> <p><b>Description:</b> Development, integration and improvement of Critical Technology Elements (CTE) of Automated Speech Recognition (ASR), Optical Character Recognition (OCR), and Machine Language Translation Translation Engine (MLT TE) software. Includes incremental development of Speech to Speech (S2S) and Text to Text (T2T) languages and domains.</p> <p><b>FY 2018 Plans:</b> Will provide for the development and collection of prioritized Speech to Speech (S2S) and Text to Text (T2T) languages and domains.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> In FY 2019 this program will transition to sustainment.</p>	8.709	0.772	-
<p><b>Title:</b> PD Support and Management Services</p> <p><b>Description:</b> Program Office Support.</p> <p><b>FY 2018 Plans:</b></p>	0.467	0.728	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604321A / <i>All Source Analysis System</i>	<b>Project (Number/Name)</b> B51 / <i>Machine - Foreign Language Translation System</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Will provide program management office support at Government activity sites.			
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> In FY 2019 this program will transition to sustainment.			
<b>Accomplishments/Planned Programs Subtotals</b>	9.176	1.500	-

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• B88605: <i>Machine Foreign Language Translation System (MFLTS)</i>	0.545	0.567	0.000	-	0.000	-	-	-	-	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

The MFLTS Technology Development (TD) Phase developed an open software architecture prototype using full and open competition that allowed the addition, upgrade and replacement of translation system components for integration into existing Programs. During the Engineering and Manufacturing Development (EMD) Phase, the program integrated technology demonstrated during the TD Phase to meet Key Performance Parameters (KPPs). This included the requirement to meet an Interagency Language Roundtable (ILR) level of 1 for two speech translation modules and an ILR level of 1+ for one text translation module in hand-held/wearable portable, laptop/mobile, and networked/web-enabled system configurations. Milestone B was achieved 22 Jul 13 and an option period for the EMD phase contract was awarded 22 Jul 13. Following the Limited Deployment Decision (LDD), a contract was awarded to integrate and field MFLTS capability drop #1 in FY16. A full and open competition will result in the award of a contract(s) in FY18 for the incremental development of new MFLTS SW Capability Drops.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604321A / All Source Analysis System				B51 / Machine - Foreign Language Translation System								
<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Support	MIPR	Various : Ft. Belvoir, VA	4.869	0.467		0.728		-		-		-	Continuing	Continuing	Continuing	
<b>Subtotal</b>			4.869	0.467		0.728		-		-		-	Continuing	Continuing	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Software Development Contract	C/CR	TBD : TBD	12.553	8.000	Feb 2018	-		-		-		-	0.000	20.553	-	
Developmental Engineering	MIPR	Various : Various	3.873	-		-		-		-		-	Continuing	Continuing	Continuing	
Product Development	C/IDIQ	TBD : TBD	-	0.100		0.025		-		-		-	Continuing	Continuing	Continuing	
<b>Subtotal</b>			16.426	8.100		0.025		-		-		-	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Engineering Support	MIPR	Various : Ft. Belvoir, VA	6.628	0.609	Dec 2016	0.747		-		-		-	Continuing	Continuing	Continuing	
<b>Subtotal</b>			6.628	0.609		0.747		-		-		-	Continuing	Continuing	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Test and Evaluation Activities	MIPR	USA Test and Eval Command : Alexandria, VA	1.400	-		-		-		-		-	Continuing	Continuing	Continuing	





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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604321A / All Source Analysis System	<b>Project (Number/Name)</b> B51 / Machine - Foreign Language Translation System

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
PD Support and Management Services	[Redacted]																											
Product Development and Engineering Support					[Redacted]																							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604321A / <i>All Source Analysis System</i>	<b>Project (Number/Name)</b> B51 / <i>Machine - Foreign Language Translation System</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Initial Capability - Technology Development (TD) Phase	4	2010	3	2013
PD Support and Management Services	1	2016	4	2019
Product Development and Engineering Support	3	2017	4	2019

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604328A / TRACTOR CAGE
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	12.525	17.252	17.050	12.000	29.050	17.909	18.269	18.690	19.070	0.000	132.765
C71: <i>Tractor Cage</i>	-	12.525	17.252	17.050	12.000	29.050	17.909	18.269	18.690	19.070	0.000	132.765

**A. Mission Description and Budget Item Justification**

The details of this program are reported in accordance with Title 10, United States Code, Section 119(a)(1).

**B. Program Change Summary (\$ in Millions)**

	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>
Previous President's Budget	12.525	17.252	18.540	-	18.540
Current President's Budget	12.525	17.252	17.050	12.000	29.050
Total Adjustments	0.000	0.000	-1.490	12.000	10.510
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-1.490	12.000	10.510

**Change Summary Explanation**

The details of this program are reported in accordance with Title 10, United States Code, Section 119(a)(1).

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	63.842	87.643	83.155	-	83.155	82.105	96.663	76.241	64.575	Continuing	Continuing
ES9: <i>Advanced Tactical Parachute System</i>	-	2.858	5.840	6.710	-	6.710	6.617	1.829	2.965	2.964	0.000	29.783
EW4: <i>Crew Served Weapons Engineering Development</i>	-	7.708	9.251	29.611	-	29.611	26.362	39.780	18.041	18.983	0.000	149.736
FF2: <i>Small Arms Fire Control</i>	-	0.000	20.117	20.201	-	20.201	21.463	10.163	11.254	4.967	0.000	88.165
FI2: <i>Lightweight 30mm Cannon</i>	-	0.000	5.500	0.000	-	0.000	1.384	0.000	0.000	0.000	0.000	6.884
S58: <i>Soldier Enhancement Program</i>	-	9.528	3.353	2.885	-	2.885	2.940	2.999	3.016	2.814	0.000	27.535
S60: <i>Clothing &amp; Equipment</i>	-	8.401	7.022	5.355	-	5.355	6.453	6.724	5.015	4.850	0.000	43.820
S61: <i>Acis Engineering Development</i>	-	3.726	4.011	3.612	-	3.612	2.990	2.866	2.926	2.969	Continuing	Continuing
S62: <i>Counter-Defilade Target Engagement - SDD</i>	-	9.244	0.000	2.000	-	2.000	0.000	0.000	0.000	0.000	0.000	11.244
S63: <i>Individual Weapons Engineering Development</i>	-	7.631	6.961	5.756	-	5.756	6.129	23.352	22.556	16.810	0.000	89.195
S64: <i>Common Remotely Operated Wpn Sys (CROWS)</i>	-	11.548	22.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	34.048
S70: <i>Personnel Recovery Support System (PRSS)</i>	-	1.084	1.330	0.968	-	0.968	0.990	0.468	0.642	0.563	Continuing	Continuing
VS5: <i>Soldier Protective Equipment</i>	-	2.114	1.758	6.057	-	6.057	6.777	8.482	9.826	9.655	0.000	44.669

**Note**

FY 2019 New starts include Next Generation Squad Automatic Rifle (NGSAR) and Increased Barrel Life Replace Chrome.

**A. Mission Description and Budget Item Justification**

Fiscal Year (FY) 2019 budget request funds Infantry Support Weapons. This Program Element (PE) Engineering and Manufacturing Development (EMD) manages the Soldier as a system, with the goal of increasing Soldiers' combat effectiveness, increasing survivability, and improving the Soldiers' quality of life. It develops and tests prototypes of weapons, clothing, equipment, and other items useful to support the Soldier.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	
<p>Project ES9 (Advanced Tactical Parachute System) supports efforts to improve Static Line (SL) and Military Free Fall (MFF) personnel parachutes and associated equipment to include canopy improvements based on integration of new technology with the goal of enhancing the insertion capability of the airborne soldier and increasing the performance, safety and durability of personnel airdrop equipment.</p> <p>Project EW4 (Crew Served Weapons Engineering) supports efforts to transition components or prototypes from Small Arms Improvement, Project S54, Program Element 0603827A, (Budget Activity 4) and other domestic and foreign sources of small arms weapons to demonstrate, test and evaluate capability near or at planned operational requirements.</p> <p>Project FF2 (Small Arms Fire Control (SAFC)) supports optimized fire control devices to support Squad (S), Crew Served (CS) and Precision (P). SAFC shall increase the probability of hit and decrease time to engage across a range of small arms weapon systems, with a direct-view optic that allows for quicker and more accurate target detection and recognition.</p> <p>Project FI2 (Lightweight 30mm Cannon) provides increased lethality modification to the Joint Light Tactical Vehicle (JLTV), it serves as the Infantry Brigade Combat Team (IBCT) light reconnaissance vehicle, an upgraded medium caliber weapon will be developed, tested and evaluated for integration into a modified remote weapon station.</p> <p>Project S58 (Soldier Enhancement Program) supports accelerated integration, modernization, and enhancement efforts of lighter, more lethal weapons, and improved Soldier items including lighter, more comfortable load-bearing equipment, field gear, survivability items, communications equipment, and navigational aids.</p> <p>Project S60 (Clothing and Equipment) supports pre-production development of state-of-the-art individual clothing and equipment to improve the survivability, mobility and sustainment affecting the quality of life of the individual Soldier.</p> <p>Project S61 (Aircrew Integrated Systems) provides System Development programs with improved aviator safety, survivability, and human performance that amplify the warfighting effectiveness and facilitates full-spectrum dominance of the Army aircraft including the AH-64 Apache/Longbow, CH-47 Chinook, UH/HH-60 Blackhawk, Light Utility Helicopter, and Armed Reconnaissance Helicopter.</p> <p>Project S62 (Counter-Defilade Target Engagement) the XM25, Individual Airburst Weapon System (IAWS) delivers a 25mm programmable high explosive airburst (HEAB) round to defeat defilade and point area targets out to approximately 600 meters. Accurate and lethal engagement of defilade targets at the squad level is the number one capability gap identified by the United States Army Infantry Center (USAIC).</p> <p>Project S63 (Small Arms Improvements) demonstrates engineering development models or integrated commercial items designed to enhance lethality, target acquisition, fire control, training effectiveness, and reliability for small arms weapon systems and ammunition. Programs include Improved Weapons Coatings, Personal Defense Weapon, 30 Round 5.56mm Magazine, Modular Handgun System (MHS), Precision Sniper Rifle (PSR), Sub Compact, and Interim Combat Service Rifle (ICR).</p>		

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>
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Project S64 (CROWS) continues enhancing CROWS capability and reliability to increase its application across combat and tactical platforms. This capability enhances the Soldier's survivability, lethality and situational awareness.

Project S70 (Personnel Recovery Support System) provides system research, development and testing of the Personal Recovery Support System/Personnel Recovery Support Equipment supporting operations to report and locate isolated, missing, detained or captured Soldiers.

Project VS5 (Soldier Protective Equipment) supports engineering and manufacturing development of Individual Soldier Ballistic Protection equipment. It will leverage advancements in technology to continue incremental improvements to body armor (to include improved outer tactical vests, plate carriers, and helmets) and other personal protective equipment.

<b>B. Program Change Summary (\$ in Millions)</b>	<b><u>FY 2017</u></b>	<b><u>FY 2018</u></b>	<b><u>FY 2019 Base</u></b>	<b><u>FY 2019 OCO</u></b>	<b><u>FY 2019 Total</u></b>
Previous President's Budget	66.943	87.643	73.419	-	73.419
Current President's Budget	63.842	87.643	83.155	-	83.155
Total Adjustments	-3.101	0.000	9.736	-	9.736
• Congressional General Reductions	-0.026	-			
• Congressional Directed Reductions	-3.940	-			
• Congressional Rescissions	-	-			
• Congressional Adds	3.000	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.135	-			
• Adjustments to Budget Years	-	-	9.736	-	9.736

**Change Summary Explanation**

Increase funding in FY2019 is for the development of Next Generation Squad Automatic Rifle (NGSAR).

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>					<b>Project (Number/Name)</b> ES9 / <i>Advanced Tactical Parachute System</i>		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
ES9: <i>Advanced Tactical Parachute System</i>	-	2.858	5.840	6.710	-	6.710	6.617	1.829	2.965	2.964	0.000	29.783
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Funding line established in FY17 for the Advanced Tactical Parachute System. Efforts were previously executed in Program Element 0604601A S60.

**A. Mission Description and Budget Item Justification**

This funding supports engineering and manufacturing development tasks related to Static Line (SL) and Military Free Fall (MFF) personnel parachutes and auxiliary equipment with the goal of enhancing the insertion capability of the airborne soldier and increasing the performance, safety and durability of personnel airdrop equipment. Funds improvements and testing/evaluation of personnel parachute systems. Includes integration and interface on the Soldier system.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Advanced Tactical Parachute System	2.858	5.840	6.710	-	6.710
<b>Description:</b> Funds are a new Project established in FY17. Efforts were previously executed in Program Element 0604601A S60.					
<b>FY 2018 Plans:</b> Efforts include enhanced capabilities transition from ET8 to include Developmental Testing and Operational Testing (DT/OT), and purchasing contract data requirements for the Enhanced Electronic Automatic Activation Device (E/EAAD) for use with the RA-1 Advanced Ram Air Parachute System. Complete DT/OT for PARANAVSYS. Obtain Milestone C (MS C) decision in FY18 and Full Material Release (FMR) in FY18 for PARANAVSYS. Procure test assets and conduct testing on T-11R (Reserve) improvements to optimize packing of both systems (T-11 and T-11R) to reduce system profile and increase number of parachutists that can be carried on C-130 and C-17 aircraft. Conduct Operational Tests on and purchasing contract data requirements for the Enhanced Electric Automatic Activation Device (E/EAAD). Conduct developmental tests for Military Free Fall Altimeters. Conduct Salt Water immersion tests to determine impact on service life of RA-1. Conduct B-line riser (allows for increased time under canopy) collapse tests on RA-1. Parachutists Oxygen Delivery System (PODS) Testing to support MS C in FY2021. Test newly developed hardware using composite materials to reduce jumper weight. Conduct over the ramp jumps T-11 testing utilizing C-17 to support long range clandestine insertion with the use of Intermediate Staging Base (ISB). Prove out propacking procedure for repacking the free fall parachutes. Update RA-1 Technical manuals to reflect packing procedures improvement. Identify					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> ES9 / <i>Advanced Tactical Parachute System</i>

**B. Accomplishments/Planned Programs (\$ in Millions)**

and test Army material solution for flotation devices based on user defined requirements. Test and validate material solution developed by Small Business Innovative Research (SBIR) effort to address shrinking and mold associated with T-11 deployment sleeve.

***FY 2019 Base Plans:***

Complete DT/OT for EEAAD; obtain MS C decision in FY19 and Full Material Release (FMR) in FY19. Complete DT/OT for Military Altimeters; obtain MS C decision in FY21 and Full Material Release (FMR) in FY21. Continue DT/OT on Parachutist Oxygen Deliver System (PODS) to support MS-C in 2021. Continue conduct of testing to support improvement to parachute systems to include RA-1 Double Bag Static Line (DBSL) over the ramp jumps on C-17 aircraft; service life extension for RA-1, T-11 and MC-6 parachutes; and reduction of glide ratio for the RA-1 parachute system.

***FY 2018 to FY 2019 Increase/Decrease Statement:***

Funding increase in Advanced Tactical Parachute system portfolio is due to anticipated increase in future requirements in FY18 and FY19.

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Accomplishments/Planned Programs Subtotals</b>	2.858	5.840	6.710	-	6.710

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• MA7801: <i>Advanced Tactical Parachute System</i>	16.611	28.440	41.610	-	41.610	48.819	60.280	54.264	45.000	0.000	295.024
• ET8: <i>Personnel Airdrop System Development</i>	0.664	0.495	0.400	-	0.400	0.300	1.282	1.280	1.835	0.000	6.256

**Remarks**

**D. Acquisition Strategy**

Acquisition strategies for these programs vary in methods, and range from: 1) Material Change programs that result in engineering changes to existing systems to; 2) Traditional development programs that include an Engineering and Manufacturing Development phase ranging in duration from 12 to 48 months, depending on the level of complexity and testing required.

**E. Performance Metrics**

N/A



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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604601A / INFANTRY SUPPORT WEAPONS				ES9 / Advanced Tactical Parachute System							
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Dev Contracts	C/FFP	Various : Various	-	1.574		4.000		3.410		-		3.410	0.000	8.984	-
Dev Sys Engineering Spt	MIPR	Various : Various	-	0.200		0.200		0.200		-		0.200	0.000	0.600	-
<b>Subtotal</b>			-	1.774		4.200		3.610		-		3.610	0.000	9.584	N/A
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Misc Support Costs	MIPR	NSRDEC : Natick, MA	-	0.200		0.331		0.400		-		0.400	0.000	0.931	-
<b>Subtotal</b>			-	0.200		0.331		0.400		-		0.400	0.000	0.931	N/A
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
DT/OT	MIPR	various : various	-	0.884		1.309		2.700		-		2.700	0.000	4.893	-
<b>Subtotal</b>			-	0.884		1.309		2.700		-		2.700	0.000	4.893	N/A
<b>Project Cost Totals</b>			-	2.858		5.840		6.710		-		6.710	0.000	15.408	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> ES9 / <i>Advanced Tactical Parachute System</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Prove out enhanced capabilities trans from ET8 to include DT/OT	[Redacted]																															
E/EAAD Operational Testing	[Redacted]																															
Enhanced EAAD MS C	[Redacted]																															
PARANAVSYS DT/OT	[Redacted]				[Redacted]																											
PARANAVSYS MS C	[Redacted]																															
PARANAVSYS Software Upgrades/Development	[Redacted]																															
Military Altimeter DT/OT	[Redacted]																															
Military Altimeter MS C	[Redacted]																															
Parachutists Oxygen Delivery System Testing	[Redacted]																															
Parachutists Oxygen Delivery System MS C	[Redacted]																															
Static Line (SL) Automatic Activation Device DT/OT Testing	[Redacted]																															
SL Canopy Release Assembly Reliability Testing	[Redacted]																															

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> ES9 / <i>Advanced Tactical Parachute System</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Prove out enhanced capabilities trans from ET8 to include DT/OT	1	2017	4	2021
E/EAAD Operational Testing	3	2018	3	2019
Enhanced EAAD MS C	4	2019	4	2019
PARANAVSYS DT/OT	1	2017	1	2018
PARANAVSYS MS C	2	2018	2	2018
PARANAVSYS Software Upgrades/Development	1	2021	4	2021
Military Altimeter DT/OT	4	2018	3	2020
Military Altimeter MS C	1	2021	1	2021
Parachutists Oxygen Delivery System Testing	3	2019	4	2019
Parachutists Oxygen Delivery System MS C	1	2021	1	2021
Static Line (SL) Automatic Activation Device DT/OT Testing	2	2019	4	2020
SL Canopy Release Assembly Reliability Testing	2	2022	3	2023

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS				<b>Project (Number/Name)</b> EW4 / Crew Served Weapons Engineering Development			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EW4: Crew Served Weapons Engineering Development	-	7.708	9.251	29.611	-	29.611	26.362	39.780	18.041	18.983	0.000	149.736
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

FY 2019 New starts include Next Generation Squad Automatic Rifle (NGSAR) and Increased Barrel Life Replace Chrome.

**A. Mission Description and Budget Item Justification**

The Crew Served Weapons Engineering and Manufacturing Development (EMD) program provides funds to transition components or prototypes from Small Arms Improvement, Project S54, Program Element 0603827A, (Budget Activity 4) and other domestic and foreign sources of small arms weapons to demonstrate, test and evaluate capability near or at planned operational requirements. Crew Served Weapons systems include weapons ranging up to 40 millimeter in caliber. Current and future efforts focus on system improvements designed to enhance lethality, target acquisition, fire control, usability, training effectiveness and reliability of weapons to include ammunition when developing and/or evaluating standard and non-standard weapons. Focus areas include system development, integration (to include human-systems), demonstration, test and evaluate components, prototypes and operational system prototypes of small arms weapons and/or enhancements. Benefits include continuous improvements to small arms weapons, fire control equipment, optics, gun barrels, ancillary equipment, training devices, component mounts, weapon mounts, and weapon/ammunition interface of current small arms fleet or new weapon systems.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> New Weapons	3.215	3.071	28.786	-	28.786
<b>Description:</b> Development of new crew served weapons					
<b>FY 2018 Plans:</b>					
M3/M3E1 Multi-Role Anti-Armor Anti-Personnel Weapon System (MAAWS): Completes Full Materiel Release for M3. Complete Urgent Materiel Release for M3E1 w/Fire Control. Begins developmental testing and complete safety confirmation in support of Type Classification and Full Materiel Release for the M3E1 w/Fire Control.					
Precision Sniper Rifle (PSR): Continues to support SOCOM full and open competitive source selection of PSR weapons with continued solicitation preparation and an Request For Proposal (RFP) release expected in 2QFY18. Support SOCOM in Phase II weapon testing of up-to three (3) IDIQ contracts awarded in 4QFY18. Complete PSR ammunition (XM1162 & XM1163) production RFP with release in 3QFY18.					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> EW4 / Crew Served Weapons Engineering Development

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>New Weapon Evaluations and Assessments: Initial evaluation and assessment of new weapons.</p> <p><b>FY 2019 Base Plans:</b>                      FY 2019 New start: Transition of technologies from Program Element 0603827A S54: Next Generation Squad Automatic Rifle (NGSAR): Will work to coordinate and develop the Capability Development Document (CDD), Acquisition Strategy, Capability Production Document (CPD), and provide data from various technologies to better inform stakeholders. Begin EMD phase for the Next Generation Squad Automatic Rifle with a single vendor.</p> <p>M3/M3E1 Multi-Role Anti-Armor Anti-Personnel Weapon System (MAAWS): Will complete developmental testing and obtain Type Classification and Full Materiel Release for M3E1 w/Fire Control.</p> <p>Precision Sniper Rifle (PSR): Will continue supporting SOCOM testing of up-to three (3) PSR systems with a down-select decision to one (1). Will purchase PSRs to support Army unique Production Qualification Testing, IOT&amp;E, and airborne deployment testing. Will award PSR ammunition production XM1162/XM1163 contracts.</p> <p>New Weapon Evaluations and Assessments: Will perform initial evaluation and assessment of new weapons.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>                      Increased funding due to New Start of Next Generation Squad Automatic Rifle.</p>					
<p><b>Title:</b> Crew Served Weapons Enhancements</p> <p><b>Description:</b> Enhancements and developments of Crew Served weapons</p> <p><b>FY 2018 Plans:</b>                      M2 Lightweight Program - Investigates alternative materials (i.e. titanium) in order to lighten the Warfighter's load, to improve Soldier mobility, respond to vehicle weight restrictions, improve weapon parts life, increase durability and potentially increase performance. Manufacture lightweight titanium weapon parts, assemble improved parts into legacy weapons, conduct testing (production verification/reliability/user evaluation/air drop) on the improved weapon system and modify weapons based on test results.</p> <p>Compact Semi-Automatic Sniper System (CSASS): Completes Production Qualification Testing (PQT) as an entry criteria for the Limited User Test (LUT). Conducts operational assessments and evaluations with a LUT as well as airborne drop testing. Completes Scoring Conference activities prior to release of the Operational Test</p>	1.259	4.464	0.600	-	0.600

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> EW4 / <i>Crew Served Weapons Engineering Development</i>

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Agency Milestone Assessment Report (OMAR). Completes provisioning activities, Core Logistics Assessment (CLA), Life Cycle Sustainment Plan (LCSP) and conducts Log Demo. Continues to develop all documentation and prepare for TC STD, Full Rate Production, and Full Material Release decisions in FY2019. The CSASS is a potential material solution for the Squad Designated Marksman Rifle (SDMR).					
Small Business Innovation Research (SBIR) Enhancements: Support Phase II Enhancement and/or initialization of Phase III SBIR activities that transferred from Program Element 0604601A S63 within the same Program Element.					
Weapon Upgrades and Accessories: Test, evaluate and analyze ongoing and new activities to enhance Crew Served Weapons.					
<b>FY 2019 Base Plans:</b> Transition of technologies from Program Element 0603827A S54: Increased Barrel Life/Replace Chrome: Will complete maturation of design, address residual issues found during previous prototype testing. Will complete refinement of drawing and specification package, build full length barrels for final qualification and safety confirmation testing. Will perform testing at a Government facility.					
M2 Lightweight Program - Will continue to investigate alternative materials (i.e. titanium) in order to lighten the Warfighter's load, to improve Soldier mobility, respond to vehicle weight restrictions, improve weapon parts life, increase durability and potentially increase performance. Manufacture lightweight titanium weapon parts, assemble improved parts into legacy weapons, conduct testing (production verification/reliability/user evaluation/air drop) on the improved weapon system and modify weapons based on test results.					
Small Business Innovation Research (SBIR) Enhancements: Will continue to support Phase II Enhancement and/or initialization of Phase III SBIR activities.					
Gunner Integrated Protection and Restraint System, Objective Gunner Protection Kit (GIPRS/OGPK): Will complete developmental verification testing and begin operational testing for the TOW Missile Objective Gunner Protection Kit (TOGPK) 2.0. Will begin work on technical publications and prepare for TOGPK 2.0 type classification.					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> EW4 / Crew Served Weapons Engineering Development			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Weapon Upgrades and Accessories: Will continue to test, evaluate and analyze ongoing and new activities to enhance Crew Served Weapons.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decreased funding due to completion of both the M2 Lightweight Program and Compact Semi-Automatic Sniper System efforts completed in FY2018.					
<b>Title:</b> Ammunition <b>Description:</b> Improvement of Crew Served Weapons Ammunition  <b>FY 2018 Plans:</b> Ammunition Upgrades: Test, evaluate and analyze the effect of current and new ammunition on Crew Served Weapons. Specific focus on alignment of requirements between crew served fire control and 40mm air burst munitions.  Evaluates other M3/E1 MAAWs munitions such as the smoke and illuminating rounds currently used by SOCOM.  <b>FY 2019 Base Plans:</b> Ammunition Upgrades: Will continue to test, evaluate and analyze the effect of current and new ammunition on Crew Served Weapons. Specific focus on alignment of requirements between crew served fire control and 40mm air burst munitions.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decreased funding due to completed FY18 ammunition efforts.	0.650	0.226	0.100	-	0.100
<b>Title:</b> Combat Optics <b>Description:</b> Improvement of Combat Optics  <b>FY 2018 Plans:</b> Mounted Machinegun Optic: Continues to finalize Test and Evaluation Master Plan (TEMP), Acquisition Strategy/Acquisition Plan, and Production Readiness Review (PRR) for program execution. Completes Procurement package, plans and develops Request for Proposals for down select. Award contract for initial source selection and down select. Develops Test Plan and conducts testing for first down select for further evaluation.	0.720	1.390	0.025	-	0.025

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> EW4 / Crew Served Weapons Engineering Development

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>Optic Upgrades: Continues engineering evaluations, verification and validation of weapon optics performance requirements.</p> <p><b>FY 2019 Base Plans:</b> Mounted Machinegun Optic: Will work to achieve Full Material Release for the MMO. Will conduct Production Verification Tests and First Article Tests and Production Readiness Review (PRR) for program production execution. Will award contract for full rate production. Will prepare and conduct First Unit Equipped actions for the MMO.</p> <p>Optic Upgrades: Will continue engineering evaluations, verification and validation of weapon optics performance requirements.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decreased funding due to the completion of the Mounted Machinegun Optic effort in R&amp;D and transitioning to production in FY18.</p>					
<p><b>Title:</b> Fire Control</p> <p><b>Description:</b> Improvement of Crew Served Weapons fire control.</p>	1.764	-	-	-	-
<p><b>Title:</b> Research and Analysis</p> <p><b>Description:</b> Market Research and Cost Benefit Analysis</p> <p><b>FY 2018 Plans:</b> Continues Market Research and Cost Benefit Analysis of new small arms weapon and/or enhancements for engineering and manufacturing development.</p> <p><b>FY 2019 Base Plans:</b> Will continue Market Research and Cost Benefit Analysis of new small arms weapon and/or enhancements for engineering and manufacturing development.</p>	0.100	0.100	0.100	-	0.100
<b>Accomplishments/Planned Programs Subtotals</b>	7.708	9.251	29.611	-	29.611



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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> EW4 / Crew Served Weapons Engineering Development
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**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Cost To	
			Base	OCO	Total					Complete	Total Cost
• S54: <i>Small Arms Improvement</i>	11.649	6.851	7.687	-	7.687	10.566	16.108	19.243	15.284	0.000	87.388
• S58: <i>Soldier Enhancement Program</i>	9.528	3.353	2.885	-	2.885	2.940	2.999	3.016	2.814	0.000	27.535
• GZ1500: <i>Sniper Rifles Modifications</i>	1.963	1.488	2.747	-	2.747	0.958	1.932	1.890	1.926	Continuing	Continuing
• GZ1290: <i>M249 SAW Machine Gun MODS</i>	1.179	3.339	3.924	-	3.924	4.487	3.414	-	-	Continuing	Continuing
• GZ1300: <i>M240 Medium Machine Gun MODS</i>	1.784	4.577	6.940	0.007	6.947	10.315	6.635	5.358	3.390	Continuing	Continuing
• GB3000: <i>MK-19 Grenade Machine Gun MODS</i>	4.959	2.000	1.684	-	1.684	1.718	6.708	11.700	14.417	Continuing	Continuing
• GB4000: <i>M2 50 Cal Machine Gun MODS</i>	48.582	47.414	21.600	4.920	26.520	12.490	10.116	3.973	0.849	Continuing	Continuing
• GC0925: <i>Modifications Less Than \$5.0m (WOCV-WTCV)</i>	3.157	2.219	5.577	-	5.577	5.089	3.386	3.158	3.150	Continuing	Continuing
• GL3200: <i>Items Less Than \$5.0m (WOCV-WTCV)</i>	2.331	5.075	3.174	1.397	4.571	1.337	2.777	2.880	2.988	Continuing	Continuing
• G13000: <i>M240 Medium Machine Gun (7.62mm)</i>	-	1.992	1.955	0.126	2.081	-	-	103.072	159.912	Continuing	Continuing
• G01506: <i>WTCV, G015060, Precision Sniper Rifle</i>	-	-	0.000	-	0.000	9.417	13.382	15.363	16.558	Continuing	Continuing
• G13101: <i>MULTI-ROLE ANTI-ARMOR ANTI-PERSONNEL WEAPON SYSTEM</i>	-	6.520	23.345	-	23.345	19.542	18.008	40.251	36.606	Continuing	Continuing

**Remarks**

In support of Small Arms Requirements, components or prototypes developed in Small Arms Improvement, Project S54, Program Element 0603827A, (Budget Activity 4) is transitioned to Crew Served Weapons Engineering Development, Project EW4, Program Element 0604601A, (Budget Activity 5) to conduct engineering and manufacturing development. Once the component, prototype or operational prototype achieves Milestone C and type classification the item transitions to small arms weapon production or modification program.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>EW4 / Crew Served Weapons Engineering Development</i>

**D. Acquisition Strategy**  
Primary strategy is to mature and finalize design efforts, award Research, Development, Test and Evaluation (RDT&E) hardware contracts, and test and evaluate systems that result in type classification and follow-on production contract awards.

**E. Performance Metrics**  
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604601A / INFANTRY SUPPORT WEAPONS				EW4 / Crew Served Weapons Engineering Development							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Allot	PM Soldier Weapons, : Picatinny Arsenal	-	0.200	Mar 2017	0.251		1.500	Mar 2019	-		1.500	Continuing	Continuing	Continuing
Travel	MIPR	PM Soldier Weapons, : Picatinny Arsenal	-	0.040	Mar 2017	0.049		0.075	Mar 2019	-		0.075	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	0.240		0.300		1.575		-		1.575	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Fabrication	Various	Various : Multiple Contractors	-	0.200	Mar 2017	0.150		19.282	Mar 2019	-		19.282	Continuing	Continuing	Continuing
Hardware Development	MIPR	Army Research Development Engineers Centers : Multiple	-	0.074	Mar 2017	2.519		2.500	Mar 2019	-		2.500	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	0.274		2.669		21.782		-		21.782	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering	MIPR	Army Research Development Engineering Centers : Multiple	-	3.174	Mar 2017	2.708		2.675	Mar 2019	-		2.675	Continuing	Continuing	Continuing
Logistics	MIPR	Tank & Automotive Command (TACOM), : Warren	-	0.269	Mar 2017	0.068		0.070	Mar 2019	-		0.070	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604601A / INFANTRY SUPPORT WEAPONS				EW4 / Crew Served Weapons Engineering Development							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Human Research and Engineering	MIPR	Army Research Laboratory, : Aberdeen Proving Ground	-	0.269	Mar 2017	0.068		0.070	Mar 2019	-		0.070	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	3.712		2.844		2.815		-		2.815	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Testing	MIPR	Army Developmental Test Command, : Aberdeen Proving Ground	-	1.365	Mar 2017	2.850		2.869	Mar 2019	-		2.869	Continuing	Continuing	Continuing
Operational Testing	MIPR	Army Test and Evaluation Command, : Aberdeen Proving Ground	-	1.848	Mar 2017	0.520		0.500	Mar 2019	-		0.500	Continuing	Continuing	Continuing
Validation Testing	MIPR	Army Test and Evaluation Centers, : Multiple	-	0.269	Mar 2017	0.068		0.070	Mar 2019	-		0.070	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	3.482		3.438		3.439		-		3.439	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			-	7.708		9.251		29.611		-		29.611	Continuing	Continuing	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>EW4 / Crew Served Weapons Engineering Development</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>NEW WEAPONS</b>																												
Next Generation Squad Automatic Rifle (NGSAR)																												
M3/M3E1 Multi-Role Anti-Armor Anti-Personnel Weapon System																												
Precision Sniper Rifle (PSR)																												
New Weapon Evaluations and Assessments																												
<b>CREW SERVED WEAPON ENHANCEMENTS</b>																												
M2 Lightweight Program																												
Gunner Integrated Protection and Restraint Systems (GIPRS/OC)																												
Increased Barrel Life																												
Compact Semi-Automatic Sniper System (CSASS)																												
Weapons Upgrades and Accessories																												
Small Business Innovation Research (SBIR) Enhancements																												
<b>AMMUNITION</b>																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>EW4 / Crew Served Weapons Engineering Development</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
XM1112 Airburst Non-Lethal Munition (ANLM)																												
Ammunition Upgrades																												
<b>COMBAT OPTICS</b>																												
Mounted Machinegun Optic																												
Optic Upgrades																												
<b>FIRE CONTROL</b>																												
Small Arms Fire Control - Precision Program of Record																												
Fire Control Upgrades																												
<b>RESEARCH AND ANALYSIS</b>																												
Research and Analysis																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>EW4 / Crew Served Weapons Engineering Development</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
NEW WEAPONS	1	2017	4	2023
Next Generation Squad Automatic Rifle (NGSAR)	1	2019	4	2023
M3/M3E1 Multi-Role Anti-Armor Anti-Personnel Weapon System (MAAWS)	1	2017	4	2020
Precision Sniper Rifle (PSR)	1	2017	4	2020
New Weapon Evaluations and Assessments	1	2018	4	2023
CREW SERVED WEAPON ENHANCEMENTS	1	2017	4	2023
M2 Lightweight Program	1	2018	4	2019
Gunner Integrated Protection and Restraint Systems (GIPRS/OGPK)	1	2017	4	2023
Increased Barrel Life	1	2019	4	2020
Compact Semi-Automatic Sniper System (CSASS)	1	2017	4	2018
Weapons Upgrades and Accessories	1	2017	4	2023
Small Business Innovation Research (SBIR) Enhancements	1	2017	4	2018
AMMUNITION	1	2017	4	2023
XM1112 Airburst Non-Lethal Munition (ANLM)	1	2017	4	2017
Ammunition Upgrades	1	2017	4	2023
COMBAT OPTICS	1	2017	4	2023
Mounted Machinegun Optic	1	2017	4	2022
Optic Upgrades	1	2017	4	2023
FIRE CONTROL	1	2017	4	2017
Small Arms Fire Control - Precision Program of Record	1	2017	4	2017
Fire Control Upgrades	1	2017	4	2017
RESEARCH AND ANALYSIS	1	2017	4	2023

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army			<b>Date:</b> February 2018	
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> EW4 / <i>Crew Served Weapons Engineering Development</i>		

Events	Start		End	
	Quarter	Year	Quarter	Year
Research and Analysis	1	2017	4	2023



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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> FF2 / Small Arms Fire Control
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
FF2: <i>Small Arms Fire Control</i>	-	0.000	20.117	20.201	-	20.201	21.463	10.163	11.254	4.967	0.000	88.165
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Small Arms Fire Control (SAFC) was previously funded under Projects S63 and EW4, Program Element (PE) 0604601A Infantry Support Weapons, and transitioned to FF2 in FY2018 under the same PE.

**A. Mission Description and Budget Item Justification**

Small Arms Fire Control (SAFC) is a requirement for optimized fire control devices with improved Size Weight and Power (SWAP) to support Squad (S), Crew Served (CS) and Precision (P). SAFC shall increase the probability of hit and decrease time to engage across a range of small arms weapon systems, with a direct-view optic that allows for quicker and more accurate target detection and recognition. The SAFC shall utilize an open system of systems architecture comprised of modular components, to deliver to current ground forces the initial increased core capability followed by increasing increments of capability/enhancements over time as technology matures and evolves. Small Arms Fire Control will culminate in multiple configurations: a Small Arms Fire Control - Squad (SAFC-S), Small Arms Fire Control - Crew Served (SAFC-CS), and Small Arms Fire Control - Precision (SAFC-P). They may include technology such as variable magnification direct view (day) optics, atmospheric sensors, an overlaid digital display, weapon orientation sensor, range determination, ballistic computer, disturbed reticle, and networked lethality. There are also other associated fire control efforts being worked simultaneously to include Advanced Individual Handheld Binocular (AIHB), Advanced Fire Control with Precision Projectile Tracking, Next Generation Fire Control, and Small Arms Fire Control for 40mm Low Velocity.

FY2019 RDT&E funding in the amount of \$20.201 million will continue the Engineering and Manufacturing Development (EMD) Phases for the two (2) Fire Control configurations ( SAFC-CS and SAFC-P) and will support integration, manufacture, and testing of Next Generation Fire Control technologies. FY2019 funding will be focused on bid sample contract awards, down selection, design/prototyping, developmental and initial operational testing and evaluation. Other associated fire control efforts being worked simultaneously include, Advanced Individual Handheld Binocular (AIHB), Advanced Fire Control with Precision Projectile Tracking, and Small Arms Fire Control for 40mm Low Velocity.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<b>Title:</b> Design, Develop and Fabricate	-	11.412	11.638	-	11.638
<b>Description:</b> Includes contract awards for the Engineering and Manufacturing Development of the three Fire Control configurations (SAFC-S, SAFC-CS and SAFC-P) and the Advanced Individual Handheld Binocular (AIHB).					
<b>FY 2018 Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> FF2 / Small Arms Fire Control

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>Multiple contract awards begins the development and integration of various Fire Control configurations and development of initial prototypes. Initial prototypes will be delivered, system functional reviews will be conducted, and a design alternation plan will be established.</p> <p><b>FY 2019 Base Plans:</b> Will continue development and integration of various Fire Control configurations and transition squad variant, to conduct functional reviews and implement alternation plans for initial prototypes. Will award EMD Phase contracts.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funded amount of contract increases for EMD contract award.</p>					
<p><b>Title:</b> Engineering Support</p> <p><b>Description:</b> Government engineering support at lab/center, providing oversight of design development, integration and contractor performance.</p> <p><b>FY 2018 Plans:</b> Provides engineering support and oversight of design improvements and contractor performance. Participate in source selection activities and technical reviews.</p> <p><b>FY 2019 Base Plans:</b> Will continue to provide systems engineering support and oversight of design improvements and contractor performance. Continue participation in source selection activities and technical reviews. Will provide oversight of development and operational test activities, preliminary and critical design reviews.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Additional funds are required for preliminary and critical design reviews in FY2019.</p>	-	3.530	3.575	-	3.575
<p><b>Title:</b> Test and Evaluation</p> <p><b>Description:</b> Government testing and evaluation of Commercial Off The Shelf / Non-Developmental Item (COTS/NDI) items, prototypes, articles and improvements.</p> <p><b>FY 2018 Plans:</b> Develops test and evaluation criteria and documentation, test bid samples, test and evaluate improvements of initial prototypes. Prototype systems will be tested both for technical capability as well as user evaluation.</p>	-	3.894	3.880	-	3.880

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> FF2 / Small Arms Fire Control

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Assess and evaluate incorporating existing target acquisition/fire control component technologies into binoculars. Recommendations for system improvement and improved acceptability will be generated.  <b>FY 2019 Base Plans:</b> Will complete bid sample testing and conduct developmental and operational test activities for small arms fire control variants. Will conduct preliminary and critical design reviews. Will continue to assess and evaluate incorporating existing target acquisition/fire control component technologies into binoculars.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Slight decrease in funds as one variant completes test and evaluation activities in early FY2019.					
<b>Title:</b> Program Management  <b>Description:</b> Program management office, providing oversight of contract actions, engineering support and test activities.  <b>FY 2018 Plans:</b> Provide program oversight of design, development, integration and testing, to include contract actions, engineering support and test activities throughout the fiscal year.  <b>FY 2019 Base Plans:</b> Provides Program Management (PM) non-labor operations.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> PM labor will be funded with OMA dollars in FY2019.	-	1.281	1.108	-	1.108
<b>Accomplishments/Planned Programs Subtotals</b>	-	20.117	20.201	-	20.201

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• S54: <i>Small Arms Improvement</i>	11.649	6.851	7.687	-	7.687	10.566	16.108	19.243	15.284	0.000	87.388
• G17202: <i>CREW SERVED SA-FC</i>	-	-	0.000	-	0.000	-	24.398	37.996	61.448	Continuing	Continuing
• G17203: <i>Precision SA-FC</i>	-	-	7.929	-	7.929	8.497	17.936	31.599	33.326	Continuing	Continuing

**Remarks**  
Small Arms Fire Control was previously funded on Program Element 0604601A Infantry Support Weapons, under Projects S63 and EW4.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> FF2 / <i>Small Arms Fire Control</i>

**D. Acquisition Strategy**

The Small Arms Fire Control (SAFC) program will use an incremental developmental acquisition strategy.

The Small Arms Fire Control - Precision (SAFC-P) shall award up to two (2) Engineering and Manufacturing Development contract in FY2018. Total Approved Acquisition Objective (AAO) for the SAFC-P is 6,004 systems.

The Small Arms Fire Control - Crew Served (SAFC-CS) shall award up to three (3) Engineering and Manufacturing Development contracts in late FY2018, with a follow-on contract option to fully develop the system. Total Approved Acquisition Objective (AAO) for the SAFC-CS is 20,478 systems.

The Small Arms Fire Control - Squad (SAFC-S) shall award up to two (2) Engineering and Manufacturing Development contracts in late FY2019 to early FY2020 carrying both systems through Critical Design Review. Iterative prototyping will be used to gather both technical and user feedback, and continuous technical improvements will be made on the system design. Based on test data and user feedback, a single vendor will be down-selected for an LRIP production option award in 4QFY2020 followed by FRP FY2021. Total Approved Acquisition Objective (AAO) for the SAFC-S is 48,095 systems.

Additional Small Arms Fire Control Projects: Other associated Fire Controls will be tested and evaluated simultaneously.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> FF2 / Small Arms Fire Control
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<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering & Manufacturing Development Contract - Precision Fire Control	C/FFP	TBD : TBD	-	-		5.193	Jan 2018	6.236	Dec 2018	-		6.236	Continuing	Continuing	-
Engineering & Manufacturing Development Contract #1 - Crew Served Fire Control	C/FFP	TBD : TBD	-	-		0.500	Dec 2017	0.600	Nov 2018	-		0.600	Continuing	Continuing	-
Engineering & Manufacturing Development Contract #2 - Crew Served Fire Control	C/FFP	TBD : TBD	-	-		0.500	Dec 2017	0.600	Nov 2018	-		0.600	Continuing	Continuing	-
Engineering & Manufacturing Development Contract #3 - Other	C/FFP	TBD : TBD	-	-		3.500	Mar 2018	3.202	Feb 2019	-		3.202	Continuing	Continuing	-
Engineering & Manufacturing Development Contract #4- Squad Fire Control	C/FFP	TBD : TBD	-	-		-		1.000	Aug 2019	-		1.000	Continuing	Continuing	-
<b>Subtotal</b>			-	-		9.693		11.638		-		11.638	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	US Army Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	-	-		3.530	Oct 2017	3.575	Oct 2018	-		3.575	Continuing	Continuing	-
Program Management (Non-Labor)	Allot	Project Manager Soldier Weapons	-	-		1.500	Oct 2017	0.558	Oct 2018	-		0.558	Continuing	Continuing	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> FF2 / Small Arms Fire Control
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<b>Support (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			<b>Target Value of Contract</b>	
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>		
		(PMSW) /Non-Labor : Picatinny Arsenal, NJ														
Contractor Support	C/FFP	TBD : TBD	-	-		1.500	Oct 2017	0.400	Nov 2018	-		0.400	Continuing	Continuing	-	
Logistical Management	MIPR	US Army Tank & Automotive Command (TACOM) : Warren, MI	-	-		-		0.150	Dec 2018	-		0.150	Continuing	Continuing	-	
<b>Subtotal</b>			-	-		6.530		4.683		-		4.683	Continuing	Continuing	N/A	

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	
Test and Evaluation	MIPR	US Army Test and Evaluation Command (ATEC) : Aberdeen Proving Ground, MD	-	-		1.419	Jan 2018	1.610	Nov 2018	-		1.610	Continuing	Continuing	-
Test and Evaluation	MIPR	US Army Research Laboratory : Aberdeen Proving Ground, MD	-	-		0.850	Nov 2017	0.770	Jan 2019	-		0.770	Continuing	Continuing	-
Test and Evaluation	MIPR	Maneuver Battle Lab, US Army Maneuver Center of Excellence : FT Benning, GA	-	-		0.800	Oct 2017	0.700	Dec 2018	-		0.700	Continuing	Continuing	-
Test and Evaluation	MIPR	White Sands Missile Range : White Sands Missile Range, NM	-	-		0.825	Nov 2017	0.800	Jan 2019	-		0.800	Continuing	Continuing	-
<b>Subtotal</b>			-	-		3.894		3.880		-		3.880	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>								<b>Date: February 2018</b>			
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS				<b>Project (Number/Name)</b> FF2 / Small Arms Fire Control				
	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>		<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	
<b>Project Cost Totals</b>	-	-	20.117		20.201	-	20.201	Continuing	Continuing	N/A	

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> FF2 / <i>Small Arms Fire Control</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Engineering & Manufacturing Development - Small Arms Fire Control - Precision																												
Engineering & Manufacturing Development - Small Arms Fire Control - Crew Served																												
Engineering & Manufacturing Development - Small Arms Fire Control - Squad																												
Additional Small Arms Fire Control Projects																												
Engineering Support																												
Test and Evaluation																												
Program Management (labor & non-labor)																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> FF2 / <i>Small Arms Fire Control</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Engineering & Manufacturing Development - Small Arms Fire Control - Precision	1	2018	2	2020
Engineering & Manufacturing Development - Small Arms Fire Control - Crew Served	2	2018	3	2020
Engineering & Manufacturing Development - Small Arms Fire Control - Squad	4	2019	2	2021
Additional Small Arms Fire Control Projects	1	2018	4	2023
Engineering Support	1	2018	4	2023
Test and Evaluation	1	2018	4	2023
Program Management (labor & non-labor)	1	2018	4	2023

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> F12 / Lightweight 30mm Cannon
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
F12: <i>Lightweight 30mm Cannon</i>	-	0.000	5.500	0.000	-	0.000	1.384	0.000	0.000	0.000	0.000	6.884
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

In support of an Army directed requirement (reference DAPR-ZA Memorandum, dated 5 July 2016) to provide an increased lethality modification to the Joint Light Tactical Vehicle (JLTV), to serve as the Infantry Brigade Combat Team (IBCT) light reconnaissance vehicle, an upgraded medium caliber weapon will be developed, tested and evaluated for integration into a modified remote weapon station.

The XM914 is an upgraded and modified version of the M230 cannon currently equipped on the AH-64 Apache advanced attack helicopter. The XM914 is a link fed, externally powered and electrically primed 30mm chain gun, capable of firing two hundred rounds per minute. The gun incorporates an anti-hangfire system and an extended barrel for enhanced muzzle velocity. The XM914 provides significant lethality improvements over the current M2 .50 caliber machine gun and MK19 grenade machine gun and provides the capability required for Soldiers in a combat environment to engage enemy personnel and light armored targets.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p><b>Title:</b> Contractor Design and Prototype Fabrication</p> <p><b>Description:</b> Includes contractor design, development and prototype fabrication for engineering and manufacturing development of the XM914 30mm autocannon.</p> <p><b>FY 2018 Plans:</b> Contractor begins work on the design and development effort for the XM914 30mm autocannon. Initial prototypes of the weapon and test hardware were purchased to conduct safety and limited reliability testing.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease in funding as weapon prototypes are delivered.</p>	-	3.600	-	-	-
<p><b>Title:</b> Engineering Support</p> <p><b>Description:</b> Government engineering support at lab/center, providing design, limited testing and oversight of development and contractor performance.</p> <p><b>FY 2018 Plans:</b></p>	-	1.150	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> F12 / Lightweight 30mm Cannon

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Provides design and development input, oversight of contractor performance, and participation in technical reviews. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease in funding as engineering support ends.					
<b>Title:</b> Test and Evaluation <b>Description:</b> Government testing and evaluation of weapon prototype, articles and system improvements. <b>FY 2018 Plans:</b> Conducts initial testing of prototype weapons. Develop test and evaluation plans, criteria and documentation. Generate system improvement recommendations. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease in funding as test and evaluation ends.	-	0.500	-	-	-
<b>Title:</b> Program Management <b>Description:</b> Program management office provides oversight of contract actions, engineering support and test activities. <b>FY 2018 Plans:</b> Provides program oversight of design, development, integration and testing, to include contract actions, engineering support and test activities throughout the fiscal year. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Program management labor costs transition to the Operations & Maintenance, Army (OMA) account in FY2019.	-	0.250	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	-	5.500	-	-	-

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• G13800: GUN AUTOMATIC 30MM M230	-	-	7.434	-	7.434	19.825	9.913	-	-	0.000	37.172
• G04700: Common Remotely Operated Weapons Station	25.164	0.750	35.968	3.378	39.346	19.825	24.560	-	-	Continuing	Continuing

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> F12 / Lightweight 30mm Cannon

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• S64: <i>Common Remotely Operated Wpn Sys (CROWS)</i>	11.548	22.500	0.000	-	0.000	-	-	-	-	0.000	34.048

**Remarks**

**D. Acquisition Strategy**

The XM914 is currently considered a non-standard weapon that is being sold commercially to foreign customers by the vendor. As a modified version of the M230 30mm chain gun for the AH-64 Apache advanced attack helicopter, the XM914 requires safety confirmation/safety release and weapon qualification for vehicle mounted platforms. In order to meet the Urgent Materiel Release (UMR) requirement of nine (9) systems by FY19 (and the remaining 243 systems to follow), a sole source contract based on urgency will be pursued for a period of performance of one (1) year. A long term Indefinite Delivery/Indefinite Quantity (IDIQ) type contract will be pursued for the year to follow.

The program supports new and emerging urgent requirements for the Joint Light Tactical Vehicle Directed Requirement and will support integration with the Remote Weapon Station on the vehicle or other platforms.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604601A / INFANTRY SUPPORT WEAPONS				F12 / Lightweight 30mm Cannon								
<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Management	MIPR	PM Soldier Weapons : Picatinny Arsenal, NJ	-	-		0.250	Oct 2017	-		-		-	Continuing	Continuing	Continuing	
<b>Subtotal</b>			-	-		0.250		-		-		-	Continuing	Continuing	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Contractor Design and Prototype Fabrication	SS/FFP	Orbital ATK : Dulles, VA	-	-		3.600	Nov 2017	-		-		-	Continuing	Continuing	Continuing	
<b>Subtotal</b>			-	-		3.600		-		-		-	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Engineering Support	MIPR	US Army Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	-	-		1.150	Oct 2017	-		-		-	Continuing	Continuing	Continuing	
<b>Subtotal</b>			-	-		1.150		-		-		-	Continuing	Continuing	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Test and Evaluation	MIPR	Army Test and Evaluation Command (ATEC) :	-	-		0.500	Jan 2018	-		-		-	Continuing	Continuing	Continuing	

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**Exhibit R-3, RDT&E Project Cost Analysis:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>F12 / Lightweight 30mm Cannon</i>
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		Aberdeen Proving Ground, MD													
<b>Subtotal</b>			-	-		0.500		-		-		-	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	-		5.500		-		-		-	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> F12 / <i>Lightweight 30mm Cannon</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Contractor Design and Prototype Fabrication																												
Engineering Support																												
Test and Evaluation																												
Program Management																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> F12 / <i>Lightweight 30mm Cannon</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Contractor Design and Prototype Fabrication	1	2018	4	2018
Engineering Support	1	2018	4	2018
Test and Evaluation	1	2018	4	2018
Program Management	1	2018	4	2018



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS			<b>Project (Number/Name)</b> S58 / Soldier Enhancement Program				
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
S58: Soldier Enhancement Program	-	9.528	3.353	2.885	-	2.885	2.940	2.999	3.016	2.814	0.000	27.535
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Description: The Soldier Enhancement Program (SEP) was established in the Fiscal Year 1990 National Defense Authorization Act. SEP provides an innovative approach that includes procurement and evaluation of Commercial Off the Shelf (COTS)/Non Developmental Item (NDI)/Government Off The Shelf (GOTS) items that have the potential to enhance an Army Infantryman and Soldiers' ability to execute their combat mission. SEP provides significant savings and acceleration in the evaluation of items. The SEP program is managed jointly by Program Executive Office (PEO) Soldier and the U.S. Army Training and Doctrine Command-Maneuver Center of Excellence. SEP suggestions are submitted by individual Soldiers, Field Commanders, commercial manufacturers, and others via the PEO Soldier SEP website. Viable suggestions are vetted by a Council of Colonels (CoC) and validated as SEP initiatives by Department of the Army, Deputy Chief of Staff, G8, Force Development. A limited number of validated SEP initiatives are procured and evaluated for feasibility and suitability. Based on the evaluation findings, the SEP CoC provides one or more of the following courses of action: (1) no further action required, (2) item did not meet objectives, (3) inform deliberate or urgent/emerging requirements generation, (4) initiate a new Program of Record (POR), (5) improve an existing POR, (6) transition to the Rapid Equipping Force or (7) add to the Rapid Fielding Initiative list.

Justification: FY19 RDT&E funding supports SEP evaluations and documentation of results.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Soldier Enhancement Program (SEP) Evaluations	9.007	2.821	2.373	-	2.373
<b>Description:</b> Procured and evaluated COTS/GOTS/NDI items that have the potential to enhance Soldier combat effectiveness.					
<b>FY 2018 Plans:</b> Funding will support evaluation of approximately 25 initiatives. Product evaluations will include safety testing, collection, and analysis of user feedback/results and documentation of results.					
<b>FY 2019 Base Plans:</b> Funding will support evaluation of approximately 20 initiatives. Product evaluations will include safety testing, collection, and analysis of user feedback/results and documentation of results.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>S58 / Soldier Enhancement Program</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
FY18 to FY19 funding decrease due to reduced number of anticipated initiatives scheduled for evaluation.					
<b>Title:</b> Systems Engineering and Program Management.	0.521	0.532	0.512	-	0.512
<b>Description:</b> Systems Engineering and Program Management.					
<b>FY 2018 Plans:</b> Upon conclusion of soldier evaluations, the SEP team will receive and review incoming proposals. The team will coordinate with industry and TRADOC to ensure submitted proposals satisfy Army needs. Will continue to evaluate SEP initiatives and provide recommendations.					
<b>FY 2019 Base Plans:</b> Upon conclusion of the evaluations, the SEP team will receive and review incoming proposals. The team will coordinate with industry and TRADOC to ensure submitted proposals satisfy Army needs. Will continue to evaluate SEP initiatives and provide recommendations.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY18 to FY19 funding increase due to level of support required.					
<b>Accomplishments/Planned Programs Subtotals</b>	9.528	3.353	2.885	-	2.885

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• MA6800: <i>Soldier Enhancement</i>	2.112	1.095	1.103	-	1.103	1.125	1.147	1.161	1.184	0.000	8.927
• E99105: <i>Soldier Enhancement Program Ammo</i>	0.341	0.248	0.253	-	0.253	0.260	0.267	0.272	0.277	0.000	1.918
• GC0076: <i>Small Arms Equipment (Soldier Enh Prog)</i>	3.155	1.573	1.640	-	1.640	1.673	1.706	1.738	1.738	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**  
SEP focuses on COTS/GOTS/NDI initiatives submitted by Soldiers and industry. SEP proposals are reviewed and approved semiannually. Procurement funds SEP COTS/GOTS/NDI items for evaluation. Research, Development, Test and Evaluation is used to conduct product evaluations which includes safety testing, data collection, analysis of Soldier feedback/results and documentation of results.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S58 / <i>Soldier Enhancement Program</i>

<b><u>E. Performance Metrics</u></b> NA
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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army											Date: February 2018				
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604601A / INFANTRY SUPPORT WEAPONS					Project (Number/Name) S58 / Soldier Enhancement Program						

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Various	MIPR	PEO Soldier : Ft. Belvoir, VA	13.256	0.521	Mar 2017	0.532	Dec 2017	0.512	Dec 2018	-		0.512	Continuing	Continuing	Continuing
<b>Subtotal</b>			13.256	0.521		0.532		0.512		-		0.512	Continuing	Continuing	N/A

**Remarks**  
Systems Engineering and Program Management includes engineering support, conducting technical evaluations, market research and program reviews.

Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Various	MIPR	Various : Various	39.573	-		-		-		-		-	0.000	39.573	Continuing
<b>Subtotal</b>			39.573	-		-		-		-		-	0.000	39.573	N/A

**Remarks**  
Candidates for the Soldier Enhancement Program are received, reviewed, and approved semi-annually. Contractual efforts are focused on procuring prototypes for testing.

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Various	MIPR	PEO Soldier : Ft. Belvoir, VA	6.424	-		-		-		-		-	0.000	6.424	-
<b>Subtotal</b>			6.424	-		-		-		-		-	0.000	6.424	N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Various	MIPR	Various : Various	34.353	9.007	Aug 2017	2.821		2.373		-		2.373	Continuing	Continuing	Continuing
<b>Subtotal</b>			34.353	9.007		2.821		2.373		-		2.373	Continuing	Continuing	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> S58 / Soldier Enhancement Program
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

**Remarks**  
Testing costs vary annually depending on number and type of items being evaluated.

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	93.606	9.528	3.353	2.885	-	2.885	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>S58 / Soldier Enhancement Program</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Evaluate Initiatives 1-2Q FY17	[Redacted] Test approved proposals																											
SEP Council of Colonel approval/prioritization process 2Q FY17	1																											
	Approval/prioritization of SEP Proposals																											
Evaluate Initiatives 3-4Q FY17	[Redacted] Test approved proposals																											
SEP Council of Colonel approval/prioritization process 4QFY17	[Redacted] 2																											
	Approval/prioritization of SEP Proposals																											
Evaluate Initiatives 1-2Q FY18					[Redacted] Test approved proposals																							
SEP Council of Colonel approval/prioritization process 2Q FY18					3																							
					Approval/prioritization of SEP Proposals																							
Evaluate Initiatives 3-4Q FY18					[Redacted] Test approved proposals																							
SEP Council of Colonel approval/prioritization process 4QFY18					[Redacted] 4																							
					Approval/prioritization of SEP Proposals																							
Evaluate Initiatives 1-2Q FY19									[Redacted] Test approved proposals																			
SEP Council of Colonel approval/prioritization process 2Q FY19									5																			
									Approval/prioritization of SEP Proposals																			
Evaluate Initiatives 3-4Q FY19									[Redacted] Test approved proposals																			
SEP Council of Colonel approval/prioritization process 4QFY19									[Redacted] 6																			
									Approval/prioritization of SEP Proposals																			
Evaluate Initiatives 1-2Q FY20													[Redacted] Test approved proposals															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> S58 / Soldier Enhancement Program

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023																																			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																																
SEP Council of Colonel approval/prioritization process 4QFY20																	7 Approval/prioritization of SEP Proposals																																											
Evaluate Initiatives 1-2Q FY21																	Test approved proposals																																											
SEP council proposal approval/prioritization 2QFY21																	8 Approval/prioritization of SEP Proposals																																											
Evaluate Initiatives 3-4Q FY21																	Test approved proposals																																											
SEP Council of Colonel approval/prioritization process 4QFY21																	9 Approval/prioritization of SEP Proposals																																											
Evaluate Initiatives 1-2Q FY22																	Test approved proposals																																											
<b>SEP council proposal approval/prioritization 2QFY22</b>																																									Test approved proposals																			
Evaluate Initiatives 3-4Q FY22																																									Test approved proposals																			
SEP Council of Colonel approval/prioritization process 4QFY22																																																									Test approved proposals			
Evaluate Initiatives 1-2Q FY23																																																									Test approved proposals			
SEP council proposal approval/prioritization 2QFY23																																																									12 Prioritization of Propo			
Evaluate Initiatives 3-4Q FY23																																																									Test app			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>S58 / Soldier Enhancement Program</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Evaluate Initiatives 1-2Q FY17	1	2017	2	2017
SEP Council of Colonel approval/prioritization process 2Q FY17	2	2017	2	2017
Evaluate Initiatives 3-4Q FY17	3	2017	4	2017
SEP Council of Colonel approval/prioritization process 4QFY17	4	2017	4	2017
Evaluate Initiatives 1-2Q FY18	1	2018	2	2018
SEP Council of Colonel approval/prioritization process 2Q FY18	2	2018	2	2018
Evaluate Initiatives 3-4Q FY18	3	2018	4	2018
SEP Council of Colonel approval/prioritization process 4QFY18	4	2018	4	2018
Evaluate Initiatives 1-2Q FY19	1	2019	2	2019
SEP Council of Colonel approval/prioritization process 2Q FY19	2	2019	2	2019
Evaluate Initiatives 3-4Q FY19	3	2019	4	2019
SEP Council of Colonel approval/prioritization process 4QFY19	4	2019	4	2019
Evaluate Initiatives 1-2Q FY20	1	2020	2	2020
SEP Council of Colonel approval/prioritization process 4QFY20	4	2020	4	2020
Evaluate Initiatives 1-2Q FY21	1	2021	2	2021
SEP council proposal approval/prioritization 2QFY21	3	2021	3	2021
Evaluate Initiatives 3-4Q FY21	3	2021	4	2021
SEP Council of Colonel approval/prioritization process 4QFY21	4	2021	4	2021
Evaluate Initiatives 1-2Q FY22	1	2022	2	2022
SEP council proposal approval/prioritization 2QFY22	2	2022	2	2022
Evaluate Initiatives 3-4Q FY22	3	2022	4	2022
SEP Council of Colonel approval/prioritization process 4QFY22	4	2022	4	2022



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**Exhibit R-4A, RDT&E Schedule Details:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S58 / <i>Soldier Enhancement Program</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
Evaluate Initiatives 1-2Q FY23	1	2023	2	2023
SEP council proposal approval/prioritization 2QFY23	2	2023	2	2023
Evaluate Initiatives 3-4Q FY23	3	2023	4	2023

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> S60 / Clothing & Equipment
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
S60: Clothing & Equipment	-	8.401	7.022	5.355	-	5.355	6.453	6.724	5.015	4.850	0.000	43.820
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This funding supports engineering and manufacturing development tasks related to individual clothing and equipment with the goal of enhancing the survivability, mobility and quality of life of the individual Soldier. It funds system integration and formal Developmental Testing/Operational Testing of preproduction and production representative systems leveraging advancements in materials, fabrication techniques, moisture management, flame resistant, antimicrobial treatments, insect protection, extreme environmental protection and chemical/biological protection and camouflage, to include evaluation, test, and conduct of Soldier evaluations of Organizational Clothing and Individual Equipment appropriate for use in jungle/tropical and Arctic environments. Goal is to increase the capabilities and durability of tactical and non-tactical clothing and individual equipment. Includes integration and interface on the Soldier system.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p><b>Title:</b> Soldier Uniforms and Clothing</p> <p><b>Description:</b> Develop and provide superior and sustainable integrated clothing for the Soldier in a rapidly changing global environment.</p> <p><b>FY 2018 Plans:</b> Uniform Clothing and Environmental Clothing System. Complete user evaluation for Flame Resistant Fuel Handlers Coveralls to support material change proposal. Complete development of Chief of Staff of the Army (CSA) initiated Army Business Uniform (Pinks &amp; Greens). Initiate modifications to achieve final designs on the Improved Hot Weather Army Combat Uniform. Initiate final design on Variant 2 of the Jungle Combat Boot. Conduct limited user evaluation on uniforms with improved protection against insects and flame while increasing moisture management, signature management, breathability, and durability for tactical clothing transitioning from S-53. Provide evaluation support of commercial offerings against the military product description for the athletic shoe in support of the Department of Defense. Conduct human factors evaluation on the Maternity uniform to support full rate production decision.</p> <p>Complete NDAA-directed testing to develop Purchase Description for Berry Amendment-compliant clothing bag running shoe. FR Uniforms: Conduct user evaluation on uniforms made from improved FR materials.</p>	6.666	5.820	4.326	-	4.326

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S60 / <i>Clothing &amp; Equipment</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Plans to continue to refine designs and incorporate alternate materials into clothing bag items.  <b>FY 2019 Base Plans:</b> Conduct user evaluation on environmental protective handwear for use in Arctic environments. Continue modifications to support improved protection against insects and flame while increasing moisture management, signature management, breathability, and durability for tactical clothing. Continue to provide evaluation support of commercial offerings against the military product description for the athletic shoe in support of the Department of Defense and Congressional direction. Conduct flame testing on all FR clothing items using testing methodology transitioning from Science and Technology (S&T) community.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding decrease in Clothing and Equipment portfolio is due to anticipated reduced requirements in FY18 and FY19.					
<b>Title:</b> Individual Equipment  <b>Description:</b> Develop and provide superior and sustainable integrated individual equipment for the Soldier in a rapidly changing global environment.  <b>FY 2018 Plans:</b> Nuclear, Biological and Chemical (NBC)/Load Carriage/Hydration: Continue live chemical agent testing for the Multi-Purpose Hydration System (MPHS) to increase operational life to reach 365 days once placed into service in an operational environment. Also, conduct second year of five year live agent test protocol to extend shelf-life of hydration systems. Continue limited user evaluation and testing of tactical holster to be fielded with the new Modular Handgun System. Conduct MOLLE 4000 large ruck user evaluation to include safety confirmation jumps to satisfy Special Operations Test Directorate.  <b>FY 2019 Base Plans:</b> Procure assets and conduct limited user evaluation on government designed Modular Handgun System Holster. Test methodology provides three dimensional anthropometrically correct instrumented hand and head forms for testing in flame environment. Perform safe to fly testing on Advanced Tactical Assault Panel. Test increased capacity capability for IWTD.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>	1.735	1.202	1.029	-	1.029

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S60 / <i>Clothing &amp; Equipment</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Funding decrease in Clothing and Equipment portfolio is due to anticipated reduced requirements in FY18 and FY19.					
<b>Accomplishments/Planned Programs Subtotals</b>	8.401	7.022	5.355	-	5.355

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• S53: <i>RDTE, 0603827.S53, Clothing and Equipment</i>	3.493	2.612	1.845	-	1.845	2.495	1.831	2.445	4.743	Continuing	Continuing
• Central Funding and Fielding: <i>OMA, 121017, Central Funding and Fielding</i>	49.604	-	0.000	-	0.000	-	-	-	-	Continuing	Continuing
• Force Readiness Operations Support: <i>OMA, 121018, Force Readiness Operations Support</i>	-	79.417	38.000	-	38.000	39.800	39.100	40.113	40.119	0.000	276.549

**Remarks**

**D. Acquisition Strategy**  
Acquisition strategies for these programs vary in methods, and range from: 1) Material Change programs that result in engineering changes to existing systems to; 2) Traditional development programs that include an Engineering and Manufacturing Development phase ranging in duration from 12 to 48 months, depending on the level of complexity and testing required.

**E. Performance Metrics**  
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604601A / INFANTRY SUPPORT WEAPONS				S60 / Clothing & Equipment								
<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Management Support	Allot	PM SCIE : Ft Belvoir	9.079	0.623		0.703		0.695		-		0.695	Continuing	Continuing	Continuing	
<b>Subtotal</b>			9.079	0.623		0.703		0.695		-		0.695	Continuing	Continuing	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Engineering Support	Various	NSRDEC : Natick, MA	15.795	0.490		0.500		0.495		-		0.495	Continuing	Continuing	Continuing	
Development Contracts	Various	Various : Various	43.633	2.500		2.745		2.187		-		2.187	Continuing	Continuing	Continuing	
<b>Subtotal</b>			59.428	2.990		3.245		2.682		-		2.682	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Misc Support Costs	Various	Various : Various	16.086	0.400		0.400		0.400		-		0.400	Continuing	Continuing	Continuing	
<b>Subtotal</b>			16.086	0.400		0.400		0.400		-		0.400	Continuing	Continuing	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Developmental Testing	MIPR	Various : Various	21.139	4.388		2.674		1.578		-		1.578	Continuing	Continuing	Continuing	
<b>Subtotal</b>			21.139	4.388		2.674		1.578		-		1.578	Continuing	Continuing	N/A	
<b>Project Cost Totals</b>			105.732	8.401		7.022		5.355		-		5.355	Continuing	Continuing	N/A	

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Army							<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>			<b>Project (Number/Name)</b> S60 / <i>Clothing &amp; Equipment</i>				
	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	

Remarks

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S60 / <i>Clothing &amp; Equipment</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023									
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4						
<b>UNIFORM CLOTHING</b>																																		
Continue Fabric & FR Upgrades																																		
FR Next Gen Materials Testing																																		
Clothing Bag Upgrades and Evaluations																																		
Jungle Ensemble Transition to Production									▲ 2																									
Cold/Extreme Cold Weather System MS C																													▲ 7					
Cold/Extreme Cold Weather Boot MS C																	▲ 4				▲ 5													
Modular Cold/Extreme Glove Sys MS C																	▲ 4																	
EPS Upgrades																																		
Military Free Fall Environment Equipment Milestone C																													▲ 6					
<b>INDIVIDUAL EQUIPMENT</b>																																		
IWTD MS C			▲ 1																															
Poncho Liner/Field Tarp Testing																																		

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>S60 / Clothing &amp; Equipment</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
On the Move Hydration Operational Life Testing	████████████████				████████████████																							
Tactical Holster Testing	████████████████				████████████████																							
Increased Capacity IWTD	████████████████				████████████████				████████████████																			
Increased on the move Hydration Capacity	████████████████				████████████████				████████████████																			
Ghillie Suit MS C	████████████████				████████████████				▲ 3																			



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S60 / <i>Clothing &amp; Equipment</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
UNIFORM CLOTHING	1	2010	4	2022
Continue Fabric & FR Upgrades	3	2009	4	2018
FR Next Gen Materials Testing	2	2021	4	2022
Clothing Bag Upgrades and Evaluations	1	2012	4	2018
Jungle Ensemble Transition to Production	2	2018	2	2018
Cold/Extreme Cold Weather System MS C	4	2023	4	2023
Cold/Extreme Cold Weather Boot MS C	1	2021	1	2021
Modular Cold/Extreme Glove Sys MS C	1	2020	1	2020
EPS Upgrades	3	2021	3	2023
Military Free Fall Environment Equipment Milestone C	1	2023	1	2023
INDIVIDUAL EQUIPMENT	2	2008	4	2022
IWTD MS C	4	2017	4	2017
Poncho Liner/Field Tarp Testing	2	2016	1	2017
On the Move Hydration Operational Life Testing	2	2017	4	2018
Tactical Holster Testing	2	2017	1	2018
Increased Capacity IWTD	1	2019	1	2020
Increased on the move Hydration Capacity	1	2019	1	2020
Ghillie Suit MS C	1	2019	1	2019

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS				<b>Project (Number/Name)</b> S61 / Acis Engineering Development			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
S61: Acis Engineering Development	-	3.726	4.011	3.612	-	3.612	2.990	2.866	2.926	2.969	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project conducts Engineering and Manufacturing Development (EMD) for the Air Soldier System (Air SS). The Air SS is Army aircrew survival and mission equipment that improves safety, survivability, and human performance. The Air SS Capability Development Document (CDD) addresses capability gaps identified during sustained combat operations in Iraq and Afghanistan including inadequate crew station compatibility caused by equipment bulk, aircraft mishaps as a result of limited Situational Awareness (SA), and lack of functionally integrated aircrew mission and survival equipment. Air SS delivers reduced bulk and weight of survival equipment; improved crew station compatibility; and improved pilot SA and safety. The Air SS provides enhanced terrain, threat, and obstacle avoidance information; improved heads-up display (HUD) technologies that increase the aviator's SA; the capability to perform extended missions in extreme environmental and chemical/biological threat conditions; the capability to digitally replace paper-based DoD Flight Information Publications (Electronic Flight Bag); and develops and tests a modernized replacement for the Air Warrior survival vest that integrates with Soldier Protection System body armor (Aircrew Combat Ensemble). This project also funds the development and test of deferred CDD capabilities including improved laser eye protection and tactile cueing that enhances aviator SA. This program does not duplicate any aircraft platform program efforts. Includes integration and interface of products on Soldiers.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Aircrew Integrated Systems (ACIS) Engineering Development	3.726	4.011	3.612	-	3.612
<b>Description:</b> Development, Integration, evaluation, testing, and qualification of Air Soldier System multi-phased capabilities as technologies mature.					
<b>FY 2018 Plans:</b> FY 2018 Plans: Conduct Operational Test of the Air SS in the UH-60L and integration, qualification, and operational test of the Electronic Flight Bag, and continue integration, test, and qualification of the Aircrew Combat Ensemble.					
<b>FY 2019 Base Plans:</b> Continue Aircrew Combat Ensemble and Electronic Flight Bag Developmental Test and Operational Test as part of the developmental effort for the Air Soldier System Pre-planned Product Improvements Phase.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S61 / <i>Acis Engineering Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Decrease in FY 2019 from FY 2018 is due to planned completion of IOT&E in FY 2018.					
<b>Accomplishments/Planned Programs Subtotals</b>	3.726	4.011	3.612	-	3.612

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• AZ3110: <i>Aircraft Procurement, Army SSN AZ3110 - ACIS</i>	30.297	47.066	27.483	-	27.483	25.423	23.353	32.381	35.104	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

Engineering and Manufacturing Development efforts for the Air SS program include development, integration, test, and airworthiness qualification of aviator flight display symbology technologies that will increase crew member situational awareness, and aircrew protective and survival equipment that reduces bulk and weight and improves crew station compatibility and mission effectiveness. Air SS includes improvements to the current flight helmet; improvements to the survival gear carriage system; lightweight body armor; environmental protective clothing and personal survival equipment; and a day/night helmet-mounted flight symbology display for UH-60 and CH-47 aviators. The Air SS P3I phase includes the development and qualification of the EFB, a digital Army aviation replacement for paper-based DoD Flight Information Publications, and the Aircrew Combat Ensemble (ACE), a replacement for the current Air Warrior survival vest that will further reduce weight and bulk, accommodate migration to the Army's new Soldier Protection System (SPS) modular ballistic protection system, and enhance compatibility and stowage/interface provisions for current and future clothing and individual survival equipment. P3I efforts also continue to develop deferred capabilities as defined within the Capability Development Document (CDD) to include tactile Situational Awareness enhancements and enhanced laser eye protection. Contracts with industry include both Cost and Firm Fixed Price using full and open competition, each evaluated and selected to appropriately share risk between industry and the government.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604601A / INFANTRY SUPPORT WEAPONS				S61 / Acis Engineering Development							
<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PM Administration	Allot	Various Government : Huntsville, Alabama	3.214	0.387		0.396		0.197		-		0.197	Continuing	Continuing	Continuing
<b>Subtotal</b>			3.214	0.387		0.396		0.197		-		0.197	Continuing	Continuing	N/A
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Air Warrior and Air Soldier System Development	C/CPFF	Various Government : Various Locations	59.133	1.492		1.768		1.349		-		1.349	Continuing	Continuing	Continuing
<b>Subtotal</b>			59.133	1.492		1.768		1.349		-		1.349	Continuing	Continuing	N/A
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Matrix Support	RO	Various Government : Various Locations	3.815	0.292		0.292		0.055		-		0.055	Continuing	Continuing	Continuing
<b>Subtotal</b>			3.815	0.292		0.292		0.055		-		0.055	Continuing	Continuing	N/A
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental and Operational Testing	RO	Various Activities : Various Locations	12.217	1.555		1.555		2.011		-		2.011	Continuing	Continuing	Continuing
<b>Subtotal</b>			12.217	1.555		1.555		2.011		-		2.011	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Army							<b>Date:</b> February 2018				
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>				<b>Project (Number/Name)</b> S61 / <i>Acis Engineering Development</i>				
	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>		<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	
<b>Project Cost Totals</b>	78.379	3.726	4.011		3.612	-	3.612	Continuing	Continuing	N/A	

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>S61 / Acis Engineering Development</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023																							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																				
Air SS Full Rate Production (FRP) Decision																																																
Air SS Pre-planned Product Improv (P3I) Phase																																																
Electronic Flight Bag (EFB) Integration & Qualification																																																
Aircrew Combat Ensemble (ACE) Integration and Qualification																																																
EFB and ACE Developmental Test/Operational Test (DT/OT)																																																
EFB Production Decision																																																
ACE Production Decision																																																
Deferred Air SS Capabilities Develop & Qual																																																

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S61 / <i>Acis Engineering Development</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Air Soldier System System (Air SS) Dev, Dem and Qual Test	1	2012	4	2015
Air SS Full Rate Production (FRP) Decision	3	2018	3	2018
Air SS Pre-planned Product Improv (P3I) Phase	1	2016	4	2023
Electronic Flight Bag (EFB) Integration & Qualification	1	2017	4	2018
Aircrew Combat Ensemble (ACE) Integration and Qualification	1	2017	4	2019
EFB and ACE Developmental Test/Operational Test (DT/OT)	1	2018	4	2019
EFB Production Decision	1	2019	1	2019
ACE Production Decision	1	2020	1	2020
Deferred Air SS Capabilities Develop & Qual	1	2020	4	2023

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> S62 / Counter-Defilade Target Engagement - SDD
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
S62: Counter-Defilade Target Engagement - SDD	-	9.244	0.000	2.000	-	2.000	0.000	0.000	0.000	0.000	0.000	11.244
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Maneuver Center of Excellence (MCoE), FT Benning, GA (User Community) identifies the Counter Defilade Target Engagement (CDTE) as a critical capability gap for our Soldiers in combat. A Next Generation Counter Defilade Weapon to mitigate the critical capability gap (defeating defilade (hidden) targets from 35-500m) is required. The Next Generation Counter Defilade Weapon will provide the Infantry Soldier with a leap-ahead overmatch capability that allows the Soldier to engage defilade targets with a high degree of accuracy while posing minimal burden, in terms of weight and size. The system will integrate a weapon, ammunition, and a target acquisition/fire control subsystem that integrates thermal capability with direct-view optics, laser rangefinder, environmental sensors, ballistic computer, and internal display.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<b>Title:</b> Support Next Generation Counter Defilade Weapon Requirements Development	9.244	-	2.000	-	2.000
<b>FY 2019 Base Plans:</b> Support Next Generation Counter Defilade Weapon Requirements Development.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding increased to support Counter Defilade Target Engagement (CDTE) Requirements Development					
<b>Accomplishments/Planned Programs Subtotals</b>	9.244	-	2.000	-	2.000

**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• G16101: (G16101) Integrated Air Burst Weapon System Family	7.064	-	0.000	-	0.000	-	-	-	-	0.000	7.064

**Remarks**



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Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604601A / INFANTRY SUPPORT WEAPONS	Project (Number/Name) S62 / Counter-Defilade Target Engagement - SDD

**D. Acquisition Strategy**

Utilize existing hardware to conduct user requested demonstrations and analyses that will be used to inform counter defilade requirements. As counter defilade requirements are finalized for the Next Generation Counter Defilade Weapon, acquisition approaches will be explored and selected in order to provide this capability to the user.

**E. Performance Metrics**

N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>											<b>Date: February 2018</b>				
<b>Appropriation/Budget Activity</b> 2040 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS					<b>Project (Number/Name)</b> S62 / Counter-Defilade Target Engagement - SDD				

<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	Various	Performed by Government : Various Activities	4.221	0.687	Mar 2018	-		0.400	Mar 2019	-		0.400	0.000	5.308	-
Contract Management Services	MIPR	ACC-APG : Aberdeen	-	0.146	Nov 2017	-		-		-		-	0.000	0.146	-
<b>Subtotal</b>			4.221	0.833		-		0.400		-		0.400	0.000	5.454	N/A

**Remarks**  
Program is under review by the Army Acquisition Executive (AAE) for a path forward.

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Contract Termination Costs	SS/BA	ATK : Plymouth, MN	127.624	8.216	Dec 2018	-		-		-		-	0.000	135.840	-
<b>Subtotal</b>			127.624	8.216		-		-		-		-	0.000	135.840	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Contractor Support	Option/ FFP	Various : PMSW, Picatinny Arsenal. NJ	0.425	0.195	Nov 2017	-		-		-		-	0.000	0.620	-
Training Development Support	MIPR	TACOM/PEO STRI : TACOM/PEO STRI	0.993	-		-		-		-		-	0.000	0.993	-
Engineering Support	MIPR	Government : Various	8.912	-		-		0.450	Mar 2019	-		0.450	0.000	9.362	-
<b>Subtotal</b>			10.330	0.195		-		0.450		-		0.450	0.000	10.975	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>S62 / Counter-Defilade Target Engagement - SDD</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Design, Develop & Fabricate	████████				████████																							
Engineering and Training Development	████████																											
Development Tests & Evaluation	████████																											
Program Management	████████																											
Pre-Production Qualification Testing (PPQT #2)	██████				████████																							
Limited User Testing (LUT)	██																											
MS C/Type Classification-Limited Procurement	▲																											
Low Rate Initial Production (LRIP)-IOT&E			██████																									
Design, Develop & Fabricate Support Requirements Development													████████															
Engineering Support													████████															
Test and Evaluation													████████															
Program Management FY19													████████															

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>S62 I Counter-Defilade Target Engagement - SDD</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Design, Develop & Fabricate	1	2011	4	2017
Engineering and Training Development	1	2011	4	2017
Development Tests & Evaluation	1	2011	4	2017
Program Management	1	2011	4	2018
Pre-Production Qualification Testing (PPQT #2)	4	2016	2	2017
Limited User Testing (LUT)	2	2017	2	2017
MS C/Type Classification-Limited Procurement	2	2017	2	2017
Low Rate Initial Production (LRIP)-IOT&E	3	2017	4	2017
Design, Develop & Fabricate Support Requirements Development	1	2019	4	2019
Engineering Support	1	2019	4	2019
Test and Evaluation	1	2019	4	2019
Program Management FY19	1	2019	4	2019

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>				<b>Project (Number/Name)</b> S63 / <i>Individual Weapons Engineering Development</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
S63: <i>Individual Weapons Engineering Development</i>	-	7.631	6.961	5.756	-	5.756	6.129	23.352	22.556	16.810	0.000	89.195
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

FY 2019 New starts include Next Generation Carbine/Rifle.

Program Element 0604601A / Infantry Support Weapons, S63 / Individual Weapons Engineering Development Small Arms Fire Control effort has moved to FF2 / Small Arms Fire Control in FY2018 within same Program Element.

**A. Mission Description and Budget Item Justification**

The Individual Weapons Engineering Development program provides funds to transition components or prototypes from Small Arms Improvement, Project S54, Program Element 0603827A, (Budget Activity 4) and other domestic and foreign sources of small arms weapons to demonstrate, test and evaluate capability near or at planned operational requirements. Small arms systems include weapons ranging up to 40 millimeter in caliber. Current and future efforts focus on system improvements designed to enhance lethality, target acquisition, fire control, usability, training effectiveness and reliability of weapons to include ammunition when developing and/or evaluating standard and non-standard weapons. Focus areas include system development, integration (to include human-systems), demonstration, test and evaluate components, prototypes and operational system prototypes of small arms weapons and/or enhancements. Benefits include continuous improvements to small arms weapons, fire control equipment, optics, gun barrels, ancillary equipment, training devices, component mounts, weapon mounts, and weapon/ammunition interface of current small arms fleet or new weapon systems.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> New Weapons	4.885	6.661	4.656	-	4.656
<b>Description:</b> Description: Development of new weapons					
<b>FY 2018 Plans:</b> Modular Handgun System (MHS): Continue Production Verification Test activities including Soldier in the Loop Accuracy testing, award first production option for the handguns and ammunition to support completion of Initial Operational Test and Evaluation (IOT&E). Complete Energetic Material Qualification (EMQ) testing, and conduct Log Demo two (2). Conduct First Article Test (FAT) for both the full size and compact versions of the MHS. Conduct activities required to support Conditional Materiel Release, Type Classification ? Limited Production, and Full Materiel Release.					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>S63 / Individual Weapons Engineering Development</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Squad Designated Marksman Rifle (SDMR): Continue to inform requirements and the Doctrine, Organization, Training, Materiel, Leadership & Education, Personnel, and Facilities (DOTMLPF) analysis. Continue to develop Acquisition Strategy and initiate execution.					
Interim Combat Service Rifle (ICSR): Test and evaluate potential ICSR variants. The ICSR will be a lightweight derivative of a 7.62mm caliber rifle for selected Brigade Combat Teams (BCT) pending development, procurement and fielding of a new Next Generation Squad Automatic Rifle (NGSAR). BCTs require the capability to engage threat personnel with aimed lethal and accurate fires at ranges exceeding the current 5.56mm Carbine provided today. Threats are now typically engaging US Forces at ranges between 300m - 600m. US Forces require this interim capability to regain parity and limited overmatch while the longer term overmatch capability is under development.					
New Weapon Evaluations and Assessments: Continue to provide initial evaluation and assessment of new weapons.					
<b>FY 2019 Base Plans:</b> FY 2019 New Start: Next Generation Carbine/Rifle: Will begin the development of the Next Generation Carbine/Rifle. BCTs require the capability to engage protected and unprotected threat personnel with aimed lethal and accurate fires exceeding the capability of current carbines available today.					
Squad Designated Marksman Rifle (SDMR): Will continue to test and evaluate the Squad Designated Marksman Rifle, a highly accurate long range rifle system for Squad Designated Marksmen within BCTs.					
New Weapon Evaluations and Assessments: Will continue to provide initial evaluation and assessment of new weapons.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease funding due to Modular Handgun System (MHS) RDTE efforts being completed in FY18.					
<b>Title:</b> Small Arms Weapons Enhancements	0.100	0.100	0.900	-	0.900
<b>Description:</b> Description: Enhancements and developments of small arms weapons					
<b>FY 2018 Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>S63 I Individual Weapons Engineering Development</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
Adaptive Lubricious Coatings: Develop manufacturing technology to support production of super hydrophobic and other coatings in support of Small Arms Weapons. Assess and evaluate current manufacturing process studies and assessments to adapt the coating technology into weapon Original Equipment Manufacturer manufacturing processes.					
Small Business Innovation Research (SBIR) Enhancements: Support Phase II Enhancement and/or initialization of Phase III SBIR activities.					
Weapon Upgrades and Accessories: Test, evaluate, and analyze ongoing and new activities to enhance small arms weapons.					
<b>FY 2019 Base Plans:</b> Adaptive Lubricious Coatings: Will continue to develop manufacturing technology to support production of super hydrophobic and other coatings in support of Small Arms Weapons. Will assess and evaluate current manufacturing process studies and assessments to adapt the coating technology into weapon Original Equipment Manufacturer manufacturing processes.					
Small Business Innovation Research (SBIR) Enhancements: Will continue to support Phase II Enhancement and/or initialization of Phase III SBIR activities.					
Weapon Upgrades and Accessories: Will continue to test, evaluate, and analyze ongoing and new activities to enhance small arms weapons.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase weapons enhancement taskings					
<b>Title:</b> Ammunition					
<b>Description:</b> Description: Improvement of small arms ammunition					
<b>FY 2018 Plans:</b> Ammunition Upgrades: Evaluate the effect of new ammunition on small arms weapons.					
<b>FY 2019 Base Plans:</b>					
	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
	0.050	0.050	0.050	-	0.050



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S63 / <i>Individual Weapons Engineering Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Ammunition Upgrades: Will continue to evaluate the effect of new ammunition on small arms weapons.					
<b>Title:</b> Combat Optics <b>Description:</b> Description: Improvement of combat optics <b>FY 2018 Plans:</b> Grenadier Sighting System (GSS): Finalize the Research and Development effort.  Optics Upgrades: Perform engineering evaluations, verification and validation of weapon optics performance requirements. <b>FY 2019 Base Plans:</b> Optics Upgrades: Will continue to perform engineering evaluations, verification and validation of weapon optics performance requirements.	2.546	0.100	0.100	-	0.100
<b>Title:</b> Research and Analysis <b>Description:</b> Market Research and Cost Benefit Analysis <b>FY 2018 Plans:</b> Continue Market Research and Cost Benefit Analysis of new small arms weapon and/or enhancements for engineering and manufacturing development. <b>FY 2019 Base Plans:</b> Will continue Market Research and Cost Benefit Analysis of new small arms weapon and/or enhancements for engineering and manufacturing development.	0.050	0.050	0.050	-	0.050
<b>Accomplishments/Planned Programs Subtotals</b>	7.631	6.961	5.756	-	5.756

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• S54: <i>Small Arms Improvement</i>	11.649	6.851	7.687	-	7.687	10.566	16.108	19.243	15.284	0.000	87.388
• G01507: <i>COMPACT SEMI-AUTOMATIC SNIPER SYSTEM</i>	-	-	46.236	-	46.236	58.999	21.097	12.237	25.363	Continuing	Continuing
• G13503: <i>M4A1 CARBINE</i>	40.493	43.150	69.306	1.800	71.106	30.394	17.037	11.010	2.166	Continuing	Continuing

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S63 / <i>Individual Weapons Engineering Development</i>
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**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Cost To	
			Base	OCO	Total					Complete	Total Cost
• GB3007: <i>M4 Carbine Mods</i>	27.752	31.315	31.575	-	31.575	17.661	10.791	10.785	10.673	Continuing	Continuing
• G01501: <i>XM320 Grenade Launcher Module (GLM)</i>	3.062	4.524	0.697	-	0.697	0.382	7.945	15.859	19.824	Continuing	Continuing
• G15325: <i>Handgun</i>	2.000	8.326	48.251	-	48.251	22.216	-	-	-	Continuing	Continuing
• GL3200: <i>Items Less Than \$5.0m (WOCV-WTCV)</i>	2.331	5.075	3.174	1.397	4.571	1.337	2.777	2.880	2.988	Continuing	Continuing
• GC0925: <i>Modifications Less Than \$5.0m (WOCV-WTCV)</i>	3.157	2.219	5.577	-	5.577	5.089	3.386	3.158	3.150	Continuing	Continuing
• S58: <i>Soldier Enhancement Program</i>	9.528	3.353	2.885	-	2.885	2.940	2.999	3.016	2.814	0.000	27.535

**Remarks**

In support of Small Arms Requirements, components or prototypes developed in Small Arms Improvement, Project S54, Program Element 0603827A, (Budget Activity 4) is transitioned to Individual Weapons Engineering Development, Project S63, Program Element 0604601A, (Budget Activity 5) to conduct engineering and manufacturing development. Once the component, prototype or operational prototype achieves Milestone C and type classification the item transitions to small arms weapon production or modification program.

**D. Acquisition Strategy**

Primary strategy is to mature and finalize design efforts, award Research, Development, Test and Evaluation (RDT&E) hardware contracts, and test and evaluate systems that result in type classification and follow-on production contract awards.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604601A / INFANTRY SUPPORT WEAPONS				S63 / Individual Weapons Engineering Development							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Allot	PM Soldier Weapons, : Picatinny Arsenal	9.425	0.301	Mar 2017	0.301		0.300	Mar 2019	-		0.300	Continuing	Continuing	Continuing
Travel	MIPR	PM Soldier Weapons, : Picatinny Arsenal	1.287	0.062	Mar 2017	0.062		0.060	Mar 2019	-		0.060	Continuing	Continuing	Continuing
<b>Subtotal</b>			10.712	0.363		0.363		0.360		-		0.360	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Fabrication	Various	Various : Multiple Contractors	2.900	0.300	Mar 2017	0.274		0.300	Mar 2019	-		0.300	Continuing	Continuing	Continuing
Hardware Development	MIPR	Army Research Development Engineering Centers, : Multiple	8.004	0.061	Mar 2017	0.035		0.050	Mar 2019	-		0.050	Continuing	Continuing	Continuing
<b>Subtotal</b>			10.904	0.361		0.309		0.350		-		0.350	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering	MIPR	Army Research Development Engineering Centers, : Multiple	58.100	4.000	Mar 2017	4.004		3.938	Mar 2019	-		3.938	Continuing	Continuing	Continuing
Logistics	MIPR	TACOM, : Warren	4.746	0.100	Mar 2017	0.124		0.100	Mar 2019	-		0.100	Continuing	Continuing	Continuing
Human Research and Engineering	MIPR	Army Research Laboratory, :	3.621	0.100	Mar 2017	0.124		0.100	Mar 2019	-		0.100	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604601A / INFANTRY SUPPORT WEAPONS				S63 / Individual Weapons Engineering Development							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
		Aberdeen Proving Ground													
<b>Subtotal</b>			66.467	4.200		4.252		4.138		-		4.138	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Testing	MIPR	Army Developmental Test Command, : Aberdeen Proving Ground	24.344	1.200	Mar 2017	0.686		0.500	Mar 2019	-		0.500	Continuing	Continuing	Continuing
Operational Testing	MIPR	Army Test and Evaluation Command, : Aberdeen Proving Ground	13.798	1.200	Mar 2017	1.008		0.204	Mar 2019	-		0.204	Continuing	Continuing	Continuing
Validation Testing	MIPR	Army Test and Evaluation Centers, : Multiple	9.212	0.307	Mar 2017	0.343		0.204	Mar 2019	-		0.204	Continuing	Continuing	Continuing
<b>Subtotal</b>			47.354	2.707		2.037		0.908		-		0.908	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			135.437	7.631		6.961		5.756		-		5.756	Continuing	Continuing	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S63 / <i>Individual Weapons Engineering Development</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>NEW WEAPONS</b>																												
Modular Handgun System (MHS)																												
Squad Designated Marksman Rifle (SDMR)																												
Next Generation Carbine/Rifle																												
New Weapon Evaluations and Assessments																												
<b>SMALL ARMS WEAPONS ENHANCEMENTS</b>																												
Adaptive Lubricious Coatings																												
Small Business Innovation Research (SBIR) Enhancements																												
Weapon Upgrades and Accessories																												
<b>AMMUNITION</b>																												
Ammunition Upgrades																												
<b>COMBAT OPTICS</b>																												
Grenadier Sighting System (GSS) for the M320 Grenade Launcher																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>S63 / Individual Weapons Engineering Development</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Optics Upgrades	[Redacted]																											
<b>FIRE CONTROL</b>																												
Small Arms Fire Control-Squad	[Redacted]																											
Fire Control Upgrades	[Redacted]																											
<b>RESEARCH AND ANALYSIS</b>																												
Research and Analysis of Small Arms	[Redacted]																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S63 / <i>Individual Weapons Engineering Development</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
NEW WEAPONS	1	2007	4	2023
Individual Carbine Competition	1	2010	4	2013
Modular Handgun System (MHS)	1	2012	4	2018
M3 Multi-Role Anti-Armor Personnel Weapon System (MAAWS)	1	2015	4	2016
Precision Sniper Rifle (PSR)	1	2015	4	2016
Squad Designated Marksman Rifle (SDMR)	1	2014	4	2019
Next Generation Carbine/Rifle	1	2019	4	2024
New Weapon Evaluations and Assessments	1	2018	4	2023
SMALL ARMS WEAPONS ENHANCEMENTS	1	2008	4	2023
Compact Semi-Automatic Sniper System (CSASS)	1	2015	4	2016
Gain Twist Rifling	1	2013	4	2014
Small Arms Signature Reduction (SASR) Suppressor Technology	1	2011	4	2014
Powered Rail now known as Intelligent Rail	1	2013	4	2016
Sniper Upgrades	1	2016	4	2016
Adaptive Lubricious Coatings	1	2018	4	2019
Small Business Innovation Research (SBIR) Enhancements	1	2015	4	2019
Weapon Upgrades and Accessories	1	2008	4	2023
AMMUNITION	1	2008	4	2023
XM1112 40MM Airburst Non-Lethal Munitions	1	2010	4	2016
Ammunition Upgrades	1	2008	4	2023
COMBAT OPTICS	1	2008	4	2023
Mounted Machine Gun Optics (MMO)	1	2015	4	2016

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>S63 / Individual Weapons Engineering Development</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
Squad Fire Control Optic	1	2014	4	2015
Grenadier Sighting System (GSS) for the M320 Grenade Launcher	1	2009	4	2018
Optics Upgrades	1	2008	4	2023
FIRE CONTROL	1	2008	4	2023
Small Arms Fire Control-Squad	1	2017	4	2017
Fire Control Upgrades	1	2008	4	2017
RESEARCH AND ANALAYSIS	1	2012	4	2023
Research and Analysis of Small Arms	1	2015	4	2023



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS			<b>Project (Number/Name)</b> S64 / Common Remotely Operated Wpn Sys (CROWS)				
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
S64: Common Remotely Operated Wpn Sys (CROWS)	-	11.548	22.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	34.048
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

In support of an Army directed requirement (reference DAPR-ZA Memorandum, date 5 July 2016) to provide an increased lethality modification to the Joint Light Tactical Vehicle (JLTV), to serve as the Infantry Brigade Combat Team (IBCT) light reconnaissance vehicle, an upgraded remote weapon station will be developed that integrates a medium-caliber weapon system. Development will also begin on integration of additional effectors, including an improved and modified remotely operated weapon station for system and component level development, to include mechanical and software integration of Stinger surface-to-air missile.

The Maneuver Support Center of Excellence (MSCoE) at FT Leonard Wood, Missouri (user community) has identified continued development of the Common Remotely Operated Weapon Station (CROWS) as a critical improvement for the Soldier in a combat environment. By addressing the capability gap of non-turreted, lightly armored vehicles where the gunner is exposed to enemy fire, the current CROWS system provides the ability to rapidly and accurately locate and engage the enemy while allowing platform gunners to remain under armor, thereby providing greater protection and increasing overall lethality.

Next generation requirements for the CROWS are identified in the CROWS Increment II Capability Development Document (CDD). CROWS Increment II capability improvements will bolster overall situational awareness, survivability and lethality. Increment II requirements include improved sensor systems for enhanced identification ranges; wider fields of view; improved on-the-move accuracy; training capability; battlefield obscurants; mission data recording for After Action Reviews (AAR); increased lethality using legacy and future anti-personnel and anti-materiel precision scalable lethal and non-lethal weapon systems; improved ballistics protection; adaptability to integrate on a variety of legacy and future platforms including ground vehicles, watercraft, semi-autonomous and autonomous platforms; precision targeting including visible and infrared (IR) pointers; target hand-off; slew-to-cue; escalation of force (EOF) capabilities; and other additional system modifications and improvements.

Obsolescence and Increment II requirements will address recommendations identified in the Operational Test Agency Milestone Assessment Report (OMAR) and user community feedback. These modifications include, but are not limited to: improved optics survivability; auto-zoom; improved auto-tracking; improved sensors for increased situational awareness; and improved rounds counter. Additionally, development efforts will include system and component level reliability improvements that will extend system life and reduce overall CROWS logistics footprint.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Medium Caliber Remote Weapon Station (RWS) Development	4.431	16.875	-	-	-
<b>FY 2018 Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> S64 / Common Remotely Operated Wpn Sys (CROWS)

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>Purchases prototypes and design improvements for a remote weapon station that integrates a medium-caliber weapon system. Contract efforts will culminate in delivery of prototypes of a modified remote weapon station for qualification testing in the following year.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funded amount of contract effort decreases as fabrication of prototypes ends.</p>					
<p><b>Title:</b> Technology Refresh and Obsolescence <b>Description:</b> Description: Technology Refresh and Obsolescence</p>	0.920	-	-	-	-
<p><b>Title:</b> Engineering Support <b>Description:</b> Description: Government Engineering Support.</p> <p><b>FY 2018 Plans:</b> Provides engineering support and oversight of the development of an improved remote weapon station that integrates a medium-caliber weapon system and an integration kit for additional effectors, such as the Stinger surface-to-air missile.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease in funded mount as engineering support and oversight of development ends.</p>	4.608	3.500	-	-	-
<p><b>Title:</b> Test and Evaluation <b>Description:</b> Description: Test and Evaluation</p> <p><b>FY 2018 Plans:</b> Begin planning and documentation for government testing and evaluation of prototype remote weapon stations that integrate a medium-caliber weapon system and an integration kit for additional effectors, such as the Stinger surface-to-air missile.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease to funded amount as government testing and evaluation ends.</p>	0.485	0.625	-	-	-
<p><b>Title:</b> Program Management <b>Description:</b> Description: Program Management.</p> <p><b>FY 2018 Plans:</b></p>	1.104	1.500	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> S64 / Common Remotely Operated Wpn Sys (CROWS)

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Will provide program management oversight of development, testing and evaluation of an improved remote weapon station that integrates a medium-caliber weapon system and an integration kit for additional effectors, such as the Stinger surface-to-air missile.					
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> Program management labor costs transition to the Operations & Maintenance, Army (OMA) account in FY2019.					
<b>Accomplishments/Planned Programs Subtotals</b>	11.548	22.500	-	-	-

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• G04700: Common Remotely Operated Weapons Station	25.164	0.750	35.968	3.378	39.346	19.825	24.560	-	-	Continuing	Continuing
• FI2: Lightweight 30mm Cannon	-	5.500	0.000	-	0.000	1.384	-	-	-	0.000	6.884
• G13800: GUN AUTOMATIC 30MM M230	-	-	7.434	-	7.434	19.825	9.913	-	-	0.000	37.172

**Remarks**

**D. Acquisition Strategy**

The modified medium-caliber remote weapon station that will begin development in FY2018 shall use an incremental acquisition approach in its strategy. The first increment will be part of an Urgent Materiel Release and will modify the legacy M153 Common Remotely Operated Weapon Station (CROWS) in order to integrate the XM914 30mm autocannon. The second increment will require further design and development changes, upgrade the optics on the remote weapon station in order to increase the target identification range of the station to match the capability of the weapon, and incorporate a coaxial machine gun as a secondary weapon system.

The integration of additional effectors, such as the Stinger surface-to-air missile system, will leverage prior efforts to integrate the Javelin missile on the remote weapon station.

The legacy Common Remotely Operated Weapon Station (CROWS) used a single-step acquisition approach in its strategy. The CROWS achieved Type Classification Standard in 3QFY2011, Full Materiel Release in 3QFY2012 and Full Rate Production in 4QFY2012, in accordance with the Capability Production Document (CPD) Increment I, as clarified in June 2009. Capability Development Document Increment II was approved in October 2015 addressing requirements for the next generation of CROWS.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S64 / <i>Common Remotely Operated Wpn Sys (CROWS)</i>
<p>The program objective is to continue developing, improving and fielding the current generation (Increment I) and next generation (Increment II) of CROWS on various platforms in accordance with the Basis of Issue Plan (BOIP). The program supports new and emerging urgent requirements like the integration of the Mine Resistant Ambush Protected (MRAP) family of vehicles, ground combat systems, Joint Lightweight Tactical Vehicles (JLTV) and fixed site mounting systems to support Integrated Base Defense (IBD).</p> <p><b>E. Performance Metrics</b> N/A</p>		

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> S64 / Common Remotely Operated Wpn Sys (CROWS)
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	MIPR	PM Soldier Weapons : Picatinny Arsenal, NJ	1.641	1.104	Feb 2017	1.500	Feb 2018	-		-		-	0.000	4.245	-
<b>Subtotal</b>			1.641	1.104		1.500		-		-		-	0.000	4.245	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Technology Refresh, Obsolescence and Increment II Enhancements	C/FFP	Kongsberg Protech Systems USA : Johnstown, PA	10.714	0.920	Jun 2017	-		-		-		-	0.000	11.634	-
Medium Caliber RWS Development	C/FFP	TBD : TBD	-	4.431	Dec 2017	16.875	Mar 2018	-		-		-	0.000	21.306	-
<b>Subtotal</b>			10.714	5.351		16.875		-		-		-	0.000	32.940	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering Support	MIPR	ARDEC : Picatinny Arsenal, NJ	1.757	4.608	Feb 2017	3.500	Feb 2018	-		-		-	0.000	9.865	-
<b>Subtotal</b>			1.757	4.608		3.500		-		-		-	0.000	9.865	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test Planning and Execution	MIPR	Multiple : Multiple	0.322	0.485	Feb 2017	0.625	Feb 2018	-		-		-	0.000	1.432	-



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S64 / <i>Common Remotely Operated Wpn Sys (CROWS)</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Contractor Design and Fabrication	█				█																							
Engineering Support (Government)	█				█																							
Development Test & Evaluation	█				█																							
Program Management	█				█																							
Increment II Product Improvement	█				█																							
Medium Caliber Remote Weapon Station Development	█				█																							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S64 / <i>Common Remotely Operated Wpn Sys (CROWS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Contractor Design and Fabrication	1	2016	4	2017
Engineering Support (Government)	3	2015	4	2018
Development Test & Evaluation	3	2015	4	2018
Program Management	3	2015	4	2018
Increment II Product Improvement	2	2017	4	2017
Medium Caliber Remote Weapon Station Development	1	2018	4	2018



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS				<b>Project (Number/Name)</b> S70 / Personnel Recovery Support System (PRSS)			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
S70: Personnel Recovery Support System (PRSS)	-	1.084	1.330	0.968	-	0.968	0.990	0.468	0.642	0.563	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Not applicable for this item.

**A. Mission Description and Budget Item Justification**

This project provides the continued maturation of PRSS products that enable operations to report and locate isolated, missing, detained or captured Soldiers. The PRSS program consists of the enhancement of existing products to ensure continued successful interoperability within the relevant theater of operations and the Continental United States (CONUS), and testing of the encrypted Personnel Recovery Device (PRD) that operates over a secure architecture.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Development of Personnel Recovery Support System (PRSS)	1.084	1.330	0.968	-	0.968
<b>Description:</b> Integration, evaluation, testing and qualification of PRSS products to ensure continued successful interoperability within the relevant theater of operation, and development of a PRD that operates over a secure architecture.					
<b>FY 2018 Plans:</b> Conduct a Limited User Test and an Operational Test of production PRDs in support of a full rate production decision.					
<b>FY 2019 Base Plans:</b> Develop and test an alternate PRD secure waveform to ensure continual cyber security is maintained.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 funding is sufficient to maintain operational continuity.					
<b>Accomplishments/Planned Programs Subtotals</b>	1.084	1.330	0.968	-	0.968

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS		<b>Project (Number/Name)</b> S70 / Personnel Recovery Support System (PRSS)	

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>			<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• G01101: Other Procurement, Army, G01101-Personnel Recovery Support System (PRSS)	10.856	5.390	5.948	4.300	10.248	4.823	5.247	5.194	3.075	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

Execute PRSS program development effort for performance optimization through contracts with industry and Military Interdepartmental Purchase Requests to other Governmental agencies. Perform continuing development and test of new waveforms and hardware to ensure successful interoperability for personnel recovery, and to mitigate potential security compromises to the PRSS system.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604601A / INFANTRY SUPPORT WEAPONS				S70 / Personnel Recovery Support System (PRSS)							
<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PM Administration	Allot	Various Organizations : Huntsville, Alabama	0.924	0.023		0.025		0.016		-		0.016	Continuing	Continuing	Continuing
<b>Subtotal</b>			0.924	0.023		0.025		0.016		-		0.016	Continuing	Continuing	N/A
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Personnel Recovery Support System Development Systems Engineering	MIPR	Various Organizations : Various Locations	7.252	0.466		0.630		0.442		-		0.442	Continuing	Continuing	Continuing
<b>Subtotal</b>			7.252	0.466		0.630		0.442		-		0.442	Continuing	Continuing	N/A
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Matrix Support	MIPR	Various Organizations : Various Locations	1.600	-		0.475		0.435		-		0.435	Continuing	Continuing	Continuing
<b>Subtotal</b>			1.600	-		0.475		0.435		-		0.435	Continuing	Continuing	N/A
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Testing / Operational Testing	MIPR	Various Organizations : Various Locations	2.586	0.595		0.200		0.075		-		0.075	Continuing	Continuing	Continuing



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S70 / <i>Personnel Recovery Support System (PRSS)</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Personnel Recovery Support System (PRSS) Development Oversight	[Redacted]																											
PRSS Oversight	[Redacted]																											
PRSS Development and Test	[Redacted]																											
PRSS Development and Test	[Redacted]																											
PRSS LUT and Operational Testing	[Redacted]																											
PRSS LUT and Operational Testing	[Redacted]																											
PRSS Upgrades & Adaptations to New Platforms	[Redacted]																											
PRSS Upgrades & Adaptations	[Redacted]																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> S70 / <i>Personnel Recovery Support System (PRSS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Personnel Recovery Support System (PRSS) Development Oversight	1	2010	4	2023
PRSS Development and Test	1	2010	4	2023
PRSS Prototype Hardware Build and Integration	3	2010	2	2016
PRSS LUT and Operational Testing	3	2018	4	2018
PRSS Upgrades & Adaptations to New Platforms	1	2015	4	2023

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS				<b>Project (Number/Name)</b> VS5 / Soldier Protective Equipment			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
VS5: Soldier Protective Equipment	-	2.114	1.758	6.057	-	6.057	6.777	8.482	9.826	9.655	0.000	44.669
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This funding supports engineering and manufacturing development and full rate production decision reviews of Soldier Protective Equipment. It leverages advancements in technology to continue improvements to hard and soft body armor components, helmets and other personal protective equipment.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Soldier Protective Equipment	2.114	1.758	6.057	-	6.057
<b>Description:</b> The objective of this effort is to increase the Warfighter lethality and mobility, by optimizing Soldier protection while effectively managing all life cycle aspects of Personal Protective Equipment (PPE).					
<b>FY 2018 Plans:</b> Conduct Soldier Protection Systems (SPS) Full Up System Level (FUSL) Experiment 1 & 2, System Integration Human Factors Evaluations (HFE) 3, and SPS improvement HFE. Conduct follow on First Article Tests (FAT) and System Level Testing for the Vital Torso Protection (VTP) systems. Prepare for the Full Rate Production (FRP) decision for VTP by preparing the Army Evaluation Command (AEC) / Director of Operational Test and Evaluation (DOTE) Live fire Test reports. Continue to evaluate and develop system and subsystem technologies across the PPE portfolio (extremities, torso and vital torso, head, eye and face protection) from emerging ballistic and blast threats. Continue to test ballistic properties of current PPE after exposure to extreme storage conditions for better shelf and service life predictions. Continue development of materials and technologies to reduce SPS weight and bulk at the system, subsystem and component level and continue efforts to characterize and increase durability and functional service life. Continue human factors and environmental/exposure testing (cold weather, durability, etc.) and qualification of the Transition Combat Eye Protection (TCEP) to allow its inclusion on the Authorized Protective Eyewear List (APEL).					
<b>FY 2019 Base Plans:</b> Continue to evaluate and develop system and subsystem technologies across the PPE portfolio (extremities, torso and vital torso, head, eye and face protection) from emerging ballistic/blast threats. Continue to test ballistic properties of current PPE after exposure to extreme storage conditions for better shelf and service life					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / INFANTRY SUPPORT WEAPONS	<b>Project (Number/Name)</b> VS5 / Soldier Protective Equipment

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
predictions. Continue SPS system human factors and environmental/exposure testing (cold weather, durability, etc.).					
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> Funding change in Soldier Protective Equipment portfolio is due to anticipated requirement changes in FY18 and FY19. Incorporate 6.4 development efforts as a result of Congressional Plus up in FY17.					
<b>Accomplishments/Planned Programs Subtotals</b>	2.114	1.758	6.057	-	6.057

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• VS4: RDTE, 0603827A.VS4, Soldier Protective Equipment	38.691	10.281	8.224	-	8.224	2.869	4.496	4.967	6.567	0.000	76.095
• OMA: OMA, 121017, Central Funding & Fielding	59.805	74.486	69.678	-	69.678	69.752	69.317	69.161	69.247	0.000	481.446

**Remarks**

**D. Acquisition Strategy**  
Acquisition strategies for these programs vary in methods, and range from: 1) Material Change programs that result in engineering changes to existing systems to; 2) Traditional development programs that include an Engineering and Manufacturing Development phase ranging in duration from 12 to 48 months, depending on the level of design complexity and testing required.

**E. Performance Metrics**  
N/A



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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604601A / INFANTRY SUPPORT WEAPONS				VS5 / Soldier Protective Equipment								
<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Management Support	Allot	Various SPIE : Various	0.167	0.150		0.156		0.300		-		0.300	0.000	0.773	-	
<b>Subtotal</b>			0.167	0.150		0.156		0.300		-		0.300	0.000	0.773	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Prototype Contracts	Various	Various : Various	31.087	1.326		1.152		2.510		-		2.510	Continuing	Continuing	-	
Prod Sys Engineering Spt	MIPR	Various : Various	8.109	-		-		0.300		-		0.300	Continuing	Continuing	-	
<b>Subtotal</b>			39.196	1.326		1.152		2.810		-		2.810	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Matrix Engineering Spt	MIPR	Various : Various	2.587	0.280		0.150		0.300		-		0.300	0.000	3.317	-	
<b>Subtotal</b>			2.587	0.280		0.150		0.300		-		0.300	0.000	3.317	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Environmental/HFE	MIPR	Various DTC & OTC : Various DTC & OTC	10.328	0.358		0.300		2.647		-		2.647	Continuing	Continuing	-	
<b>Subtotal</b>			10.328	0.358		0.300		2.647		-		2.647	Continuing	Continuing	N/A	

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>								<b>Date: February 2018</b>			
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>				<b>Project (Number/Name)</b> <i>VS5 / Soldier Protective Equipment</i>			
	<b>Prior Years</b>	<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	52.278	2.114		1.758		6.057	-	6.057	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>VS5 / Soldier Protective Equipment</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Test and Qualify Improvements to SPS through FY23	[Redacted]																											
TEP Transition to FRP	▲1																											
Conduct IHPS FAT			■																									
IHPS LFT				▲2																								
IHPS Transition to FRP											▲4																	
TCEP LFT			■																									
TCEP APEL Update							▲3																					
TCEP Durability/Cold Weather Test							■																					
SPS System Level Test Technology Insertions	[Redacted]																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>INFANTRY SUPPORT WEAPONS</i>	<b>Project (Number/Name)</b> <i>VS5 / Soldier Protective Equipment</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Test and Qualify Improvements to SPS through FY23	1	2015	4	2023
TEP Transition to FRP	1	2017	1	2017
Conduct IHPS FAT	4	2017	4	2017
IHPS LFT	4	2017	4	2017
IHPS Transition to FRP	2	2019	2	2019
TCEP LFT	4	2017	4	2017
TCEP APEL Update	1	2018	1	2018
TCEP Durability/Cold Weather Test	2	2018	3	2018
SPS System Level Test Technology Insertions	1	2017	4	2023

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>MEDIUM TACTICAL VEHICLES</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	6.039	3.704	-	3.704	2.152	3.325	3.360	3.458	0.000	22.038
H07: <i>Family Of Med Tac Veh</i>	-	0.000	6.039	3.704	-	3.704	2.152	3.325	3.360	3.458	0.000	22.038

**A. Mission Description and Budget Item Justification**

This Program Element (PE) supports continued modernization of the Army's medium truck and trailer fleet and the Armored Security Vehicle (ASV).

The Family of Medium Tactical Vehicles (FMTV) fills 2 1/2-ton Light Medium Tactical Vehicle (LMTV) and 5-ton Medium Tactical Vehicle (MTV) truck requirements and associated companion trailers. FMTV trucks perform over 55 percent of the Army's local haul, line haul, and unit resupply missions. It operates throughout theater as multi-purpose transportation vehicles in combat, combat support, and combat service support units.

The ASV is an all-wheel drive armored vehicle that provides ballistic protection, overhead protection, and protection against landmines. It is used by the Military Police to perform missions of area security, maneuver, and mobility support.

Funding from this Program Element will be used to support the continued evolution of the future FMTV fleet as well as tech insertion opportunities to keep the current FMTV fleet relevant on today's battlefield. This includes upgrades in survivability and crew protection, improved safety by leveraging advancements in commercial active safety technologies, modernizing the aging Low Velocity Air Drop (LVAD) fleet of vehicles, improved utilization through modularity, integration of advanced high efficiency powertrains and fuel saving technologies, and insertion of autonomous vehicle capabilities that will change the way transportation missions are conducted around the world.

FY 2019 Project H07 Base funds in the amount of \$3.704 million will be used to conduct Live Fire Testing of the FMTVA2 truck and the FMTVA1P2 Underbody Armor Kit, as well as design and build an FMTV LVAD technical demonstrator.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>MEDIUM TACTICAL VEHICLES</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	0.000	6.039	3.744	-	3.744
Current President's Budget	0.000	6.039	3.704	-	3.704
Total Adjustments	0.000	0.000	-0.040	-	-0.040
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-0.040	-	-0.040

**Change Summary Explanation**

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604604A / MEDIUM TACTICAL VEHICLES				<b>Project (Number/Name)</b> H07 / Family Of Med Tac Veh			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
H07: Family Of Med Tac Veh	-	0.000	6.039	3.704	-	3.704	2.152	3.325	3.360	3.458	0.000	22.038
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Family of Medium Tactical Vehicles (FMTV) A2 production and Engineering Change Proposal (ECP) modernization effort restores vehicle performance that was lost due to the addition of armor protection kits as the threat to tactical vehicles and the FMTV has increased. The FMTVA2 also addresses Space, Weight, Power, and Cooling (SWaP-C) constraints from having to host an increasing amount of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) and Counter-Incendiary Explosive Device (IED) equipment. Program Management Office (PMO) Medium Tactical Vehicles (MTV) is executing the FMTVA2 effort documented in a signed Acquisition Decision Memorandum (ADM) by the Army Acquisition Executive (AAE) on 16 November 2015. FY 2019 Project H07 Base funds in the amount of \$1.000 million will be used to conduct Live Fire Testing of the FMTVA2.

The FMTVA1P2 represents the FMTV model currently in production with over 38,000 vehicles fielded to date. The FMTVA1P2 will remain in the tactical vehicle fleet until 2040 and beyond. To keep the A1P2 fleet viable into the future and able to perform its mission in austere environments, upgrades to Survivability and Crew Protection Kits will be required as the threat on the battlefield evolves. FY 2019 Project H07 Base funds in the amount of \$.200 million will be used for Live Fire Testing of the improvements to the FMTV Underbody Armor Kits that are required to support Full Material Release.

The three FMTV Low Velocity Air Drop (LVAD) models (M1081, M1093, and M1094) ended production in 2009 and represent the oldest vehicles in the FMTV fleet. Updates to the LVAD are needed to address obsolescence issues and bring the configuration up to current standards. FY 2019 Project H07 Base funds in the amount of \$2.504 million will be used to design and build an FMTV LVAD technical demonstrator.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> FMTVA2 Live Fire Test	-	1.900	1.000
<b>Description:</b> Live Fire test assets are needed to support Live Fire Testing required per Chapter 139, Title 10 USC.			
<b>FY 2018 Plans:</b> Funding is to procure four Family of Medium Tactical Vehicles (FMTV) M1078A2 vehicles for Live Fire testing.			
<b>FY 2019 Plans:</b> Funding will be used to conduct Live Fire Testing on four FMTV M1078A2 vehicles.			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Continuing effort.			
<b>Title:</b> FMTV Underbody Armor Kit Improvement	-	1.800	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / MEDIUM TACTICAL VEHICLES	<b>Project (Number/Name)</b> H07 / Family Of Med Tac Veh		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p><b>Description:</b> Development and testing of improvements to the FMTV Underbody Armor Kit that simplifies the design and reduces installation cost and complexity.</p> <p><b>FY 2018 Plans:</b> Funding is for development and testing of the FMTV Underbody Armor Kit.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> No FY19 RDTE will be used for this category.</p>				
<p><b>Title:</b> Configuration Options Next Generation LVAD Model</p> <p><b>Description:</b> Updates to the Low Velocity Air Drop (LVAD) are needed to address obsolescence issues and bring the configuration up to today?s standards.</p> <p><b>FY 2018 Plans:</b> Funding is for analysis to support configuration options for the next generation LVAD model.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> No FY19 RDTE used for this category.</p>		-	0.500	-
<p><b>Title:</b> Improved Vehicle Safety Technologies</p> <p><b>Description:</b> Improved vehicle safety technologies are now available commercially that can reduce the number and severity of motor vehicle accidents</p> <p><b>FY 2018 Plans:</b> Funding is for development and integration of active safety improvements on the FMTVA1P2.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> No FY19 RDTE used for this category.</p>		-	1.339	-
<p><b>Title:</b> FMTV Obsolescence Concerns</p> <p><b>Description:</b> Address potential obsolescence issues with the powertrain and Material Handling Equipment (MHE) used on the FMTV.</p> <p><b>FY 2018 Plans:</b> Funding is for Analysis of Alternative engine and MHE options to address future obsolescence issues.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b></p>		-	0.450	-



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / MEDIUM TACTICAL VEHICLES	<b>Project (Number/Name)</b> H07 / Family Of Med Tac Veh

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
No FY19 RDTE used for this category.			
<p><b>Title:</b> Systems Engineering/Program Management</p> <p><b>Description:</b> SEPM includes System Engineering and Program Management oversight required to manage the program and provide contractor oversight. Salaries, Benefits, Travel, Personnel Training and other Government costs are included for retaining a professional acquisition workforce.</p> <p><b>FY 2018 Plans:</b> Includes Program Management, Engineering and Budget support for FMTVA1P2 and FMTVA2.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> No FY19 RDTE used for this category.</p>	-	0.050	-
<p><b>Title:</b> FMTVA1P2 Underbody Armor Kit Live Fire Tests</p> <p><b>Description:</b> Live Fire testing of the FMTVA1P2 Underbody Armor Kit improvements to support Full Material Release.</p> <p><b>FY 2019 Plans:</b> Funds will be for Live Fire Testing of the FMTVA1P2 Underbody Armor Kit improvements to support Full Material Release.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> To begin Live Fire testing of FMTVA1P2 Underbody Armor Kit begins.</p>	-	-	0.200
<p><b>Title:</b> FMTV LVAD Technical Demonstrator Vehicle Design and Build</p> <p><b>FY 2019 Plans:</b> Funding will be used to design and build an FMTV LVAD technical demonstrator.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> New effort to design and build an FMTV LVAD technical demonstrator.</p>	-	-	2.504
<b>Accomplishments/Planned Programs Subtotals</b>	-	6.039	3.704

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• D15500: Family Of Medium Tactical Veh (FMTV)	352.769	78.650	132.882	-	132.882	82.544	91.472	104.211	48.729	0.000	891.257

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / MEDIUM TACTICAL VEHICLES	<b>Project (Number/Name)</b> H07 / Family Of Med Tac Veh

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

**D. Acquisition Strategy**

- Conduct FMTVA2 Live Fire Testing: This effort will utilize Government test facilities.
- Conduct FMTV Underbody Armor Kit Live Fire Testing: This effort will utilize Government testing facilities.
- Design and build FMTV LVAD Technical Demonstrator: This effort will utilize Government testing facilities.

**E. Performance Metrics**

N/A

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / MEDIUM TACTICAL VEHICLES	<b>Project (Number/Name)</b> H07 / Family Of Med Tac Veh
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<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FMTV Underbody Armor Kit Improvement.	TBD	To Be Decided : TBD	-	-		1.800		-		-		-	0.000	1.800	-
Configuration Options Next Generation LVAD Model	TBD	To Be Decided : TBD	-	-		0.500		-		-		-	0.000	0.500	-
Improved Vehicle Safety technologies	TBD	To Be Decided : TBD	-	-		1.339		-		-		-	0.000	1.339	-
FMTV Obsolescence Concerns	TBD	To Be Decided : TBD	-	-		0.450		-		-		-	0.000	0.450	-
FMTV LVAD Technical Demonstrator Design and Build	MIPR	TBD : TBD	-	-		-		2.504	Mar 2019	-		2.504	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	-		4.089		2.504		-		2.504	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Engineering/ Program Management (SEPM)	MIPR	PM MTV : TACOM LCMC, Warren, MI	-	-		0.050		-		-		-	0.000	0.050	-
<b>Subtotal</b>			-	-		0.050		-		-		-	0.000	0.050	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FMTVA2 Live Fire Assets	C/FFP	TBD : TBD	-	-		1.900		-		-		-	0.000	1.900	Continuing
FMTVA2 Live Fire Tests	MIPR	ATC : Aberdeen Proving Ground	-	-		-		1.000	Jul 2019	-		1.000	0.000	1.000	-
FMTVA1P2 Underbody Armor Kit Live Fire Tests	MIPR	ATC : Aberdeen Proving Ground	-	-		-		0.200	Apr 2019	-		0.200	0.000	0.200	-



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / MEDIUM TACTICAL VEHICLES	<b>Project (Number/Name)</b> H07 / Family Of Med Tac Veh	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>FMTVA1P2 FY17-19 Production (Sole Source)</b>																												
FMTVA1P2 Underbody Armor Kit Improvement																												
Configuration Options Next Generation LVAD Model																												
Improved Vehicle Safety Technologies																												
FMTV Obsolescence Concerns																												
<b>FMTVA2 FY18-25 Production (Competitive)</b>																												
FMTVA2 Test, TDP Update, Log Product Development																												
FMTVA2 Live Fire Test Assets																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / MEDIUM TACTICAL VEHICLES	<b>Project (Number/Name)</b> H07 / Family Of Med Tac Veh

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
RESEARCH, DEVELOPMENT, TEST & EVALUATION	1	2003	1	2004
FMTV Technology Insertion	1	2008	4	2015
FMTV Armor Technology Insertion	1	2010	4	2015
FMTV Fuel Economy	1	2010	4	2015
FMTV Force Protection Improvement	2	2015	4	2015
ASV Mission Enhancement Package (MEP)	2	2010	2	2012
ASV Current Production	1	2010	1	2013
FMTVA1P2 FY17-19 Production (Sole Source)	4	2017	4	2019
FMTVA1P2 Underbody Armor Kit Improvement	3	2018	4	2020
Configuration Options Next Generation LVAD Model	3	2018	4	2019
Improved Vehicle Safety Technologies	3	2018	4	2019
FMTV Obsolescence Concerns	3	2018	4	2019
FMTVA2 FY18-25 Production (Competitive)	2	2018	2	2025
FMTVA2 Test, TDP Update, Log Product Development	3	2018	1	2022
FMTVA2 Live Fire Test Assets	2	2018	3	2019

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	<b>R-1 Program Element (Number/Name)</b> PE 0604611A / JAVELIN
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	19.241	21.095	10.623	-	10.623	11.897	0.000	0.000	0.000	0.000	62.856
499: Javelin (AAWS-M)	-	19.241	21.095	10.623	-	10.623	11.897	0.000	0.000	0.000	0.000	62.856

**Note**

Not applicable for this item.

**A. Mission Description and Budget Item Justification**

Javelin is a man-portable, fire-and-forget, medium-range missile with enhanced situational awareness and precision direct-fire effects to defeat armored vehicles, fortifications, and soft targets in a range of military operations. Javelin uses a modular design to allow the system to evolve to meet changing threats and requirements via both software and hardware upgrades. The system consists of a reusable Command Launch Unit (CLU) with a built-in-test (BIT), and a modular missile encased in a disposable launch tube assembly. The system also includes training devices for tactical training and classroom training

FY 2019 Base dollars in the amount of \$10.623 million will continue development engineering of the Javelin Lightweight Command Launch Unit (CLU). Objective of the Javelin Lightweight CLU is a 50% reduction in weight and a 35% reduction in size compared to the Block I CLU, while meeting detect, recognize, and identify requirements. Javelin Lightweight CLU is a result of user feedback on weight and bulk, and addresses the Close Combat Missile System - Medium Capability Production Document objective system weight requirement.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	20.011	21.095	17.772	-	17.772
Current President's Budget	19.241	21.095	10.623	-	10.623
Total Adjustments	-0.770	0.000	-7.149	-	-7.149
• Congressional General Reductions	-0.010	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.760	-			
• Adjustments to Budget Years	-	-	-7.149	-	-7.149

**Change Summary Explanation**

Reduction of \$7.149 M represents a program rephrasing of Base dollars from FY19 to FY20.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604611A / JAVELIN				<b>Project (Number/Name)</b> 499 / Javelin (AAWS-M)			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
499: Javelin (AAWS-M)	-	19.241	21.095	10.623	-	10.623	11.897	0.000	0.000	0.000	0.000	62.856
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Javelin is a man-portable, fire-and-forget, medium-range missile with enhanced situational awareness and precision direct-fire effects to defeat armored vehicles, fortifications, and soft targets in a range of military operations. Javelin uses a modular design to allow the system to evolve to meet changing threats and requirements via both software and hardware upgrades. The system consists of a reusable Command Launch Unit (CLU) with a built-in-test (BIT), and a modular missile encased in a disposable launch tube assembly. The system also includes training devices for tactical training and classroom training

FY2019 Base dollars in the amount of \$10.623 million will continue development engineering of the Javelin Lightweight Command Launch Unit (CLU). Objective of the Javelin Lightweight CLU is a 50% reduction in weight and a 35% reduction in size compared to the Block I CLU, while meeting detect, recognize, and identify requirements. Javelin Lightweight CLU is a result of user feedback on weight and bulk, and addresses the Close Combat Missile System - Medium Capability Production Document objective system weight requirement.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Javelin System Improvements	19.241	21.095	10.623	-	10.623
<b>Description:</b> Develop Lightweight Command Launch Unit.					
<b>FY 2018 Plans:</b> Finalize Design Phase including a system level analysis, a formal Design Review, and the building of 8 Design Verification Testing (DVT) units. Conduct DVT which will include producibility, electromagnetic/electrostatic discharge, image quality, and mechanical separation/launch dynamic tests. Conduct system-level Limited User Assessment. Begin the design, build, and integration of Qualification Units.					
<b>FY 2019 Base Plans:</b> Conduct Critical Design Review. Design, build and integrate Qualification Units. Begin Qualification Testing.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding is decreased from FY18 to FY19 due to a rephasing of \$7.149M from FY19 to FY20.					
<b>Accomplishments/Planned Programs Subtotals</b>	19.241	21.095	10.623	-	10.623



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604611A / JAVELIN	<b>Project (Number/Name)</b> 499 / Javelin (AAWS-M)
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**C. Other Program Funding Summary (\$ in Millions)**

<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• CC0007: <i>Javelin (AAWS-M) System Summary</i>	191.575	118.235	303.665	31.120	334.785	116.742	135.070	212.930	246.157	0.000	1,355.494
• H06103: <i>Javelin Lightweight Command Launch Unit (CLU)</i>	-	-	22.500	-	22.500	-	29.736	59.604	77.670	0.000	189.510

**Remarks**

FY 2017-2020 procurement funds are to procure missiles only. No CLUs will be procured with FY 2017-2020 funds. Missiles, Lightweight CLUs, and associated training devices will be procured with FY 2021-2023 procurement funds.

**D. Acquisition Strategy**

Javelin Lightweight CLU development is Sole Source to the Javelin Joint Venture (Raytheon, Tucson, AZ, and Lockheed Martin, Orlando, FL). An Engineering Services Cost Plus contract with the Javelin Joint Venture will be utilized for Lightweight CLU development efforts. The major subassemblies, which are also the primary cost drivers, will be competed. The Javelin Joint Venture has invested Industry Research and Development in the Lightweight CLU. Development, prototype, and testing will occur FY 2015-2020 with production beginning in FY 2021. Army Acquisition Objective (AAO) is 4,809. Current plan is to field to priority Infantry and Stryker Brigade Combat Teams and Special Forces and cascade Block 0 CLUs out of the inventory.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604611A / JAVELIN	<b>Project (Number/Name)</b> 499 / Javelin (AAWS-M)
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Engineering/ Program Management, Govt	Allot	Multiple : Redstone Arsenal, AL	0.766	1.699	Nov 2016	1.883	Oct 2018	0.956	Oct 2018	-		0.956	1.071	6.375	-
<b>Subtotal</b>			0.766	1.699		1.883		0.956		-		0.956	1.071	6.375	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Lightweight CLU Development	SS/CPFF	JJV/Raytheon/ Lockheed Martin : Orlando, FL/ Tucson,AZ	4.987	16.994	Jul 2017	16.903	Nov 2018	7.861	Nov 2018	-		7.861	5.471	52.216	-
Lightweight CLU Development	MIPR	Redstone Test Center : Redstone Arsenal, AL	-	0.548	Nov 2016	-		-		-		-	0.000	0.548	-
Lightweight CLU Trade Studies and Demonstrations	MIPR	AMRDEC : Redstone Arsenal, AL	2.043	-		-		-		-		-	0.000	2.043	-
<b>Subtotal</b>			7.030	17.542		16.903		7.861		-		7.861	5.471	54.807	N/A

**Remarks**  
 JJV - Javelin Joint Venture  
 SS CPFF - Sole Source Cost Plus Fixed Fee  
 CLU - Command Launch Unit  
 AMRDEC - Aviation & Missile Research, Development and Engineering Center  
 MIPR - Military Interdepartmental Purchase Request

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Lightweight CLU Design Verification Testing	SS/CPFF	JJV/Raytheon/ Lockheed Martin :	-	-		2.003	Nov 2018	-		-		-	0.000	2.003	-



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**Exhibit R-4, RDT&E Schedule Profile: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604611A / JAVELIN	<b>Project (Number/Name)</b> 499 / Javelin (AAWS-M)
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Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
LW CLU Prototype Demonstration	[Bar]																											
LW CLU Design / Build / Integrate DVT Units	[Bar]				[Bar]																							
LW CLU Design Verification Testing					[Bar]																							
LW CLU Design/Build/Integrate Qualification Units									[Bar]																			
LW CLU Qualification Testing													[Bar]															

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604611A / JAVELIN	<b>Project (Number/Name)</b> 499 / Javelin (AAWS-M)
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
LW CLU Prototype Demonstration	1	2017	1	2017
LW CLU Design / Build / Integrate DVT Units	3	2016	2	2018
LW CLU Design Verification Testing	2	2018	3	2018
LW CLU Design/Build/Integrate Qualification Units	3	2018	1	2020
LW CLU Qualification Testing	4	2019	4	2020

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / <i>FAMILY OF HEAVY TACTICAL VEHICLES</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	10.989	10.507	11.950	-	11.950	11.745	16.240	3.085	2.971	0.000	67.487
659: <i>Family Of Hvy Tac Veh</i>	-	0.948	0.900	1.979	-	1.979	6.921	13.420	0.000	0.000	0.000	24.168
E50: <i>TRAILER DEVELOPMENT</i>	-	5.691	3.850	5.293	-	5.293	0.000	0.000	0.000	0.000	0.000	14.834
VR5: <i>TWV Protection Kits</i>	-	4.350	5.757	4.678	-	4.678	4.824	2.820	3.085	2.971	0.000	28.485

**A. Mission Description and Budget Item Justification**

This Program Element (PE) aligns system development and demonstration of Heavy Tactical Vehicles (HTV) with Future Force requirements to support combat and combat support missions. Missions include the following: line haul, local haul, and unit resupply. HTV trucks transport water, ammunition, and general cargo over all terrain and throughout the battle-space. Systems include the Heavy Expanded Mobility Tactical Truck (HEMTT), Palletized Load System (PLS), Heavy Equipment Transporter System (HETS), Line Haul, Heavy Dump Truck (HDT) as well as Recovery Systems that rescue large wheeled vehicle platforms in severe off-road conditions such as the Modular Catastrophic Recovery System (MCRS). Funding will also be used for developing the Army's next generation of tactical trucks, as part of the Army's Tactical Wheeled Vehicle Modernization Strategy. This Program Element (PE) supports the Family of Heavy Trucks to include, enablers, active safety technologies, and heavy tactical trailer development. Periodic evolutionary upgrade of survivability and crew protection as described in the Long Term Protection Strategy (LTPS) is also supported by this PE for both the HTV family of vehicles and the Family of Medium Tactical Vehicles (FMTV). The Army plans to procure a replacement for the DODX 40000 series tank hauling rail car. The existing fleet will begin mandatory retirement starting in 2031. In order to maintain the current capability of hauling two tanks per rail car and the increased weight of the tank, the Army will be developing a new 150+ ton articulated rail car that is supported by this PE.

FY 2019 Project 659 Base funds in the amount of \$1.979 million are for the research and development of a solution to modify the HETS M1070A1 tractor and increase capability to an 85 Ton payload. Funding will also be used for Systems Engineering/Program Management (SEPM) for the Enhanced Heavy Equipment Transporter System (EHETS) to develop contracting documentation, System Engineering Plans (SEP) and Test and Evaluation Master Plans (TEMP). SEPM includes PM and System Engineering oversight required to manage the program and provide contractor oversight. Salaries, Benefits, Travel, Personnel Training and other Government costs are included for retaining a professional acquisition workforce.

FY 2019 Project E50 Base funds in the amount of \$5.293 million will be used to build Heavy Dump Truck (HDT) Armor Capable Truck Asset Prototypes and Armor Solution testing. Armor Solution testing costs include system testing, evaluation and document production for the HDT program. Funding will also be used for the research and development of a solution to modify the HETS M1070A1 tractor and increase capability to an 85 Ton payload.

FY 2019 Project VR5 Base funds in the amount of \$4.678 million will be used to build Heavy Dump Truck (HDT) Armor Capable Truck Asset Prototypes and Armor Solution testing. Armor Solution testing costs include system testing, evaluation, and document production for the HDT program. Funding will also be used for the Objective Gunner Protection Kit / Common Remotely Operated Weapon Station (OGPK/CROWS) upgrades on Heavy Expanded Mobility Tactical Truck A4 (HEMTTA4)

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / <i>FAMILY OF HEAVY TACTICAL VEHICLES</i>
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and Palletized Load System A1 (PLSA1) Suspensions. Live Fire Testing (LFT) will also be conducted on the improvements to the Family of Medium Tactical Vehicles (FMTV) Underbody Armor Kits that are required to support Full Material Release.

The FY 2019 funding request was reduced by \$17.983 million to account for the availability of prior year execution balances.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	11.429	10.507	20.602	-	20.602
Current President's Budget	10.989	10.507	11.950	-	11.950
Total Adjustments	-0.440	0.000	-8.652	-	-8.652
• Congressional General Reductions	-0.005	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.435	-			
• Adjustments to Budget Years	-	-	-8.652	-	-8.652

**Change Summary Explanation**

FY 2019 has an approximate decrease of 42% (\$8.652 million) to the total program element since the FY 2018 President's Budget submission. Funds were ahead of need for the Engineering and Manufacturing Development (EMD) phase activities for the Enhanced Heavy Equipment Transporter System (EHETS). EMD award is planned in FY23.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> 659 / Family Of Hvy Tac Veh
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
659: Family Of Hvy Tac Veh	-	0.948	0.900	1.979	-	1.979	6.921	13.420	0.000	0.000	0.000	24.168
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

The EHETs program is expected to enter at Milestone B after completion of the Analysis of Alternatives (AoA).

**A. Mission Description and Budget Item Justification**

The Heavy Equipment Transporter System (HETS) is comprised of a M1070A1 Tractor and M1000 Trailer for transport, recovery and evacuation of heavy, oversized combat equipment such as the M1A1 Abrams main battle tank and M88 or similar loads. The current HETS has two capability gaps; Payload and Road Network Accessibility. The HETS is not capable of transporting or loading/unloading the heaviest combat platform in the ABCT since it exceeds the HETS rated payload of 70 tons (U.S.). Road Network Accessibility of the current HETS is restricted due to exceeding axle load limits CONUS/OCONUS, which prevents the HETS from obtaining road permits. Short term is an interim solution to modify current HETS tractors and build new HETS trailers and the long term solution is the Enhanced Heavy Equipment Transporter System (EHETS) that will address these capability gaps in the future.

The current interim solution is in response to a United States Army Europe (USAREUR) Operational Needs Statement (ONS# 17-22207) for Heavy Equipment Transporter Systems with deliveries beginning the first quarter of FY2020. The USAREUR HETS ONS solution shall be capable of carrying 78.5 Tons of payload while achieving host country road permits at a reduced weight of 75 tons. The recommended course of action for satisfying the ONS is to utilize a modified version of the M1070A1 tractor combined with a commercial 8-axle trailer. Per the 1 DEC 17 Army Requirements Oversight Committee (AROC), this trailer will be capable of carrying 85 tons. The AROC also directed an additional modification to the tractor that will allow it to achieve an ultimate carrying capacity of 85 tons.

The Enhanced Heavy Equipment Transporter System (EHETS) is a force protected tractor and trailer to operationally move and load/unload the heaviest combat platform in the ABCT. EHETS will be capable of transporting at a higher rated payload and will self-load/unload heavy and outsized equipment such as the Abrams SEpv2 and SEpv3, which currently exceeds the existing Heavy Equipment Transporter System rated capacity of 70-tons (U.S.), while achieving road network accessibility (e.g. road permits) and mobility on primary and secondary roads.

FY 2019 Project 659 Base funds in the amount of \$0.300 million are for Systems Engineering/Program Management (SEPM) for the Enhanced Heavy Equipment Transporter System (EHETS) to develop contracting documentation, Systems Engineering Plans (SEP) and Test and Evaluation Master Plans (TEMP). SEPM includes PM and System Engineering oversight required to manage the program and provide contractor oversight. Salaries, Benefits, Travel, Personnel Training and other Government costs are included for retaining a professional acquisition workforce.

FY 2019 Project 659 Base funds in the amount of \$1.679 million are for the research and development of a solution to modify the HETS M1070A1 tractor and increase carrying capacity to 85 tons.



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> 659 / Family Of Hvy Tac Veh			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p><b>Title:</b> EHETS System Engineer/Program Management Support (SEPM)</p> <p><b>Description:</b> SEPM includes PM and System Engineering oversight required to manage the program and provide contractor oversight. Salaries, Benefits, Travel, Personnel Training and other Government costs are included for retaining a professional acquisition workforce.</p> <p><b>FY 2018 Plans:</b> Program Management and Engineering Support</p> <p><b>FY 2019 Base Plans:</b> Program Management and Engineering Support to prepare contracting documentation, Systems Engineering Plans (SEP) and Test and Evaluation Master Plans (TEMP).</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease due to core personnel support accounted for from other funding source.</p>	-	0.650	0.300	-	0.300
<p><b>Title:</b> EHETS Development</p> <p><b>Description:</b> Perform Pre-Materiel Development Decision (Pre-MDD) Study</p> <p><b>FY 2018 Plans:</b> Engineering, testing, technical reports and analysis</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease due to Pre-Materiel Development Decision (Pre-MDD) Studies completion.</p>	0.300	0.250	-	-	-
<p><b>Title:</b> USAREUR HETS ONS System Engineer/Program Management Support (SEPM)</p> <p><b>Description:</b> SEPM includes PM and System Engineering oversight required to manage the program and provide contractor oversight. Salaries, Benefits, Travel, Personnel Training and other Government costs are included for retaining a professional acquisition workforce.</p>	0.148	-	-	-	-
<p><b>Title:</b> USAREUR HETS ONS Design, Test, and Tooling</p> <p><b>Description:</b> Design, internal tests and tooling for the USAREUR HETS ONS trailer build at the contractor's facility.</p>	0.500	-	-	-	-
<p><b>Title:</b> HETS M1070A1 Tractor Modification</p>	-	-	1.679	-	1.679

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> 659 / Family Of Hvy Tac Veh

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p><b>Description:</b> Modify M1070A1 tractors that are required for the USAREUR HETS ONS to meet an 85 tons capability.</p> <p><b>FY 2019 Base Plans:</b> Research and develop a solution to modify the current M1070A1 HETS tractor to ultimately carry an 85 tons payload when paired with the commercial trailer.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase due to requirement to develop a M1070A1 HETS tractor modification with 85 tons capability approved at the 1 Dec 2017 Army Requirements Oversight Committee (AROC).</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	0.948	0.900	1.979	-	1.979

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• DV0012: HEAVY EQUIPMENT TRANSPORTER SYS	-	37.398	87.582	76.000	163.582	185.471	21.250	-	-	0.000	407.701
• DA0924: Modification Of In Svc Equip	189.456	148.587	78.507	186.377	264.884	80.864	59.713	66.333	71.186	0.000	881.023

**Remarks**  
The EHETS program is expected to enter at Milestone B after completion of the AoA and the approved Capabilities Development Document (CDD). Modification Of in Svc Equip is a shared funding line with other product offices.

**D. Acquisition Strategy**  
The current interim solution for the Heavy Equipment Transporter System (HETS) is in response to a United States Army Europe (USAREUR) Operational Needs Statement (ONS# 17-22207) with deliveries beginning the first quarter of FY 2020. The USAREUR HETS ONS solution shall be capable of carrying 78.5 Tons of payload while achieving host country road permits at a reduced weight of 75 tons. The recommended course of action for satisfying the ONS is to utilize a modified version of the M1070A1 tractor combined with a commercial 8-axle trailer. Per the 1 DEC 17 Army Requirements Oversight Committee (AROC), this trailer will be capable of carrying 85 tons. The AROC also directed an additional modification to the tractor that will allow it to achieve an ultimate carrying capacity of 85 tons.

Based on the outcome of the Analysis of Alternatives (AoA) and Materiel Development Decision (MDD), the Enhanced Heavy Equipment Transporter System (EHETS) is expected to enter at MS B and the acquisition will be a full and open competition. Planned efforts include: Requirements Analysis (FY18), Milestone B, Test plans and RFP documentation preparation (FY19-FY21), RFP release (FY22), and EMD Contract Award (FY23).

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	Project (Number/Name) 659 / Family Of Hvy Tac Veh

**E. Performance Metrics**

The costs, schedule and technical (performance) requirements are reviewed and compared to the Acquisition Program Baseline (APB) on a regular basis. Meetings are held monthly to review and discuss status of each program. Schedules are monitored by the respective Integrated Product Team (IPT) to oversee and compare progress to APB timelines via an Integrated Master Schedule (IMS) for each program. All technical requirements are tested and confirmed prior to start of production. In addition, each program has the ability to perform added tests during production as required to assure technical requirements are being met. The product office also uses Project Recon to perform risk management. The tool is designed to capture, manage, and link Risks, Issues, and Opportunities in a centralized database to create an integrated model that covers the entire program lifecycle.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> 659 / Family Of Hvy Tac Veh
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<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EHETS - Engineering Testing, Technical Reports and Analysis	MIPR	Defense Technical Information Center (DTIC) : Ft. Belvoir, VA	-	0.300	Dec 2017	0.250	Nov 2017	-		-		-	0.000	0.550	-
HETS M1070A1 Tractor Modification	SS/FP	TBD : TBD	-	-		-		1.679	Mar 2019	-		1.679	0.000	1.679	-
<b>Subtotal</b>			-	0.300		0.250		1.679		-		1.679	0.000	2.229	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Systems Engineering/ Program Management (SEPM) Support	MIPR	TACOM LCMC : Warren, MI	-	0.148	Mar 2018	0.650	Dec 2017	0.300	Mar 2019	-		0.300	0.000	1.098	-
<b>Subtotal</b>			-	0.148		0.650		0.300		-		0.300	0.000	1.098	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
USAREUR HETS ONS Design, Internal Tests, Tooling	C/FFP	TBD : TBD	-	0.500	Apr 2018	-		-		-		-	0.000	0.500	-
<b>Subtotal</b>			-	0.500		-		-		-		-	0.000	0.500	N/A

			Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	0.948	0.900	1.979	-	1.979	0.000	3.827	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> 659 / Family Of Hvy Tac Veh

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
<b>Enhanced Heavy Equipment Traansporter System (EHETS)</b>																																				
Perform pre-MDD Studies																																				
Matériel Development Decision (MDD)																													▲ 2							
Analysis of Alternatives (AoA)																																				
Program Milestone B Documentation Preparation																																				
Contract Documentation and Test Plans Development																																				
Request for Proposal (RFP) Release																													▲ 6							
Source Selection Evaluation Board (SSEB)																																				
Milestone B																													▲ 7							
Engineering and Manufacturing Development (EMD) Contract Award																													▲ 8							
<b>USAREUR HETS ONS</b>																																				
USAREUR HETS ONS Trailer Prototypes request for Prototype Proposal Release (PPR)	▲ 1																																			
USAREUR HETS ONS Trailer Prototype Award	▲ 3																																			

**UNCLASSIFIED**

<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date: February 2018</b>		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES		<b>Project (Number/Name)</b> 659 / Family Of Hvy Tac Veh	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
USAREUR HETS ONS Trailer Production Award (Procurement Funded)									5																			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> 659 / Family Of Hvy Tac Veh

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Enhanced Heavy Equipment Traansporter System (EHETS)	1	2017	4	2023
Perform pre-MDD Studies	1	2017	1	2018
Materiel Development Decision (MDD)	2	2018	2	2018
Analysis of Alternatives (AoA)	2	2018	2	2019
Program Milestone B Documentation Preparation	2	2019	2	2023
Contract Documentation and Test Plans Development	1	2019	4	2021
Request for Proposal (RFP) Release	1	2022	1	2022
Source Selection Evaluation Board (SSEB)	2	2022	3	2023
Milestone B	3	2023	3	2023
Engineering and Manufacturing Development (EMD) Contract Award	3	2023	3	2023
USAREUR HETS ONS	1	2019	1	2019
USAREUR HETS ONS Trailer Prototypes request for Prototype Proposal Release (PPR)	1	2018	1	2018
USAREUR HETS ONS Trailer Prototype Award	3	2018	3	2018
USAREUR HETS ONS Trailer Production Award (Procurement Funded)	4	2019	4	2019

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES					<b>Project (Number/Name)</b> E50 / TRAILER DEVELOPMENT		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
E50: TRAILER DEVELOPMENT	-	5.691	3.850	5.293	-	5.293	0.000	0.000	0.000	0.000	0.000	14.834
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Semi Trailer Low Bed (STLB) is a 25-ton payload capacity semi-trailer with a fixed goose neck, step deck, and rear loading ramps. The STLB is interoperable with a variety of trucks residing across the U.S. Army equipment and will be introduced into a theater of operations to transport construction equipment (CE) employed by U.S. Army Engineers to execute horizontal and vertical construction projects in support of U.S. Military or other national goals and objectives. The STLB is employed to transport CE, miscellaneous equipment, disabled equipment, Class IV (construction materials), and logistical provisions. The STLB supports units in the execution of the following tasks: expand the lodgment, construction/upgrade/rehabilitation and maintenance of main supply routes (MSR), alternate supply routes (ASR), logistical facilities, bituminous roads, helipads, airfields, landing strips, motor pools, parking areas, etc. These types of facilities are required for sustainment operations during decisive action operations. The STLB will also be used during routine exercises/deployments, disaster relief, and other nation building operations. The STLB will be capable of supporting mobility, counter mobility, survivability, counter improvised and sustainment needs and all applicable North Atlantic Treaty Organization (NATO) interoperability criteria.

The Heavy Equipment Transporter System (HETS) is comprised of a M1070A1 Tractor and M1000 Trailer for transport, recovery and evacuation of heavy, oversized combat equipment such as the M1A1 Abrams main battle tank and M88 or similar loads. The current HETS has two capability gaps; Payload and Road Network Accessibility. The HETS is not capable of transporting or loading/unloading the heaviest combat platform in the ABCT since it exceeds the HETS rated payload of 70 tons (U.S.). Road Network Accessibility of the current HETS is restricted due to exceeding axle load limits CONUS/OCONUS, which prevents the HETS from obtaining road permits. Short term is an interim solution to modify current HETS tractors and build new HETS trailers and the long term solution is the Enhanced Heavy Equipment Transporter System (EHETS) that will address these capability gaps in the future.

The current interim solution is in response to a United States Army Europe (USAREUR) Operational Needs Statement (ONS# 17-22207) for Heavy Equipment Transporter Systems with deliveries beginning the first quarter of FY 2020. The USAREUR HETS ONS solution shall be capable of carrying 78.5 Tons of payload while achieving host country road permits at a reduced weight of 75 tons. The recommended course of action for satisfying the ONS is to utilize a modified version of the M1070A1 tractor combined with a commercial 8-axle trailer. Per the 1 DEC 17 Army Requirements Oversight Committee (AROC), this trailer will be capable of carrying 85 tons. The AROC also directed an additional modification to the tractor that will allow it to achieve an ultimate carrying capacity of 85 tons.

The Enhanced Heavy Equipment Transporter System (EHETS) is a force protected tractor and trailer to operationally move and load/unload the heaviest combat platform in the ABCT. EHETS will be capable of transporting at a higher rated payload and will self-load/unload heavy and outsized equipment such as the Abrams SEPv2 and SEPv3, which currently exceeds the existing Heavy Equipment Transporter System rated capacity of 70-tons (U.S.), while achieving road network accessibility (e.g. road permits) and mobility on primary and secondary roads.



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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> E50 / TRAILER DEVELOPMENT
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The Heavy Dump Truck (HDT) supports construction projects by loading, transporting and dumping payloads of sand and gravel aggregates, crushed rock, hot asphalt mixes, earth, clay, rubble, large boulders and other materials up to gross vehicle weight rating to job sites under world-wide climatic conditions. The HDT also serves as a quarry truck for the quick transport of bulk raw earth material to and from the crushing, screening and washing plant and the asphalt mixing plant. The HDT also serves as a transportation asset for organizational equipment. The HDT is Long Term Armor Strategy (LTAS) compliant with MRAP 1.1 underbody protection. The armor solution is developed concurrently with the production of armor capable HDTs. Upon development of the armor solution, the Government procures the armored HDT's.

FY 2019 Project E50 Base funds in the amount of \$3.793 million will be used to build Heavy Dump Truck (HDT) Armor Capable Truck Asset Prototypes and Armor Solution testing. The HDT integrated armor requirement is compliant with the Tactical Wheeled Vehicle Long Term Armor Strategy (LTAS) Ballistic Specifications. It is required to replace the F5070, M917 and M917A1 HDTs with the oldest fielded variants at 50 years of age.

FY 2019 Project E50 Base funds in the amount of \$1.500 million are for the research and development of a solution to modify the HETS M1070A1 tractor and increase carrying capacity to 85 tons.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p><b>Title:</b> Bid Sample Testing</p> <p><b>Description:</b> Limited performance and reliability testing of trailers.</p> <p><b>FY 2018 Plans:</b> This testing is a limited performance and reliability test of free bid sample trailers provided by potential offerors. The test results will be used in the Source Selection Evaluation Board (SSEB) to assist in the down-select.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease with no additional RDTE funded requirements for the 25T trailer or test funds in FY19. The 25T trailer requirement continues with procurement funds.</p>	-	2.740	-	-	-
<p><b>Title:</b> Source Selection Evaluation Board (SSEB)</p> <p><b>Description:</b> Evaluate contractors for an Indefinite Delivery Indefinite Quantity (IDIQ) contract for prototype trailers.</p> <p><b>FY 2018 Plans:</b> Conduct SSEB to award IDIQ contract to two contractors for prototype trailers for a run-off test.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b></p>	-	0.500	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army				<b>Date:</b> February 2018	
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES		<b>Project (Number/Name)</b> E50 / TRAILER DEVELOPMENT	
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Decrease with no additional RDTE funded requirements for the 25T trailer or the SSEB in FY19. The 25T trailer requirement continues with procurement funds.					
<b>Title:</b> Systems Engineering/Program Management (SEPM) Support					
<b>Description:</b> SEPM includes PM and System Engineering oversight required to conduct requirements analysis, specification development, program management and contractor oversight. Salaries, Benefits, Travel, Personnel Training and other Government costs are included for retaining a professional acquisition workforce.					
<b>FY 2018 Plans:</b> Program Management and Engineering Support for 25T					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease with no additional RDTE funded requirements for the 25T trailer in FY19. The 25T trailer requirement continues with procurement funds.					
	-	0.610	-	-	-
<b>Title:</b> USAREUR HETS ONS Design, Test, and Tooling					
<b>Description:</b> Design, internal tests and tooling for the USAREUR HETS ONS trailer build at the contractor's facility.					
	4.540	-	-	-	-
<b>Title:</b> Trailer Fleet Management Study					
<b>Description:</b> Study to determine if the Army's trailer and prime mover fleet is capable of operationally transporting and sustaining the upgraded ABCT of Army 2025.					
	1.051	-	-	-	-
<b>Title:</b> Trailer Corrosion Study					
<b>Description:</b> A corrosion study performed to identify changes to operational movement and sustainment concepts needed to improve the trailer fleet.					
	0.100	-	-	-	-
<b>Title:</b> HDT Prototypes					
<b>Description:</b> Build armor capable Heavy Dump Trucks and 1 armor solution. The armor solution is developed concurrently with the armor capable truck.					
<b>FY 2019 Base Plans:</b>					
	-	-	3.793	-	3.793

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> E50 / TRAILER DEVELOPMENT

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
The armor solution is developed concurrently with the production of armor capable HDTs. Upon development of the armor solution, the Government procures a total of six (6) armored HDT prototypes. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase with contract available to award the armor solution along with truck prototypes in preparation of test.					
<b>Title:</b> HETS M1070A1 Tractor Modification <b>Description:</b> Modify M1070A1 tractors that were required for the USAREUR HETS ONS to meet an 85 tons capability. <b>FY 2019 Base Plans:</b> Research and develop a solution to modify the current M1070A1 HETS tractor to ultimately carry an 85 tons payload when paired with the commercial trailer. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase due to requirement to develop a M1070A1 HETS tractor modification with 85 ton capability approved at the 1 Dec 2017 Army Requirements Oversight Committee (AROC).	-	-	1.500	-	1.500
<b>Accomplishments/Planned Programs Subtotals</b>	5.691	3.850	5.293	-	5.293

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• D01650: SEMITRAILER LOW BED 25 TON	-	-	1.618	-	1.618	4.621	16.119	16.427	16.642	0.000	55.427
• DV0012: HEAVY EQUIPMENT TRANSPORTER SYS	-	37.398	87.582	76.000	163.582	185.471	21.250	-	-	0.000	407.701
• D16001: TRUCK, DUMP, 20T (CCE)	3.927	0.967	6.480	-	6.480	24.138	27.639	28.460	-	0.000	91.611

**Remarks**

**D. Acquisition Strategy**  
The current interim solution for the Heavy Equipment Transporter System (HETS) is in response to a United States Army Europe (USAREUR) Operational Needs Statement (ONS# 17-22207) with deliveries beginning the first quarter of FY 2020. The USAREUR HETS ONS solution shall be capable of carrying 78.5 Tons of payload while achieving host country road permits at a reduced weight of 75 tons. The recommended course of action for satisfying the ONS is to utilize a modified

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> E50 / TRAILER DEVELOPMENT
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version of the M1070A1 tractor combined with a commercial 8-axle trailer. Per the 1 DEC 17 Army Requirements Oversight Committee (AROC), this trailer will be capable of carrying 85 tons. The AROC also directed an additional modification to the tractor that will allow it to achieve an ultimate carrying capacity of 85 tons.

The Heavy Dump Truck (HDT) overall strategy includes a contract to one Original Equipment Manufacturer (OEM) to develop an armor solution for a commercial dump truck. The commercial dump truck (capable of being armored) will be produced prior to the development of this armor solution. This armored solution will be tested prior to approval for build to incorporate into the HDT production. The armored HDT will be procured after successful completion of the armor Live Fire Test (LFT) in FY21.

**E. Performance Metrics**

The costs, schedule and technical (performance) requirements are reviewed and compared to the Acquisition Program Baseline (APB) on a regular basis. Meetings are held monthly to review and discuss status of each program. Schedules are monitored by the respective Integrated Product Team (IPT) to oversee and compare progress to APB timelines via an Integrated Master Schedule (IMS) for each program. All technical requirements are tested and confirmed prior to start of production. In addition, each program has the ability to perform added tests during production as required to assure technical requirements are being met. The product office also uses Project Recon to perform risk management. The tool is designed to capture, manage, and link Risks, Issues, and Opportunities in a centralized database to create an integrated model that covers the entire program lifecycle.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES				E50 / TRAILER DEVELOPMENT							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Heavy Dump Truck (HDT) Prototype Design of Armored Cab	C/DIQ	TBD : TBD	-	-		-		3.793	Jun 2019	-		3.793	0.000	3.793	-
USAREUR HETS ONS Design, Test, and Tooling	C/TBD	TBD : TBD	-	4.540	Apr 2018	-		-		-		-	0.000	4.540	-
HETS M1070A1 Tractor Modification	C/TBD	TBD : TBD	-	-		-		1.500	Mar 2019	-		1.500	0.000	1.500	-
<b>Subtotal</b>			-	4.540		-		5.293		-		5.293	0.000	9.833	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering/ Program Management (SEPM)	MIPR	TACOM : Warren, MI	-	-		0.610		-		-		-	0.000	0.610	-
Source Selection Evaluation Board (SSEB)	MIPR	TACOM LCMC : Warren, MI	-	-		0.500		-		-		-	0.000	0.500	-
Trailer Fleet Management Study	C/FFPLOE	Booz Allen Hamilton : Warren, Michigan	-	1.051	Aug 2017	-		-		-		-	0.000	1.051	-
Trailer Corrosion Study	MIPR	TARDEC : Warren, Michigan	-	0.100	Aug 2017	-		-		-		-	0.000	0.100	-
<b>Subtotal</b>			-	1.151		1.110		-		-		-	0.000	2.261	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Bid Sample Testing	PO	Army Test and Evaluation	-	-		2.740		-		-		-	0.000	2.740	-

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>											<b>Date: February 2018</b>				
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES					<b>Project (Number/Name)</b> E50 / TRAILER DEVELOPMENT					
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
		Command (ATEC) : Aberdeen, MD													
<b>Subtotal</b>			-	-	2.740			-		-		-	0.000	2.740	N/A
			<b>Prior Years</b>	<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>			-	5.691	3.850			5.293		-		5.293	0.000	14.834	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
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Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
<b>SEMITRAILER LOW BED 25T Trailer</b>																																
Materiel Development Decision (MDD)																													▲ 2			
Requirements Analysis/Creation of Performance Spec																													■			
25T Milestone C (MS C)																													▲ 6			
<b>USAREUR HETS ONS</b>																																
USAREUR HETS ONS Trailer Prototypes request for Prototype Proposal Release (PPR)																													▲ 1			
USAREUR HETS ONS Trailer Prototypes Award																													▲ 5			
USAREUR HETS ONS Trailers Production Award (Procurement funded)																													▲ 7			
<b>HEAVY DUMP TRUCK (HDT)</b>																																
HDT Source Selection Evaluation Board (SSEB)																													■			
HDT Milestone C																													▲ 3			
HDT Contract Award																													▲ 4			
HDT Armor Development																													■			

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> E50 / TRAILER DEVELOPMENT

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
HDT Armored Prototype Build & Test																												
HDT Armored Production Build (Procurement funded)																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
SEMITRAILER LOW BED 25T Trailer	3	2018	1	2019
Materiel Development Decision (MDD)	2	2018	2	2018
Requirements Analysis/Creation of Performance Spec	3	2017	2	2018
25T Milestone C (MS C)	2	2019	2	2019
USAREUR HETS ONS	1	2018	1	2019
USAREUR HETS ONS Trailer Prototypes request for Prototype Proposal Release (PPR)	1	2018	1	2018
USAREUR HETS ONS Trailer Prototypes Award	3	2018	3	2018
USAREUR HETS ONS Trailers Production Award (Procurement funded)	4	2019	4	2019
HEAVY DUMP TRUCK (HDT)	4	2017	3	2022
HDT Source Selection Evaluation Board (SSEB)	4	2017	2	2018
HDT Milestone C	2	2018	2	2018
HDT Contract Award	2	2018	2	2018
HDT Armor Development	3	2018	3	2019
HDT Armored Prototype Build & Test	3	2019	2	2021
HDT Armored Production Build (Procurement funded)	2	2021	3	2022

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> VR5 / TWV Protection Kits
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
VR5: TWV Protection Kits	-	4.350	5.757	4.678	-	4.678	4.824	2.820	3.085	2.971	0.000	28.485
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This program element supports periodic, evolutionary upgrade of survivability and crew protection for Heavy Tactical Vehicles (HTV) and Medium Tactical Vehicles (MTV) as described in the Tactical Wheeled Vehicle (TWV) Strategy and individual variants' Capability Production Documents. The upgrades will leverage the Army Technology Objective's (ATO) survivability and Army Research Laboratory's (ARL) research and development activities to develop and evaluate armor kits which increase the protection level of all HTVs to the Mine-Resistant Ambush Protected (MRAP) protection level as well as anticipating changing threat environments, protection gaps, or improving the operating performance, efficiency, and reliability through armor weight reduction. This Program Element (PE) also supports increasing crew protection by leveraging advancements in autonomous ground vehicle technology via development and evaluation of autonomous applique kits that can be applied to the current and future HTV fleet.

The Heavy Dump Truck (HDT) supports construction projects by loading, transporting and dumping payloads of sand and gravel aggregates, crushed rock, hot asphalt mixes, earth, clay, rubble, large boulders and other materials up to gross vehicle weight rating to job sites under world-wide climatic conditions. The HDT also serves as a quarry truck for the quick transport of bulk raw earth material to and from the crushing, screening and washing plant and the asphalt mixing plant. The HDT also serves as a transportation asset for organizational equipment. The HDT is Long Term Armor Strategy (LTAS) compliant with MRAP 1.1 underbody protection. The armor solution is developed concurrently with the production of armor capable HDTs. Upon development of the armor solution, the Government procures the armored HDT's.

The Heavy Equipment Transporter System (HETS) is comprised of a M1070A1 Tractor and M1000 Trailer for transport, recovery and evacuation of heavy, oversized combat equipment such as the M1A1 Abrams main battle tank and M88 or similar loads. The current HETS has two capability gaps; Payload and Road Network Accessibility. The HETS is not capable of transporting or loading/unloading the heaviest combat platform in the ABCT since it exceeds the HETS rated payload of 70 tons (U.S.). Road Network Accessibility of the current HETS is restricted due to exceeding axle load limits CONUS/OCONUS, which prevents the HETS from obtaining road permits. Short term is an interim solution to modify current HETS tractors and build new HETS trailers.

The current interim solution is in response to a United States Army Europe (USAREUR) Operational Needs Statement (ONS# 17-22207) for Heavy Equipment Transporter Systems with deliveries beginning the first quarter of FY2020. The USAREUR HETS ONS solution shall be capable of carrying 78.5 Tons of payload while achieving host country road permits at a reduced weight of 75 tons. The recommended course of action for satisfying the ONS is to utilize a modified version of the M1070A1 tractor combined with a commercial 8-axle trailer. Per the 1 DEC 17 Army Requirements Oversight Committee (AROC), this trailer will be capable of carrying 85 tons. The AROC also directed an additional modification to the tractor that will allow it to achieve an ultimate carrying capacity of 85 tons.

The overall design was enhanced considerably on the Family of Medium Tactical Vehicles (FMTV) Underbody Armor Kit and requires live fire testing to support Full Material Release. The Family of Medium Tactical Vehicles (FMTV) requirement document issued for a Medium Tactical Truck (MTT) with model configuration upgrades

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> VR5 / TWV Protection Kits
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needed to support required transport capabilities, armor capabilities, and load dimensions. This Acquisition Strategy reduces operation and support costs, displaces vehicles which cannot be armored, and results in a more reliable fleet.

FY 2019 Project VR5 Base funds in the amount of \$2.378 million will be used to build two (2) Heavy Dump Truck (HDT) Armor Capable Truck Asset Prototypes and Armor Solution testing. Armor Solution testing costs include system testing, evaluation, and document production for the HDT program. The Government conducts Production Verification Testing (PVT), which includes First Production Vehicle Inspection (FPVI) and Logistics Development on an armor capable HDT, and Reliability, Availability, and Maintainability (RAM) testing. Upon development of the armor solution, the Government procures armored HDT's.

FY 2019 Project VR5 Base funds in the amount of \$1.500 million will be used for OGPK/CROWS Weapon Station updates to existing logistic products, as well as hardware development in support of crew served weapons on unarmored and armored trucks. There have been several survivability enhancements that have occurred since the HEMTT and PLS truck production program began. These enhancements did not incorporate measures to correct for automotive performance degradation that has occurred due to the additional mass of the survivability enhancements. Currently the HEMTTA4 and PLSA1 with top, side, underbody, fuel tank and RPG protection; as well as the addition of a weapon station, have overloaded the truck axles. To regain the original design performance and safety factors, new suspension components are required.

FY 2019 Project VR5 Base funds in the amount of \$0.800 million will be used for Live Fire Testing of the improvements to the Family of Medium Tactical Vehicles (FMTV) A1P2 Underbody Armor Kit that are required to support Full Material Release.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p><b>Title:</b> Heavy Dump Truck (HDT) Armor Development</p> <p><b>Description:</b> Develop HDT Armor</p> <p><b>FY 2018 Plans:</b> Develop HDT Armor - contractor to design/engineer armor solution</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease with no additional funding requirements in FY19 for development of an armor solution for the HDT. Begin building armored truck prototypes in FY19 in preparation of test.</p>	-	2.134	-	-	-
<p><b>Title:</b> HEMTTA4/PLSA1 Suspension and Weapon Station Upgrade CROWS</p> <p><b>Description:</b> Design new HEMTTA4 and PLSA1 axle and suspension components and integrate protected weapon station.</p> <p><b>FY 2018 Plans:</b></p>	0.325	1.273	1.500	-	1.500

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> VR5 / TWV Protection Kits

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>Conduct studies, modeling and simulation, and Computer Aided Design (CAD) model and drawing creation, and create bill of materiel.</p> <p><b>FY 2019 Base Plans:</b> To regain the original design performance and safety factors, new suspension components are required. The requirement to support crew served weapons on unarmored and armored trucks drives an update to existing logistic products as well as hardware development.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase cost working towards a solution to integrate a protected weapon station onto HEMTT/PLS trucks. New suspension components are required.</p>					
<p><b>Title:</b> HEMTTA4/PLSA1 Suspension and Weapon Station Upgrade - Prototype Axle, Suspension, and Protected Weapon Station</p> <p><b>Description:</b> Build prototypes of the new HEMTTA4 /PLSA1 axle, suspension and protected weapon station integration designs.</p> <p><b>FY 2018 Plans:</b> Order and receive parts, verify quality and assemble.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease with no further funding requirements in FY19 toward completing efforts of prototype HEMTT/PLS axle, suspension or integration designs.</p>	-	1.000	-	-	-
<p><b>Title:</b> HEMTTA4/PLSA1 Suspension and Weapon Station Upgrade - Test</p> <p><b>Description:</b> Test prototypes of the new HEMTTA4/PLSA1 axle, suspension and protected weapon station.</p> <p><b>FY 2018 Plans:</b> Install axles, suspension and protected weapon station. Perform automotive testing.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease with no additional funding requirements in FY19. Prototype testing for suspension is completed.</p>	-	0.500	-	-	-
<p><b>Title:</b> HEMTTA4/PLSA1 Underbody Armor Kit TDP Conversion - Convert TDP</p> <p><b>Description:</b> Convert current TDP into standard TDP format for Government use.</p>	-	0.270	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> VR5 / TWV Protection Kits

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p><b>FY 2018 Plans:</b> Includes review by Configuration Management Team, revisions to CAD and drawings, and standardization to current requirements.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease with no additional funding requirements in FY19 for the Armor Kits TDP conversion.</p>					
<p><b>Title:</b> HEMTTA4/PLSA1 Underbody Armor Kit TDP Conversion - Conduct Fit-up</p> <p><b>Description:</b> Verification of TDP.</p> <p><b>FY 2018 Plans:</b> Conduct virtual installation of kit onto HEMTTA4/PLSA1 truck cabs.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease with no additional funding requirements in FY19 for the Verification of Armor Kit TDP Conversion.</p>	-	0.010	-	-	-
<p><b>Title:</b> HEMTTA4/PLSA1 Underbody Armor Kit TDP Conversion - Release TDP</p> <p><b>Description:</b> Officially release TDP into the TACOM Release System and place under change control.</p> <p><b>FY 2018 Plans:</b> Create folder structure and placement of data into Windchill by Configuration Management Team.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease with no additional funding requirements in FY19 for the TDP release.</p>	-	0.020	-	-	-
<p><b>Title:</b> Systems Engineering/Program Management (SEPM) Support</p> <p><b>Description:</b> SEPM includes PM and System Engineering oversight required to manage the program and provide contractor oversight. Salaries, Benefits, Travel, Personnel Training and other Government costs are included for retaining a professional acquisition workforce.</p> <p><b>FY 2018 Plans:</b> Program Management and Engineering Support</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease with no additional SEPM required in FY19 for Weapon Station upgrade activities.</p>	-	0.550	-	-	-
<p><b>Title:</b> USAREUR HETS ONS Design, Test, and Tooling</p>	1.559	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army				<b>Date:</b> February 2018	
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES		<b>Project (Number/Name)</b> VR5 / TWV Protection Kits	
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<i><b>Description:</b></i> Design, internal tests and tooling for the USAREUR HETS ONS trailer build at the contractor's facility.					
<i><b>Title:</b></i> USAREUR HETS ONS Trailer Prototypes					
<i><b>Description:</b></i> Procure commercial 8-axle trailers to use with modified HETS tractors.					
<i><b>Title:</b></i> HDT Prototypes					
<i><b>Description:</b></i> Build armor capable Heavy Dump Trucks and 1 armor solution. The armor solution is developed concurrently with the armor capable truck.					
<i><b>FY 2019 Base Plans:</b></i> The armor solution is developed concurrently with the production of armor capable HDTs. Upon development of the armor solution, the Government procures six (6) armored HDT.					
<i><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b></i> Increase in FY19 with contract available to award the armor solution along with truck prototypes in preparation of test.					
<i><b>Title:</b></i> HDT Testing					
<i><b>Description:</b></i> HDT RAM and Performance system testing and evaluation of the armored capable HDT's. Conduct development and operational testing of the armored capable HDT's.					
<i><b>FY 2019 Base Plans:</b></i> Costs include system testing, evaluation, and document production for the HDT program.					
<i><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b></i> Increase in FY19 to begin testing of the armor solution and HDT prototypes. Testing will continue in FY20.					
<i><b>Title:</b></i> FMTVA1P2 Underbody Armor Kit - Live Fire Testing					
<i><b>Description:</b></i> Development and testing of improvements to the FMTV Underbody Armor Kit that simplifies the design and reduces installation cost and complexity.					
<i><b>FY 2019 Base Plans:</b></i>					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> VR5 / TWV Protection Kits
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY19 funding will be used for Live Fire Testing of the FMTV Underbody Armor Kit improvements to support Full Material Release.					
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> Increase for first year of Live Fire Test of the FMTVA2 underbody armor.					
<b>Accomplishments/Planned Programs Subtotals</b>	4.350	5.757	4.678	-	4.678

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	<u>Cost To Complete</u>	<u>Total Cost</u>
• D04017: HEAVY TACTICAL VEHICLE PROTECTION KITS	108.949	25.124	19.062	30.738	49.800	26.748	52.785	53.179	73.310	0.000	389.895
• D04016: MEDIUM TACTICAL VEHICLE PROTECTION KITS	36.756	17.916	19.066	19.262	38.328	19.370	44.562	44.854	23.853	0.000	225.639
• D16001: Truck, Dump, 20T (CCE) (D16001)	3.927	0.967	6.480	-	6.480	24.138	27.639	28.460	-	0.000	91.611

**Remarks**

**D. Acquisition Strategy**

The Heavy Dump Truck's overall strategy includes a contract to one Original Equipment Manufacturer (OEM) to develop an armor solution for a commercial dump truck. The commercial dump truck (capable of being armored) will be produced prior to the development of this armor solution. This armored solution will be tested prior to approval for build to incorporate to the HDT production. The armored HDT will be procured after successful completion of the armor live fire test in FY21.

The current interim solution for the Heavy Equipment Transporter System (HETS) is in response to a United States Army Europe (USAREUR) Operational Needs Statement (ONS# 17-22207) with deliveries beginning the first quarter of FY 2020. The USAREUR HETS ONS solution shall be capable of carrying 78.5 Tons of payload while achieving host country road permits at a reduced weight of 75 tons. The recommended course of action for satisfying the ONS is to utilize a modified version of the M1070A1 tractor combined with a commercial 8-axle trailer. Per the 1 DEC 17 Army Requirements Oversight Committee (AROC), this trailer will be capable of carrying 85 tons.

Conduct FMTVA1P2 Underbody Armor Kit Live Fire Testing. This effort will utilize Government test facilities.

Design, develop, prototype and test new axle, suspension components, and protected weapon station components. The new components will be tested and approved to be released as a stand-alone kit or revision to the current underbody armor kit (aka C-Kit).

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	Project (Number/Name) VR5 / TWV Protection Kits

Technical Data Package (TDP) Conversion from Prototype-level to Production-level: Funds will be used to convert and release a Production-level TDP. When complete, the kit can be procured.

**E. Performance Metrics**

The cost, schedule and technical (performance) requirements are reviewed and compared to the Acquisition Program Baseline (APB) on a regular basis. Meetings are held monthly to review and discuss status of each program. Schedules are monitored by the respective Integrated Product Team (IPT) to oversee and compare progress to APB timelines via an Integrated Master Schedule (IMS) for each program. All technical requirements are tested and confirmed prior to start of production. In addition, each program has the ability to perform added tests during production as required to assure technical requirements are being met. The product office also uses Project Recon to perform risk management. The tool is designed to capture, manage, and link Risks, Issues, and Opportunities in a centralized database to create an integrated model that covers the entire program lifecycle.



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> VR5 / TWV Protection Kits
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<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Heavy Dump Truck (HDT) Prototype Design of Armored Cab	C/IDIQ	TBD : TBD	-	-		2.134		1.915	Jun 2019	-		1.915	0.000	4.049	-
HEMTTA4/PLSA1 Suspension and Weapon Station Upgrade	SS/CPFF	Oshkosh : Oshkosh, WI	-	-		1.273		-		-		-	0.000	1.273	-
HEMTTA4/PLSA1 Weapon Station Interface Ring - TDP Update	MIPR	TARDEC : WARREN, MICHIGAN	-	0.130	Nov 2017	-		-		-		-	0.000	0.130	-
HEMTTA4/PLSA1 Suspension and Weapon Station Upgrade - Prototype	SS/CPFF	Oshkosh : Oshkosh, WI	-	-		1.000		-		-		-	0.000	1.000	-
HEMTTA4/PLSA1 Underbody Armor Kit TDP Conversion - Convert TDP	PO	TARDEC : Warren, MI	-	-		0.270		-		-		-	0.000	0.270	-
HEMTTA4/PLSA1 Underbody Armor Kit TDP Conversion - Conduct Fit-up	MIPR	TARDEC : Warren, MI	-	-		0.010		-		-		-	0.000	0.010	-
HEMTTA4/PLSA1 Underbody Armor Kit TDP Conversion - Release TDP	MIPR	TARDEC : Warren, MI	-	-		0.020		-		-		-	0.000	0.020	-
Weapon Station OGPK/ CROWS - STS Task Order	SS/CPFF	Oshkosh : Wisconsin	-	0.326	Jan 2018	-		1.500	Mar 2019	-		1.500	0.000	1.826	-
HETS ONS - Prototypes	C/TBD	TBD : TBD	-	2.691	Feb 2018	-		-		-		-	0.000	2.691	-
<b>Subtotal</b>			-	3.147		4.707		3.415		-		3.415	0.000	11.269	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> VR5 / TWV Protection Kits
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Systems Engineering/ Program Management (SEPM)	MIPR	TACOM LCMC : Warren, MI	-	-		0.550		-		-		-	0.000	0.550	-
<b>Subtotal</b>			-	-		0.550		-		-		-	0.000	0.550	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
HEMTTA4/PLSA1 Suspension and Weapon Station Upgrade - Test	PO	Aberdeen Proving Ground (APG) : Aberdeen, MD	-	-		0.500		-		-		-	0.000	0.500	-
USAREUR HETS ONS Design, Internal Tests, Tooling	MIPR	TARDEC : Warren, MI	-	1.203	Apr 2018	-		-		-		-	0.000	1.203	-
FMTVA1P2 Underbody Armor Kit - Live Fire Testing	MIPR	ATC : Aberdeen	-	-		-		0.800	Apr 2019	-		0.800	0.000	0.800	-
HDT - Armor Solution Testing	MIPR	ATC : Aberdeen	-	-		-		0.463	Dec 2018	-		0.463	0.000	0.463	-
<b>Subtotal</b>			-	1.203		0.500		1.263		-		1.263	0.000	2.966	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
<b>Project Cost Totals</b>		-	4.350	5.757	4.678	-	4.678	0.000	14.785	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> VR5 / TWV Protection Kits	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>HEAVY DUMP TRUCK (HDT)</b>																												
HDT SSEB																												
HDT Milestone C																												
HDT Contract Award																												
HDT Armor Development																												
HDT Armored Prototype Build & Test																												
HDT Armored Production Build																												
HEMTTA4/PLSA1 Suspension and Weapon Station OGPK/CROWS Task Order 1																												
FMTVA1P2 Underbody Armor Kit - Live Fire Testing																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / FAMILY OF HEAVY TACTICAL VEHICLES	<b>Project (Number/Name)</b> VR5 / TWV Protection Kits

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
HEAVY DUMP TRUCK (HDT)	4	2017	3	2022
HDT SSEB	4	2017	2	2018
HDT Milestone C	2	2018	2	2018
HDT Contract Award	2	2018	2	2018
HDT Armor Development	3	2018	3	2019
HDT Armored Prototype Build & Test	3	2019	2	2021
HDT Armored Production Build	2	2021	3	2022
HEMTTA4/PLSA1 Suspension and Weapon Station OGPK/CROWS Task Order 1	2	2019	3	2019
FMTVA1P2 Underbody Armor Kit - Live Fire Testing	3	2019	1	2020

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / <i>Air Traffic Control</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	3.326	3.536	12.347	-	12.347	6.992	8.526	7.835	2.568	0.000	45.130
586: <i>Air Traffic Control</i>	-	3.326	3.536	12.347	-	12.347	6.992	8.526	7.835	2.568	0.000	45.130

**A. Mission Description and Budget Item Justification**

This program element funds continuous efforts in the development of modernized tactical Air Traffic Control (ATC) systems that will enable safety of aircraft operations. ATC systems are required to achieve or maintain compliance with civil, military, domestic and international ATC mandates and combat identification requirements.

Tactical Airspace Integration System (TAIS), the Army's system of record for Airspace Control (AC) and enroute Air Traffic Services (ATS) within the Army Mission Command Information System (MCIS), requires the development testing and integration of these new web-based services for AC into common MCIS hardware, while meeting the Common Operating Environment (COE) standards. Includes development and testing of improvements to the air picture to include Blue Force Tracker correlation and radar fusion capability. TAIS develops software and hardware for AC web services to operate effectively in a dynamic net-centric interconnected environment and integrates advanced surveillance capabilities to further enhance airspace integration and dynamic management capabilities.

Air Traffic Navigation Integration and Coordination System (ATNAVICS) is an Airport Surveillance Radar (ASR) and Precision Approach Radar (PAR) system that provides ATS at Army terminal airfields and landing sites at Division, Corps, and Echelons Above Corps to include services for Joint and Allied aircraft. ATNAVICS will integrate TPX-59 capabilities to control aircraft both Outside of the Continental United States and Continental United States. ATNAVICS will network its radar picture and interrogator data to aviation and joint network nodes through TAIS. . As the Department of Defense transitions military aircraft to positional self-reporting technologies, flight information will be captured by the Advanced Surveillance program. Advanced Surveillance allows ATC reception of aircraft self-reporting data to include the Automatic Dependent Surveillance Broadcast and integrates local radar feeds and self-reporting aircraft positional data into a correlated situational awareness air picture.

Mobile Tower System (MOTS) Preplanned Product Improvement (P3I) upgrades provides the Joint Force Commander or Combatant Commander a highly mobile, self-contained, integrated and reliable information system platform for visual and procedural aircraft deconfliction and aircrew force protection in unified action terminal airspace environments. The Airfield Lighting System (ALS) is a component of the MOTS and can be operated by solar power or by generator power. The ALS improvements include a Precision Approach Path Indicator and an ALS trailer charging system.

Tactical Terminal Control System (TTCS) is a mobile ATC communications system that provides initial ATS at remote landing sites and drop zones. It enables secure ground-to-air and ground-to-ground communications between Army aircraft, other services, Allied aircraft and ground stations. TTCS provides aircraft separation and ground control capabilities, a meteorological measuring system for basic weather information, Blue Force Tracker which provides near real time situational awareness and precision location capability. Future improvements include incorporating advance surveillance as risk mitigation by improving airspace situational awareness and providing an improved soldier interface that is common with other ATC systems.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / <i>Air Traffic Control</i>
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ATC Tactical Networking supports the non-recurring engineering, test and evaluation tasks for integration of radios, control stations and transmitter/receivers and software that will provide all ATC tactical systems an airfield network node capability. This will enable each ATC system to send voice and data between ATC platforms including connectivity to an external network for long range flight-following and data exchange further reducing aviation operational risk by providing ATC operators a common air picture. ATC Networking is required to meet the Net Ready Key Performance Parameter for ATC tactical systems.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	3.421	3.536	12.199	-	12.199
Current President's Budget	3.326	3.536	12.347	-	12.347
Total Adjustments	-0.095	0.000	0.148	-	0.148
• Congressional General Reductions	-0.001	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.094	-			
• Adjustments to Budget Years	-	-	0.148	-	0.148

**Change Summary Explanation**

FY 2019 reflects HQDA realignments to other programs (+\$0.830 million) and realignment of reimbursable manpower funding to direct manpower funding (-\$0.682 million).

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604633A / Air Traffic Control				Project (Number/Name) 586 / Air Traffic Control			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
586: Air Traffic Control	-	3.326	3.536	12.347	-	12.347	6.992	8.526	7.835	2.568	0.000	45.130
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This Project funds continuous efforts in the development of modernized tactical Air Traffic Control (ATC) systems that will enable safety of aircraft operations. ATC systems are required to achieve or maintain compliance with civil, military, domestic and international ATC mandates and combat identification requirements.

Tactical Airspace Integration System (TAIS), the Army's system of record for Airspace Control (AC) and enroute Air Traffic Services (ATS) within the Army Mission Command Information System (MCIS), requires the development testing and integration of these new web-based services for AC into common MCIS hardware, while meeting the Common Operating Environment (COE) standards. Includes development and testing of improvements to the air picture to include Blue Force Tracker correlation and radar fusion capability. TAIS develops software and hardware for AC web services to operate effectively in a dynamic net-centric interconnected environment and integrates advanced surveillance capabilities to further enhance airspace integration and dynamic management capabilities.

Air Traffic Navigation Integration and Coordination System (ATNAVICS) is an Airport Surveillance Radar (ASR) and Precision Approach Radar (PAR) system that provides ATS at Army terminal airfields and landing sites at Division, Corps, and Echelons Above Corps to include services for Joint and Allied aircraft. ATNAVICS will integrate TPX-59 capabilities to control aircraft both Outside of the Continental United States and Continental United States. ATNAVICS will network its radar picture and interrogator data to aviation and joint network nodes through TAIS. As the Department of Defense transitions military aircraft to positional self-reporting technologies, flight information will be captured by the Advanced Surveillance program. Advanced Surveillance allows ATC reception of aircraft self-reporting data to include the Automatic Dependent Surveillance Broadcast and integrates local radar feeds and self-reporting aircraft positional data into a correlated situational awareness air picture.

Mobile Tower System (MOTS) Preplanned Product Improvement (P3I) upgrades provides the Joint Force Commander or Combatant Commander a highly mobile, self-contained, integrated and reliable information system platform for visual and procedural aircraft deconfliction and aircrew force protection in unified action terminal airspace environments. The Airfield Lighting System (ALS) is a component of the MOTS and can be operated by solar power or by generator power. The ALS improvements include a Precision Approach Path Indicator and an ALS trailer charging system.

Tactical Terminal Control System (TTCS) is a mobile ATC communications system that provides initial ATS at remote landing sites and drop zones. It enables secure ground-to-air and ground-to-ground communications between Army aircraft, other services, Allied aircraft and ground stations. TTCS provides aircraft separation and ground control capabilities, a meteorological measuring system for basic weather information, Blue Force Tracker which provides near real time situational awareness and precision location capability. Future improvements include incorporating advance surveillance as risk mitigation by improving airspace situational awareness and providing an improved soldier interface that is common with other ATC systems.

ATC Tactical Networking supports the non-recurring engineering, test and evaluation tasks for integration of radios, control stations and transmitter/receivers and software that will provide all ATC tactical systems an airfield network node capability. This will enable each ATC system to send voice and data between ATC platforms

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / <i>Air Traffic Control</i>	<b>Project (Number/Name)</b> 586 / <i>Air Traffic Control</i>
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including connectivity to an external network for long range flight-following and data exchange further reducing aviation operational risk by providing ATC operators a common air picture. ATC Networking is required to meet the Net Ready Key Performance Parameter for ATC tactical systems.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p><b>Title:</b> Tactical Airspace Integration System (TAIS)</p> <p><b>Description:</b> TAIS Airspace Information Center (AIC), Common Operating Environment (COE) and Airspace Integration Improvements Initiative enhancements will be addressed through upgrades to the communications suite through new components such as 117G radios, BFT2/KGV-72, and ADS-B. TAIS develops software and required hardware for airspace management web services to operate effectively in a dynamic net-centric interconnected COE environment. TAIS will also integrate advanced surveillance interfaces and passive receiver to further enhance a dynamic airspace management capability.</p> <p><b>FY 2018 Plans:</b> Continue ongoing COE, Joint Interoperability Testing and Network Integration Event test and certification in support of the interoperability within the Army's Mission Command Information System (MCIS). Incorporate emerging Federal Aviation Administration (FAA) requirements. Develop software solutions to provide FAA Notice to Airman, Pilot Reports and Temporary Flight Restrictions. Develop system and user defined quality of service and performance tools to monitor and adjust critical performance and loading of software. Develop real time retrieval of AMPS mission data using a web-service and end points. Continue System Modification 2 testing including transportability, mobility and Electro Magnetic Environmental Effects (E3) tests.</p> <p><b>FY 2019 Plans:</b> Continue COE and Airspace Integration Improvements, Joint Interoperability Testing and Network Integration Event test and certification in support of the interoperability within the Army's Mission Command Information System (MCIS). Incorporate emerging Federal Aviation Administration (FAA) requirements. Develop software solutions to provide FAA Notice to Airman, Pilot Reports and Temporary Flight Restrictions. Develop system and user defined quality of service and performance tools to monitor and adjust critical performance and loading of software. Continue System Modification 2 testing which includes reliability and maintainability, communications range testing, transportability, and mobility tests.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Battery of testing that will be performed in FY19 is more extensive than testing being performed in FY18. Additional funds are required to support post testing non-recurring engineering (NRE) and software development activities.</p>	1.715	0.679	10.285
<p><b>Title:</b> Air Traffic Navigation Integration and Coordination System (ATNAVICS) Modernization</p> <p><b>Description:</b> ATNAVICS is a highly mobile tactical area surveillance and precision approach air traffic control radar system. It provides the Joint Force Commander or Combatant Commander, with a mobile, self-contained and reliable Airport Surveillance Radar, Precision Approach Radar and a Secondary Surveillance Radar capability. System modernization includes radar interrogation enhancements.</p> <p><b>FY 2018 Plans:</b></p>	0.445	1.462	2.062



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / <i>Air Traffic Control</i>	<b>Project (Number/Name)</b> 586 / <i>Air Traffic Control</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Provide Risk Management Framework to comply with Cyber Security requirements and Army Test and Evaluation Command testing required for Full Material Release.  <b>FY 2019 Plans:</b> Complete NRE to ensure ATNAVICS compliance with Risk Management Framework (RMF) to comply with Cyber Security requirements. Complete system Army Test Evaluation Command (ATEC) testing required for Full Material Release. Continue modernization for TPX-59 and Range Extension.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> There is a greater level of effort in FY19 in order to complete testing and RMF compliance than is scheduled in FY18.				
<b>Title:</b> Tactical Terminal Control System (TTCS)  <b>Description:</b> The TTCS is a mobile ATC communications system that provides initial ATS at remote landing sites and drop zones. It enables secure ground-to-air and ground-to-ground communications between Army aircraft, other services, Allied aircraft and ground stations. TTCS also provides aircraft separation and ground control capabilities, a meteorological measuring system for basic weather information, and Blue Force Tracker which provides near real time situational awareness and precision location capability.  <b>FY 2018 Plans:</b> Complete nonrecurring engineering test and evaluation tasks necessary for the development and integration of the ATC Tactical Network. The ATC Tactical Network effort will enable the TTCS to share air traffic control data with the other tactical PM ATC platforms.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY19 has been decreased to zero due to TTCS RDTE effort planned completion in FY18.		0.441	0.883	-
<b>Title:</b> Program Management (PM) Support  <b>Description:</b> PM support of PM ATC  <b>FY 2018 Plans:</b> Continue program management support of PM ATC.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY19 decrease reflects transition of manpower funding to Direct OMA funding.		0.725	0.512	-
<b>Accomplishments/Planned Programs Subtotals</b>		3.326	3.536	12.347

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / Air Traffic Control	<b>Project (Number/Name)</b> 586 / Air Traffic Control
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• AA0050: Air Traffic Control	50.405	83.790	63.872	-	63.872	47.695	54.320	49.562	50.267	0.000	399.911

**Remarks**

**D. Acquisition Strategy**

This project is comprised of multiple systems supporting ATC development and test efforts. While the detailed acquisition strategy varies by program, the general strategy for each program is to complete development and testing efforts through contract modifications, engineering service tasks, and new/follow-on contracts. ATC systems are required to achieve or maintain compliance with civil, military, domestic and international air traffic control and upcoming Next Gen requirements and mandates as well as current aircraft self-reporting transponders.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / Air Traffic Control	<b>Project (Number/Name)</b> 586 / Air Traffic Control
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PM Support	Various	PM ATC : Redstone Arsenal, AL	1.032	0.725	Oct 2016	0.512	Jul 2018	-		-		-	0.000	2.269	-
<b>Subtotal</b>			1.032	0.725		0.512		-		-		-	0.000	2.269	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TAIS (Web Based Services Dev)	SS/T&M	General Dynamics C4S : Huntsville, AL	27.922	1.715	Jan 2017	0.679	May 2018	10.285	Jun 2019	-		10.285	Continuing	Continuing	Continuing
ATNAVICS Modernization, TPX-59 and Range Extension	Various	Various : Various	19.561	0.445	Sep 2017	1.462	Feb 2018	2.062	Jan 2019	-		2.062	0.000	23.530	-
Mobile Tower System (MOTS) P3I Threshold	Various	Various : Various	2.200	-		-		-		-		-	0.000	2.200	-
Tactical Terminal Control System (TTCS)	Various	Various : Various	2.340	0.441	Sep 2017	0.883	Mar 2018	-		-		-	0.000	3.664	-
<b>Subtotal</b>			52.023	2.601		3.024		12.347		-		12.347	Continuing	Continuing	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
<b>Project Cost Totals</b>		53.055	3.326	3.536	12.347	-	12.347	Continuing	Continuing	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / Air Traffic Control	<b>Project (Number/Name)</b> 586 / Air Traffic Control
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Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
TAIS (Web Based Services Dev)																																				
ATNAVICs Modernization TPX-59																																				
ATNAVICs Modernization Range Extension																																				
Tactical Terminal Control System (TTCS) - ATC Tactical Network																																				
TTCS - JLTv Integration																																				
TTCS TOCNET Upgrade																																				

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / <i>Air Traffic Control</i>	<b>Project (Number/Name)</b> 586 / <i>Air Traffic Control</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
TAIS (Web Based Services Dev)	1	2015	4	2023
ATNAVICS Modernization TPX-59	3	2017	4	2019
ATNAVICS Modernization Range Extension	1	2019	4	2019
Tactical Terminal Control System (TTCS) - ATC Tactical Network	2	2018	2	2019
TTCS - JLTV Integration	1	2024	4	2024
TTCS TOCNET Upgrade	4	2017	4	2018

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604641A / <i>TACTICAL UNMANNED GROUND VEHICLE</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	32.315	0.000	0.000	-	0.000	0.000	15.814	27.176	15.643	0.000	90.948
DV7: <i>Small Unmanned Ground Vehicle</i>	-	32.315	0.000	0.000	-	0.000	0.000	15.814	27.176	15.643	0.000	90.948

**A. Mission Description and Budget Item Justification**

The Common Robotic System - Individual (CRS(I)) will be a man-packable, small (<25lbs), highly mobile, unmanned robotic system with advanced sensors/mission modules for dismounted Service Members. The CRS(I) will be designed so operator can quickly re-configure for other various missions by adding or removing modules and/or payloads. The CRS(I) will also include the Army universal controller used by all unmanned ground and aerial vehicles within the battalion formation providing interoperability, logistics, and training efficiencies. The CRS(I) will provide interrogation, detection, confirmation, and neutralization capabilities employed to support a wide spectrum of mobility missions for current and future forces. This capability provides commanders the ability to persistently monitor the Operating Environment (OE) while protecting and sustaining the force. The CRS(I) complements the Joint Integrated War-fighting Force by providing standoff to the War fighter during major combat, stability, and homeland security operations.

The Robotics Enhanced Program (REP) uses a "buy, try, and inform" methodology to evaluate Commercial Off the Shelf (COTS), Government Off the Shelf (GOTS) and Non-Developmental Item (NDI) products that have the potential to enhance Soldier combat effectiveness. Actual operational user feedback and evaluation results obtained will inform emerging capabilities and requirements documents in support of a Cost-Benefit Analysis to support future Army decision making.

Robotics Architecture (RA) provides the engineering and development resources to manage the overarching architecture for robotic systems that are both modular and interoperable across the Joint Force in order to facilitate future modernization efforts. It will manage the interoperability standards, modular payload interface, common software and universal controllers. RA includes the construction of program specific Interoperability Profiles (IOP) (i.e. Small Multipurpose Equipment Transport (SMET), Leader/Follower (LF), Route Clearance Interrogation System (RCIS), Common Robotics System-Vehicle (CRS(V)), CRS(I) Inc II, etc.) and new standards addressing emerging requirements (i.e. Cyber Security, Information Assurance, new payloads, etc).

Robotics Development (RD) includes efforts necessary to evaluate integrated technologies, validate material solutions and determine initial Analysis of Alternatives (AoA) in support of pre-Material Development Decision (MDD) activities for emerging requirements and programs of record. RD is designed to facilitate the transition of robotics and autonomous systems technology from Science and Technology (S&T) projects, REP initiatives and/or Small Business Innovative Research (SBIR) into emerging programs of record through development of emerging capabilities. This line is for robotic systems that are transported by individual Soldiers, by vehicle, maneuver under their own power, or are installed as robotic applique kits. RD supports early evaluations for operational effectiveness studies of platforms (i.e. SMET, Leader/Follower (LF), Route Clearance Interrogation Systems (RCIS), CRS(V), CRS(I) Inc II, Soldier Born Sensors, etc) to determine Technology Readiness Levels (TRL) and Manufacturing Readiness Levels (MRL). Studies support AoA that include Army Material Systems Analysis Activity (AMSAA), RAND Corporatin studies, and/or modeling to increase confidence in the material solution defined in the emerging Capability Development Document (CDD)/Capability Production Document(CPD) that support appropriate Acquisition Category (ACAT), Milestone Decision Authority (MDA) and office of primary responsibility designations.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604641A / <i>TACTICAL UNMANNED GROUND VEHICLE</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	39.282	0.000	0.000	-	0.000
Current President's Budget	32.315	0.000	0.000	-	0.000
Total Adjustments	-6.967	0.000	0.000	-	0.000
• Congressional General Reductions	-0.015	-			
• Congressional Directed Reductions	-5.750	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.202	-			

**Change Summary Explanation**

FY 2017 Request was congressionally decremented by \$5.750M for EMD Contract delay; \$.015M for FFRDC Reduction; and \$1.202M for SBIR/STTR Reduction.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604641A / <i>TACTICAL UNMANNED GROUND VEHICLE</i>				<b>Project (Number/Name)</b> DV7 / <i>Small Unmanned Ground Vehicle</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
<i>DV7: Small Unmanned Ground Vehicle</i>	-	32.315	0.000	0.000	-	0.000	0.000	15.814	27.176	15.643	0.000	90.948
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Common Robotic System - Individual (CRS(I)) will be a man-packable, small (<25lbs), highly mobile, unmanned robotic system with advanced sensors/mission modules for dismounted Service Members. The CRS(I) will be designed so operator can quickly re-configure for other various missions by adding or removing modules and/or payloads. The CRS(I) will also include the Army universal controller used by all unmanned ground and aerial vehicles within the battalion formation providing interoperability, logistics, and training efficiencies. The CRS(I) will provide interrogation, detection, confirmation, and neutralization capabilities employed to support a wide spectrum of mobility missions for current and future forces. This capability provides commanders the ability to persistently monitor the Operating Environment (OE) while protecting and sustaining the force. The CRS(I) complements the Joint Integrated Warfighting Force by providing standoff to the Warfighter during major combat, stability, and homeland security operations.

The Robotics Enhanced Program (REP) uses a "buy, try, and inform" methodology to evaluate Commercial Off the Shelf (COTS), Government Off the Shelf (GOTS) and Non-Developmental Item (NDI) products that have the potential to enhance Soldier combat effectiveness. Actual operational user feedback and evaluation results obtained will inform emerging capabilities and requirements documents in support of a Cost-Benefit Analysis to support future Army decision making.

Robotics Architecture (RA) provides the engineering and development resources to manage the overarching architecture for robotic systems that are both modular and interoperable across the Joint Force in order to facilitate future modernization efforts. It will manage the interoperability standards, modular payload interface, common software and universal controllers. RA includes the construction of program specific Interoperability Profiles (IOP) (i.e. Small Multipurpose Equipment Transport (SMET), Leader/Follower (LF), Route Clearance Interrogation System (RCIS), Common Robotics System-Vehicle (CRS(V)), CRS(I) Inc II, etc.) and new standards addressing emerging requirements (i.e. Cyber Security, Information Assurance, new payloads, etc).

Robotics Development (RD) includes efforts necessary to evaluate integrated technologies, validate material solutions and determine initial Analysis of Alternatives (AoA) in support of pre-Material Development Decision (MDD) activities for emerging requirements and programs of record. RD is designed to facilitate the transition of robotics and autonomous systems technology from Science and Technology (S&T) projects, REP initiatives and/or Small Business Innovative Research (SBIR) into emerging programs of record through development of emerging capabilities. This line is for robotic systems that are transported by individual Soldiers, by vehicle, maneuver under their own power, or are installed as robotic applique kits. RD supports early evaluations for operational effectiveness studies of platforms (i.e. SMET, Leader/Follower (LF), Route Clearance Interrogation Systems (RCIS), CRS(V), CRS(I) Inc II, Soldier Born Sensors, etc) to determine Technology Readiness Levels (TRL) and Manufacturing Readiness Levels (MRL). Studies support AoA that include Army Material Systems Analysis Activity (AMSAA), RAND Corporation studies, and/or modeling to increase confidence in the material solution defined in the emerging Capability Development Document (CDD)/Capability Production Document (CPD) that support appropriate Acquisition Category (ACAT), Milestone Decision Authority (MDA) and office of primary responsibility designations.



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604641A / TACTICAL UNMANNED GROUND VEHICLE	<b>Project (Number/Name)</b> DV7 / Small Unmanned Ground Vehicle

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> CRS-I and emerging robotic requirements.	32.315	-	-
<b>Description:</b> The CRS(I) program expects Milestone B in the second quarter of FY 2018. The CRS(I) program achieved Material Development Decision (MDD) approval in the first quarter of FY 2016 and released a Request for Proposal (RFP) in the third quarter of FY 2017. In FY 2015, CRS(I) completed an AoA letter of sufficiency, began the program Test & Evaluation Working-Level Integrated Product Team (T&E WIPT), and formed a CRS(I) program IPT to support the acquisition process. An IPT was formed to support emerging robotic system requirements and REP initiatives.			
<b>Accomplishments/Planned Programs Subtotals</b>	32.315	-	-

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• G99595: Common Robotic System-Individual (CRS-I)	-	-	3.161	-	3.161	8.297	28.603	49.745	75.093	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

The CRS(I) Acquisition Strategy was approved in Jan 2016 and will enter MS-B as an ACAT III program. CRS(I) strategy includes the following considerations: Full and open competition contract (i.e. cost plus fixed fee for EMD and Firm Fixed Price (FFP) for LRIP and Production) with up to two vendors selected to complete PDR and CDR with a Run-Off event in FY 2019 to select a single vendor to complete EMD for MS-C in the first quarter of FY 2021.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604641A / TACTICAL UNMANNED GROUND VEHICLE	<b>Project (Number/Name)</b> DV7 / Small Unmanned Ground Vehicle
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CRS(I)	Various	PM FP, PdM UGV : Warren, MI	2.884	3.406	Jan 2017	-		-		-		-	0.000	6.290	-
REP	Various	PM FP, PdM UGV & PdM ALUGS : Warren, MI	2.733	0.621	Jan 2017	-		-		-		-	0.000	3.354	-
Robotics Development	Various	PM FP, PdM UGV & PdM ALUGS : Warren, MI	-	2.256	Mar 2017	-		-		-		-	0.000	2.256	-
Robotics Architecture	MIPR	PM FP, PdM UGV : Warren, MI	-	0.750	Jun 2017	-		-		-		-	0.000	0.750	-
<b>Subtotal</b>			5.617	7.033		-		-		-		-	0.000	12.650	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
REP	TBD	PM FP, PdM UGV & PdM ALUGS : Warren, MI	2.750	0.636	Jul 2017	-		-		-		-	0.000	3.386	-
Robotic Architecture	MIPR	PM FP, PdM UGV, PdM ALUGS & TARDEC : Warren, MI	-	0.753	May 2017	-		-		-		-	0.000	0.753	-
Robotics Development	TBD	PM FP, PdM UGV & PdM ALUGS : Warren, MI	-	2.975	Dec 2016	-		-		-		-	0.000	2.975	-
<b>Subtotal</b>			2.750	4.364		-		-		-		-	0.000	7.114	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604641A / TACTICAL UNMANNED GROUND VEHICLE	<b>Project (Number/Name)</b> DV7 / Small Unmanned Ground Vehicle
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CRS(I)	Various	PM FP, PdM UGV : Warren, MI	3.000	4.111	Nov 2016	-		-		-		-	0.000	7.111	-
REP	Various	PM FP, PdM UGV & PdM ALUGS : Warren, MI	1.895	2.109	Jun 2017	-		-		-		-	0.000	4.004	-
Robotic Architecture	Various	PM FP, PdM UGV & PdM ALUGS : Warren, MI	-	0.500	Nov 2016	-		-		-		-	0.000	0.500	-
Robotics Development	Various	PM FP, PdM UGV & PdM ALUGS : Warren, MI	-	4.786	Aug 2017	-		-		-		-	0.000	4.786	-
<b>Subtotal</b>			4.895	11.506		-		-		-		-	0.000	16.401	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CRS(I)	MIPR	PM FP, PdM UGV : Warren, MI	0.500	3.513	Aug 2017	-		-		-		-	0.000	4.013	-
REP	MIPR	PM FP, PdM UGV & PdM ALUGS : Warren, MI	0.500	2.634	Jul 2017	-		-		-		-	0.000	3.134	-
Robotics Development	MIPR	PM FP, PdM UGV & PdM ALUGS : Warren, MI	-	3.265	Aug 2017	-		-		-		-	0.000	3.265	-
<b>Subtotal</b>			1.000	9.412		-		-		-		-	0.000	10.412	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	14.262	32.315	0.000	-	-	-	0.000	46.577	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604641A / TACTICAL UNMANNED GROUND VEHICLE	<b>Project (Number/Name)</b> DV7 / Small Unmanned Ground Vehicle

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
MS B and Contract Award (x2 Competitive)			1 MS B																									
REP Initiative(s) 16.2																												
REP Initiative(s) 17.1																												
REP Initiative(s) 17.2																												
<b>Robotics Development</b>																												
Squad Multipurpose Equipment Transport																												
Leader/Follower																												
Route Clearance and Interrogation System (RCIS)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604641A / <i>TACTICAL UNMANNED GROUND VEHICLE</i>	<b>Project (Number/Name)</b> DV7 / <i>Small Unmanned Ground Vehicle</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CRS(I)	1	2016	1	2016
MS B and Contract Award (x2 Competitive)	3	2017	3	2017
REP	2	2015	2	2015
REP Initiative(s) 16.1	1	2016	4	2016
REP Initiative(s) 16.2	2	2016	1	2017
REP Initiative(s) 17.1	4	2016	4	2017
REP Initiative(s) 17.2	2	2017	4	2017
Robotics Development	1	2017	1	2017
Squad Multipurpose Equipment Transport	1	2017	4	2017
Leader/Follower	1	2017	4	2017
Route Clearance and Interrogation System (RCIS)	1	2017	4	2017

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / <i>LIGHT TACTICAL WHEELED VEHICLES</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.476	7.000	8.212	-	8.212	2.965	1.977	1.976	0.000	0.000	22.606
E40: <i>LTV Prototype</i>	-	0.476	7.000	8.212	-	8.212	2.965	1.977	1.976	0.000	0.000	22.606

**Note**

This project includes GMV and Joint Light Tactical Vehicle - Reconnaissance Vehicle (JLTV-RV). Ground Mobility Vehicle (GMV) was a new start program in FY17. Joint Light Tactical Vehicle- Reconnaissance Vehicle (JLTV-RV) is a new start program in FY18.

**A. Mission Description and Budget Item Justification**

The Army Ground Mobility Vehicle (GMV) provides enhanced tactical mobility for an Infantry Brigade Combat Team (IBCT) 9-Soldier infantry squad with their associated equipment to move quickly around the battlefield. This capability is required across the range of military operations facing IBCT units conducting crises response, initial entry, and selected decisive action missions. GMV deploys worldwide by sea, air, and land modes to support strategic deployment and operational maneuver in accordance with Army and Joint doctrine. This capability provides flexibility for entry operations (permissive and non-permissive) to counter threat anti-access strategies by using multiple austere entry points to bring in combined arms configured units.

The Joint Light Tactical Vehicle - Reconnaissance Vehicle (JLTV-RV) was designated as the interim solution (2016 AROCM16-11.2) for the Light Reconnaissance Vehicle (LRV) to address a near term capability gap identified in the U.S. Army Combat Vehicle Modernization Strategy for the IBCT Cavalry Squadrons and Infantry Battalion Scout Platoons. This effort includes increased precision lethality through improved optics and a larger caliber weapon system to provide overmatch and counter threats as forces perform reconnaissance, surveillance and security operations.

FY19 GMV budget activities include Contractor Test Support, PQT testing to support FMR for A-GMV 1.1. testing, and program management support.

FY19 JLTV-LRV budget activities include Contractor Test Support, safety, performance, reliability, and ballistic testing of the JLTV-LRV, and program management support.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / <i>LIGHT TACTICAL WHEELED VEHICLES</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	0.494	7.000	8.300	-	8.300
Current President's Budget	0.476	7.000	8.212	-	8.212
Total Adjustments	-0.018	0.000	-0.088	-	-0.088
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.018	-			
• Adjustments to Budget Years	-	-	-0.088	-	-0.088

**Change Summary Explanation**

FY19 decrease of \$88K is due to economic adjustment for inflation.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / LIGHT TACTICAL WHEELED VEHICLES	<b>Project (Number/Name)</b> E40 / LTV Prototype
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
E40: LTV Prototype	-	0.476	7.000	8.212	-	8.212	2.965	1.977	1.976	0.000	0.000	22.606
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

This project includes GMV and Joint Light Tactical Vehicle - Reconnaissance Vehicle (JLTV-RV). Ground Mobility Vehicle (GMV) was a new start program in FY17. Joint Light Tactical Vehicle- Reconnaissance Vehicle (JLTV-RV) is a new start program in FY18.

**A. Mission Description and Budget Item Justification**

The Army Ground Mobility Vehicle (GMV) provides enhanced tactical mobility for an Infantry Brigade Combat Team (IBCT) 9-Soldier infantry squad with their associated equipment to move quickly around the battlefield. This capability is required across the range of military operations facing IBCT units conducting crises response, initial entry, and selected decisive action missions. GMV deploys worldwide by sea, air, and land modes to support strategic deployment and operational maneuver in accordance with Army and Joint doctrine. This capability provides flexibility for entry operations (permissive and non-permissive) to counter threat anti-access strategies by using multiple austere entry points to bring in combined arms configured units.

The Joint Light Tactical Vehicle - Reconnaissance Vehicle (JLTV-RV) was designated as the interim solution (2016 AROCM16-11.2) for the Light Reconnaissance Vehicle (LRV) to address a near term capability gap identified in the U.S. Army Combat Vehicle Modernization Strategy for the IBCT Cavalry Squadrons and Infantry Battalion Scout Platoons. This effort includes increased precision lethality through improved optics and a larger caliber weapon system to provide overmatch and counter threats as forces perform reconnaissance, surveillance and security operations.

FY19 GMV budget activities include Contractor Test Support, PQT testing to support FMR for A-GMV 1.1. testing, and program management support.

FY19 JLTV-LRV budget activities include monitoring of Contractor Test Support, safety, performance, reliability, and ballistic testing of the JLTV-LRV, and program management support.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019
<b>Title:</b> GMV Contract Test Support	0.153	-	0.264
<b>Description:</b> Funding is provided for the contract award for Ground Mobility Vehicle (GMV) Contractor Test Support.			
<b>FY 2019 Plans:</b> Will continue support of GMV Contractor Test Support.			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>			



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / LIGHT TACTICAL WHEELED VEHICLES	<b>Project (Number/Name)</b> E40 / LTV Prototype		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Increase in funding to support of Full Materiel Release (FMR) and operational testing.				
<p><b>Title:</b> GMV Test and Evaluation</p> <p><b>Description:</b> Funding is provided for Ground Mobility Vehicle (GMV) testing events.</p> <p><b>FY 2018 Plans:</b> Continuation of Urgent Materiel Release (UMR) and First Unit Equipped (FUE) Performance Qualification Testing (PQT) for A-GMV 1.1. Beginning Full Materiel Release (FMR) PQT for A-GMV 1.1. Testing covers Inspections, Physical Characteristics, Ride Quality, Human Factors Engineering, Slopes and Grades, Braking, Steering and Handling, Transportability, limited and extended endurance testing. Start of Low Velocity Air Drop (LVAD) testing for A-GMV 1.1 .</p> <p><b>FY 2019 Plans:</b> PQT will support FMR for A-GMV 1.1. Testing covers Inspections, Physical Characteristics, Ride Quality, Human Factors Engineering, Slopes and Grades, Braking, Steering and Handling, Transportability, and extended endurance testing.</p> <p>LVAD testing for A-GMV 1.1.</p> <p>Operational testing for A-GMV 1.1.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Continuation of PQT and LVAD testing for A-GMV.1.1</p>		0.323	1.450	2.705
<p><b>Title:</b> GMV Program Management Support</p> <p><b>Description:</b> Funding is provided for the support of Ground Mobility Vehicle (GMV) program management government operations.</p> <p><b>FY 2018 Plans:</b> Beginning of GMV test program management support efforts.</p> <p><b>FY 2019 Plans:</b> Funding will be for the continuation of labor and travel test support for GMV.</p>		-	0.160	0.160
<p><b>Title:</b> GMV Seating Kit</p> <p><b>Description:</b> Development of Ground Mobility Vehicle (GMV) Seating kit to obtain 9-man seating kit.</p> <p><b>FY 2018 Plans:</b></p>		-	0.390	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / LIGHT TACTICAL WHEELED VEHICLES	<b>Project (Number/Name)</b> E40 / LTV Prototype		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Development of the GMV seating kit <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Completion of seating kit in FY18.				
<b>Title:</b> JLTV-RV Mission Equipment Packages (MEP) <b>Description:</b> Effort to design/develop the integration kit for the improved optics and weapon system of JLTV. <b>FY 2018 Plans:</b> Contract award of work directive on current JLTV contract. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Completion in FY18.		-	0.328	-
<b>Title:</b> JLTV-RV Test Assets <b>Description:</b> Purchase JLTV-RV Mission Equipment Packages (MEP) test assets. <b>FY 2018 Plans:</b> Test assets for performance testing, Log Demonstration, and Limited User Test. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Procure MEP Test Assets in FY18 to start testing in FY19.		-	4.139	-
<b>Title:</b> JLTV-RV Program Management Support <b>Description:</b> Funding is provided for the support of JLTV-RV program management government operations. <b>FY 2018 Plans:</b> Beginning of support for JLTV-RV test program management efforts. <b>FY 2019 Plans:</b> Will continue support for JLTV-RV test program management efforts. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease due to economic adjustment.		-	0.533	0.445
<b>Title:</b> JLTV-RV Contractor Test Support <b>Description:</b> Funding is provided for the JLTV-LRV Contractor Test Support contract award.		-	-	0.409

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / LIGHT TACTICAL WHEELED VEHICLES	<b>Project (Number/Name)</b> E40 / LTV Prototype
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019
<b>FY 2019 Plans:</b> Will initiate of JLTV-RV Contractor Test Support.			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Initiation of JLTV-RV Contract Test Support.			
<b>Title:</b> JLTV-RV Test and Evaluation <b>Description:</b> Funding is provided to perform safety, performance, reliability, and ballistic testing of the JLTV-LRV.	-	-	4.229
<b>FY 2019 Plans:</b> Will provide safety, performance, reliability, and ballistic testing of the JLTV-RV. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Safety, performance, reliability, and ballistic testing of the JLTV-RV.			
<b>Accomplishments/Planned Programs Subtotals</b>	0.476	7.000	8.212

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• D15505: Ground Mobility Vehicle D15505 OPA	4.907	40.935	46.988	-	46.988	49.818	48.861	48.861	19.212	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**  
Ground Mobility Vehicle (GMV) Phase I: Per the Directed Requirement, procure the GMV capability for 5 Airborne IBCTS through the SOCOM GMV1.1 contract. GMV Phase II: Pursue development of the GMV to fulfill the requirements for the remainder of the IBCTS using a commercial item. A firm fixed priced contract will be awarded through full and open competition. Funding for Phase II will be competed in the FY19-23 POM with an expectation that contract award would be in FY20.

Pursue development of the LRV to fulfill near term capability gap identified in the U.S. Army Combat Vehicle Modernization Strategy for the Infantry Brigade Combat Team (IBCT) Cavalry Squadrons and Infantry Battalion Scout Platoons. The Light Reconnaissance Vehicle (LRV) MEP will be incorporated into the current JLTV Technical Data Battalion Scout Platoons. The LRV MEP will be incorporated into the current JLTV Technical Data Package (TDP) and will be a kit option on the next JLTV contract. The program is planning for the next production contract to be awarded through full and open competition.

**E. Performance Metrics**  
N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / LIGHT TACTICAL WHEELED VEHICLES	<b>Project (Number/Name)</b> E40 / LTV Prototype
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<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
GMV Seating Kit Development	MIPR	TBD : TBD	-	-		0.390		-		-		-	0.000	0.390	-
JLTV-RV Mission Equipment Packages Integration	Option/CPFF	Oshkosh : Oshkosh, Wisconsin	-	-		0.328		-		-		-	0.000	0.328	-
JLTV-RV Test Assets	C/TBD	TBD : TBD	-	-		4.139		-		-		-	0.000	4.139	-
GMV Contractor Test Support	Option/CPFF	GD-OTS : St Petersburg, FL	-	0.153	Dec 2017	-		0.264	Jan 2019	-		0.264	0.000	0.417	-
JLTV-RV Contractor Test Support	Option/FFP	Oshkosh : Oshkosh, WI	-	-		-		0.409	Jan 2019	-		0.409	0.000	0.409	-
<b>Subtotal</b>			-	0.153		4.857		0.673		-		0.673	0.000	5.683	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
GMV PM Support	MIPR	PL GMV : TACOM Warren, MI	-	-		0.160		0.160	Oct 2018	-		0.160	0.000	0.320	-
JLTV-RV PM Support	MIPR	PM JLTV : TACOM Warren, MI	-	-		0.533		0.445	Oct 2018	-		0.445	0.000	0.978	-
<b>Subtotal</b>			-	-		0.693		0.605		-		0.605	0.000	1.298	N/A

**Remarks**  
Not applicable

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
GMV Operational Testing, LVAD, Rollover and Durability Testing	MIPR	Various : Various	-	0.323	Jan 2018	1.450		2.705	Dec 2018	-		2.705	0.000	4.478	-

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>												<b>Date: February 2018</b>			
<b>Appropriation/Budget Activity</b> 2040 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604642A / <i>LIGHT TACTICAL WHEELED VEHICLES</i>						<b>Project (Number/Name)</b> E40 / <i>LTV Prototype</i>			
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
JLTV-RV, Safety, Performance, Reliability, and Ballistic testing	MIPR	Various : Various	-	-		-		4.229	Jan 2019	-		4.229	0.000	4.229	-
<b>Subtotal</b>			-	0.323		1.450		6.934		-		6.934	0.000	8.707	N/A
<b>Project Cost Totals</b>			-	0.476		7.000		8.212		-		8.212	0.000	15.688	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / <i>LIGHT TACTICAL WHEELED VEHICLES</i>	<b>Project (Number/Name)</b> E40 / <i>LTV Prototype</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
GMV Directed Requirement Approval	▲ 1 DR Approval																											
GMV MDD Phase I			▲ 3 MDD I																									
GMV MS C					■ MS C																							
GMV Hardware Contract					▲ 6 Contract Award																							
GMV UMR Approval					▲ 7 UMR																							
GMV Production Qualification Testing									■ Testing																			
GMV Log Development									■ Log Development																			
GMV Full Rate Production													▲ 9 FRP															
JLTV-RV Acquisition Concept Brief to AAE		▲ 2 Acq Concept Brief																										
JLTV-RV Directed Requirement Update			▲ 4 DR Update																									
JLTV-RV Contract Award for Test Assets					▲ 5 Contract Award																							
JLTV-RV Development									■ Development																			
JLTV-RV XM914 Decision Point									▲ 8 XM914 Decision Point																			

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / <i>LIGHT TACTICAL WHEELED VEHICLES</i>	<b>Project (Number/Name)</b> E40 / <i>LTV Prototype</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
JLTV-RV Testing									Testing																			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / <i>LIGHT TACTICAL WHEELED VEHICLES</i>	<b>Project (Number/Name)</b> E40 / <i>LTV Prototype</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
GMV Directed Requirement Approval	2	2017	2	2017
GMV MDD Phase I	4	2017	4	2017
GMV MS C	2	2018	2	2018
GMV Hardware Contract	2	2018	2	2018
GMV UMR Approval	3	2018	3	2018
GMV Production Qualification Testing	3	2018	1	2019
GMV Log Development	3	2018	3	2019
GMV Full Rate Production	1	2020	1	2020
JLTV-RV Acquisition Concept Brief to AAE	3	2017	3	2017
JLTV-RV Directed Requirement Update	4	2017	4	2017
JLTV-RV Contract Award for Test Assets	2	2018	2	2018
JLTV-RV Development	2	2018	2	2020
JLTV-RV XM914 Decision Point	4	2018	4	2018
JLTV-RV Testing	3	2019	4	2020



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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / <i>Armored Systems Modernization (ASM) - Eng Dev</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	9.306	36.242	393.613	-	393.613	270.183	189.650	83.393	12.271	0.000	994.658
EV8: <i>Mobile Protected Firepower</i>	-	9.306	36.242	393.613	-	393.613	270.183	189.650	83.393	12.271	0.000	994.658

**A. Mission Description and Budget Item Justification**

Infantry Brigade Combat Teams (IBCTs) lack the mobile protected firepower capability necessary to defeat enemy prepared positions, destroy enemy armored vehicles, close with the enemy through fire and maneuver, and ensure freedom of maneuver and action in close contact with the enemy. Mobile Protected Firepower (MPF) will provide the protected, long range, precision direct-fire capability to ensure freedom of movement and action during offensive operations or defeat attacking enemy during defensive operations.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	9.678	36.242	90.159	-	90.159
Current President's Budget	9.306	36.242	393.613	-	393.613
Total Adjustments	-0.372	0.000	303.454	-	303.454
• Congressional General Reductions	-0.005	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.367	-			
• Other Adjustments 1	-	-	303.454	-	303.454

**Change Summary Explanation**

Increase from FY2018 to FY2019 is for the Engineering and Manufacturing Development (EMD) contract awards and other support costs to include support equipment

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604645A / Armored Systems Modernization (ASM) - Eng Dev					<b>Project (Number/Name)</b> EV8 / Mobile Protected Firepower			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	
EV8: Mobile Protected Firepower	-	9.306	36.242	393.613	-	393.613	270.183	189.650	83.393	12.271	0.000	994.658	
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-			

**A. Mission Description and Budget Item Justification**

Infantry Brigade Combat Teams (IBCTs) lack the mobile protected firepower capability necessary to defeat enemy prepared positions, destroy enemy armored vehicles, close with the enemy through fire and maneuver, and ensure freedom of maneuver and action in close contact with the enemy. Mobile Protected Firepower (MPF) will provide the protected, long range, precision direct-fire capability to ensure freedom of movement and action during offensive operations or defeat attacking enemy during defensive operations.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Government Engineering and Project Management	9.306	36.242	20.888
<b>Description:</b> Funding is provided for government program management and system engineering support costs to include salaries, travel, training, supplies, facilities and equipment to manage the Mobile Protected Firepower program.			
<b>FY 2018 Plans:</b> Conduct Development Request For Proposal (RFP) Release Decision Point by 1QFY2018 for approval to release RFP by 1QFY2018. Conduct a Source Selection Evaluation Board (SSEB) along with several Peer Reviews during RFP development and prior to SSEB selection. SSEB will encompass a paper proposal along with optional Bid Sample which will be evaluated. Includes funding for government personnel (labor, travel, training, and supplies) other support and planning efforts (other government agencies, support contractors, automated data processing, communications, and equipment). In addition PM will be funding ARDEC, Watervliet Arsenal and Rock Island Arsenal to procure tooling, non-recurring engineering, cannon assembly safety certification tests and Technical Data Package (TDP) Development.			
<b>FY 2019 Plans:</b> Continue government program management and system engineering support costs. These funds cover the costs of government and direct support contractors salaries, travel, training, supplies, facilities and equipment to manage the Mobile Protected Firepower program. Support includes other government agencies, support contractors, automated data processing, communications and equipment. MPF plans to award up to two contracts for EMD in the 1st QTR FY2019.			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease from FY18 to FY19 will reduce project management and engineering support costs.			
<b>Title:</b> Product Development	-	-	352.912

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / <i>Armored Systems Modernization (ASM) - Eng Dev</i>	<b>Project (Number/Name)</b> EV8 / <i>Mobile Protected Firepower</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p><b>Description:</b> Funds provided to support Engineering Manufacturing and Development (EMD) contract awards</p> <p><b>FY 2019 Plans:</b> Mobile Protected Firepower (MPF) milestone B (MS B) approval is scheduled for 1Q FY2019 followed by EMD contract awards with up to 2 vendors with prototypes (24), ballistic hulls (4), and test assets. Conduct start of work meeting, Design Maturity Review (DMR), and contractor/government program management reviews. Planning activities associated with delivery of prototypes, ballistic hulls and test assets in FY 2020. As well as developmental tests will begin in 1QFY2020 with a soldier vehicle assessment. Concurrently, planning for logistics assessments, technical manual development, and provisioning conferences.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase from FY18 to FY19 is for the EMD contract award support costs.</p> <p><b>Title:</b> Other support costs</p>			
<p><b>Description:</b> Funds provided to other support costs (designs, software) associated with EMD contract</p> <p><b>FY 2019 Plans:</b> Other support costs include support equipment. Support equipment includes the costs of design and development of deliverable items and associated software required to support and maintain the system. It includes equipment and tools unique to the system used to fuel, service, transport, hoist, repair, overhaul, assemble, disassemble, test, inspect, or otherwise maintain the mission equipment this includes Government Test preparation costs.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase from FY18 to FY19 other EMD contract support costs to include support equipment</p>	-	-	19.813
<b>Accomplishments/Planned Programs Subtotals</b>	9.306	36.242	393.613

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• G80820: G80820	-	-	0.000	-	0.000	-	-	311.007	307.438	5,202.655	5,821.100

**Remarks**

**D. Acquisition Strategy**  
Mobile Protected Firepower (MPF) Materiel Development Decision (MDD) occurred on 1QFY2017. The AAE approved the MPF program to enter the Material Solution Phase and begin the Analysis of Alternative (AoA) to assess the operational effectiveness, suitability, and life-cycle cost of potential materiel solutions that satisfy requirements contained within the MPF Initial Capabilities Document (ICD) and the draft Capability Development Document (CDD). Materiel Solution Analysis will

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / <i>Armored Systems Modernization (ASM) - Eng Dev</i>	<b>Project (Number/Name)</b> EV8 / <i>Mobile Protected Firepower</i>

support a future decision to enter at Milestone B in 1QFY2019. MPF strategy is to pursue through development and integration of existing mature subsystems into a MPF platform. EMD phase is scheduled to begin in FY 2019 and last thru FY 2022 with an anticipated MS C by 3QFY2022.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604645A / Armored Systems Modernization (ASM) - Eng Dev				EV8 / Mobile Protected Firepower							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Management Office	RO	Government Warren MI; : Various	-	9.306	Dec 2016	15.219	Dec 2017	20.888	Dec 2018	-		20.888	Continuing	Continuing	-
105MM Risk Assessment	RO	Government Picatinny Arsenal, NJ, Watervliet Arsenal, NY, Rock Island Arsenal, IL : Various	-	-		21.023	Aug 2018	-		-		-	0.000	21.023	-
<b>Subtotal</b>			-	9.306		36.242		20.888		-		20.888	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor 1 Product Development	C/TBD	TBD : TBD	-	-		-		176.456	Oct 2018	-		176.456	0.000	176.456	-
Contractor 2 Product Development	C/TBD	TBD : TBD	-	-		-		176.456	Oct 2018	-		176.456	0.000	176.456	-
<b>Subtotal</b>			-	-		-		352.912		-		352.912	0.000	352.912	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Other Support Cost	RO	TBD : TBD	-	-		-		19.813	Apr 2019	-		19.813	0.000	19.813	-
<b>Subtotal</b>			-	-		-		19.813		-		19.813	0.000	19.813	N/A
<b>Project Cost Totals</b>			-	9.306		36.242		393.613		-		393.613	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>							<b>Date: February 2018</b>			
<b>Appropriation/Budget Activity</b>			<b>R-1 Program Element (Number/Name)</b>			<b>Project (Number/Name)</b>				
2040 / 5			PE 0604645A / Armored Systems Modernization (ASM) - Eng Dev			EV8 / Mobile Protected Firepower				
	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
<b>Remarks</b>										

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / Armored Systems Modernization (ASM) - Eng Dev	<b>Project (Number/Name)</b> EV8 / Mobile Protected Firepower

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Alternative of Analysis (AoA) / Army Requirements Oversight Council (AROC)			3 AoA AROC																									
Acquisition Strategy Panel (ASP)		1 ASP																										
AROC Capabilities Development Document (CDD)		2 CDD AROC Approved																										
Joint Requirements Oversight Council (JROC) CDD						4 Expected CDD JROC Approval																						
Request for Proposal (RFP)						RFP																						
Risk Reduction of Large Caliber Weapon System																												
Source Selection Eval Board (SSEB) / Paper Proposals & Bid Samples																												
Milestone (MS) B																												
Contract Award (EMD)																												
MPF EMD																												
MPF Prototype Deliveries (24 Prototypes and 4 BH&Ts)																												
Pre-Production Test																												
Soldier Vehicle Assessment (SVA)																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / Armored Systems Modernization (ASM) - Eng Dev	<b>Project (Number/Name)</b> EV8 / Mobile Protected Firepower	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023												
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4									
Limited User Training (LUT)																					■ LUT																
Milestone (MS) C																									▲ 7 MS C												
MPF LRIP Option #1 Award																													▲ 8 MPF LRIP Option #1 Award								
MPF LRIP Delivery ((26)																																	■ M				



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / <i>Armored Systems Modernization (ASM) - Eng Dev</i>	<b>Project (Number/Name)</b> EV8 / <i>Mobile Protected Firepower</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Alternative of Analysis (AoA) / Army Requirements Oversight Council (AROC)	3	2017	3	2017
Acquisition Strategy Panel (ASP)	3	2017	3	2017
AROC Capabilities Development Document (CDD)	3	2017	3	2017
Joint Requirements Oversight Council (JROC) CDD	2	2018	2	2018
Request for Proposal (RFP)	1	2018	1	2018
Risk Reduction of Large Caliber Weapon System	3	2017	2	2019
Source Selection Eval Board (SSEB) / Paper Proposals & Bid Samples	2	2018	4	2018
Mileston (MS) B	1	2019	1	2019
Contract Award (EMD)	1	2019	1	2019
MPF EMD	1	2019	3	2022
MPF Prototype Deliveries (24 Prototypes and 4 BH&Ts)	1	2020	4	2020
Pre-Production Test	2	2020	4	2021
Soldier Vehicle Assessment (SVA)	4	2020	3	2021
Limited User Training (LUT)	3	2021	4	2021
Milestone (MS) C	3	2022	3	2022
MPF LRIP Option #1 Award	3	2022	3	2022
MPF LRIP Delivery ((26)	4	2023	1	2025

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	76.491	108.504	139.614	-	139.614	82.845	54.135	43.435	41.533	Continuing	Continuing
L67: <i>Soldier Night Vision Devices</i>	-	23.054	32.504	60.060	-	60.060	29.079	20.416	18.259	18.164	Continuing	Continuing
L70: <i>Night Vision Dev Ed</i>	-	37.346	52.900	53.737	-	53.737	40.075	22.855	14.071	9.300	Continuing	Continuing
L75: <i>Profiler</i>	-	3.736	0.000	0.000	-	0.000	0.000	0.000	0.000	2.107	0.000	5.843
L76: <i>Dismounted Fire Support Laser Targeting Systems</i>	-	5.562	14.957	15.341	-	15.341	5.880	5.292	5.496	5.921	Continuing	Continuing
L79: <i>Joint Effects Targeting Systems (JETS)</i>	-	6.793	8.143	10.476	-	10.476	7.811	5.572	5.609	6.041	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

This program element provides night vision/reconnaissance, surveillance and target acquisition technologies required for United States defense forces to engage enemy forces twenty-four hours a day under conditions of degraded visibility due to darkness, adverse weather, battlefield obscurants, foliage and man-made structures. These developments and improvements to high performance night vision electro-optics, radar, laser, and thermal systems and integration of related multi-sensor suites will enable near to long range target acquisition, identification and engagement to include significant fratricide reduction, which will improve battlefield command and control in "around-the-clock" combat operations.

Project EQ9 focuses on a kit of electronic devices that acquires, collects, and transmits data to provide near real time feedback in order to validate, follow, locate, or track a target (i.e., tagging, tracking, and locating (TTL)). Using electronic audio and/or video recorders, information obtained will validate movement and identify targets. In addition, threat monitoring can be integrated into existing operational tools, help to paint a clearer picture of the battlefield, pinpoint possible target locations, and identify and exploit enemy movements and patterns. Close Access Target Reconnaissance (CATR) has been fielded since 2005 as a Quick Reaction Capability (QRC) program.

Project L67 develops, improves and miniaturizes high performance night vision electro-optics, thermal and laser systems. It also provides for systems integration of related multi-sensor suites to enable near to long-range target acquisition and engagement as well as improved battlefield command and control in around-the-clock combat operations. It focuses on adapting demonstrated technologies that bring improvements to the dismounted Soldiers' equipment. This project develops or enhances equipment that provides the individual Soldier's day/night situational awareness and individual targeting capability. This project includes cost associated with efforts for integration and interface of products on Soldiers head, body and weapons.

Project L70 focuses on night vision, reconnaissance, surveillance and target acquisition (RSTA) sensor and suites of sensors to provide well-defined surveillance and targeting capabilities for a variety of Current, Modular, and Future Force platforms. This project includes: 3rd Generation Forward Looking Infra-Red (3GEN FLIR) B-Kit development activities, the 3GEN Long Range Advanced Scout Surveillance System (LRAS3) Modification Work Order (MWO) to integrate 3GEN FLIR B-Kit, and

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	
<p>the Assistant Secretary of the Army for Acquisition, Logistics, and Technology ASA(ALT) Common Operating Environment (COE) effort to meet sensor interoperability requirements and improve the soldier-machine interface of the Program of Record (POR).</p> <p>Project L75 focuses on development of Profiler Block enhanced capabilities for meteorological (MET) measurement sensors and data. Improvements have reduced the footprint (less soldiers/vehicles) and complexity of the system, improved performance (accuracy), improved survivability, connectivity, no balloon sensor, multiple initialization data, and terrain visualization. The improved MET message data will increase lethality by enabling artillery a greater probability of first round hit with indirect fire systems. Profiler Block III provides a networked laptop configuration while further reducing the system's logistics footprint with the elimination of the High Mobility Multi-purpose Wheeled Vehicle (HMMWV) mounted shelter and trailer located in the Tactical Operations Center (TOC). The Profiler Virtual Module (PVM), a product improvement to the Block III, concept includes the following updates: update of weather model; update of software architecture removing legacy Block I code and creating a modular framework; development in conjunction with the Advanced Field Artillery Tactical Data System (AFATDS) program including AFATDS, to provide increased interoperability and usability; and to enable operation of the Profiler system in a virtual machine for use in the Common Operating Environment (COE) versions 2,3,4,and 5. This concept is a flexible approach that supports use of existing Block III hardware, increased accuracy during technical refresh of hardware with higher performance computers, and virtualization on the Command Post Computing Environment (CP CE) server.</p> <p>Project L76 matures technologies and capabilities which benefit the Lightweight Laser Designator Rangefinder (LLDR, AN/PED-1, AN/PED-1A, and AN/PED-1B) and the Joint Effects Targeting System (JETS). These precision targeting and next generation systems are used by dismounted Soldiers to locate, identify, and target enemy assets. This project focuses on reducing size, weight, power and cost, improving imaging performance, and increasing targeting accuracy. Targeting accuracy improvements will focus on developing and integrating affordable, non-magnetic, high accuracy, full-time (24/7), and all weather Precision Azimuth and Vertical Angle Measurement (PAVAM) devices, with reduced size, weight, and power characteristics into the LLDR system. Long term goals include improving current celestial navigation systems to increase operational availability, developing precision targeting capabilities that will operate in a Global Positioning System (GPS) denied environment to improve situational awareness, and to integrate Military Global Positioning System (GPS) User Equipment (M-Code) (next-generation GPS) receivers into LLDR and JETS, when available.</p> <p>Project L79 focuses on the Joint Effects Targeting System (JETS). JETS is an Army program with joint information (Air Force and Marine Corps). JETS will meet the one-man, hand-held precision targeting gap identified by the Fires Center of Excellence (FCOE). JETS is a light-weight, handheld system that will provide the single dismounted observer and Joint Terminal Attack Controller (JTAC) with a common, enhanced day and night thermal capability to rapidly acquire, accurately locate, positively identify, and precisely designate targets. JETS Target Location and Designation System (TLDS) will be able to interface with existing and future Forward Entry Systems (FESs) and operate in environments where global positioning system (GPS) capabilities are degraded or denied including the integration of military GPS user equipment (M-Code) GPS receivers, when they become available. This project will address continued development and integration of improved precision targeting components to reduce size, weight, power, and cost of systems for dismounted precisions Fires mission.</p>		

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	84.519	108.504	105.417	-	105.417
Current President's Budget	76.491	108.504	139.614	-	139.614
Total Adjustments	-8.028	0.000	34.197	-	34.197
• Congressional General Reductions	-0.038	-			
• Congressional Directed Reductions	-5.000	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.990	-			
• Adjustments to Budget Years	-	-	34.197	-	34.197

**Change Summary Explanation**

Fiscal Year 2019: Program increase of \$36.705 million to Project L67 for Soldier Night Vision Devices. Program decreases of \$1.888 million to L70 Night Vision Dev Ed, \$0.336 million to L76 - Dismounted Fire Support Laser Targeting Systems, and \$0.284 million to L79 - Joint Effects Targeting Systems (JETS). Both L75 Profiler and EQ9 - CATR remained unchanged at \$0.000 million.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>				<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L67: <i>Soldier Night Vision Devices</i>	-	23.054	32.504	60.060	-	60.060	29.079	20.416	18.259	18.164	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project develops, improves and miniaturizes high performance night vision electro-optics, thermal and laser systems. It also provides for systems integration of related multi-sensor suites to enable near to long-range target acquisition and engagement as well as improved battlefield command and control in around-the-clock combat operations. It focuses on adapting demonstrated technologies that bring improvements to the dismounted Soldiers' equipment. This project develops or enhances equipment that provides the individual Soldier's day/night situational awareness and individual targeting capability. This project includes cost associated with efforts for integration and interface of products on Soldiers head, body and weapons.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Family of Weapon Sights (FWS)	23.054	24.057	20.722	-	20.722
<p><b>Description:</b> FWS is a family of weapon sights that enable combat forces to acquire and engage targets with small arms and to conduct surveillance and fire control under day/night obscurants, no-light, and adverse weather conditions. The family utilizes advancements in thermal and low light level sensors to produce Individual (I), Crew-Served (CS), and Sniper (S) weapon sights operable in-line with a day optic or in stand-alone mode. This project integrates smaller pixel focal plane arrays in multiple large format sizes to improve sensitivity, clarity, and range, while simultaneously reducing the size, weight and power consumption of all variants. The FWS-I variant is a weapon mounted long-wave infrared sensor that enables Soldiers to fire quickly and accurately from any carry position and with significantly reduced exposure to enemy fire by providing a wireless zeroed weapon aimpoint in the Soldier's Enhanced Night Vision Goggle III (ENVG III) goggle or day display on the helmet. Leveraging the success of the Individual variant development, the FWS-CS variant operates as the primary sight; it includes a wireless Helmet Mount Display (HMD) and provides the Soldier with input from a laser range finder device, resulting in a more accurate aimpoint that adjusts automatically for range, ammunition characteristics, and vertical angle. The FWS-S variant mounts in-line with the Sniper's direct view optic providing a thermal imagery capability to the host weapon at the weapon's maximum effective range, plus 20% overmatch. FWS-S provides Snipers a large format display with increased pixel density that enables accurate long range engagements while maintaining day sight, extending the lethality and provide exceptional observation. The modified FWS- CS Light program will leverage the advancements in technology from the FWS and will support</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018							
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>								
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>										
<p>Combat support and Service Support units with a FWS -CS Light. This also supports Thermal Weapon Sight obsolesce through the Future Years Defense Plan.</p> <p><b>FY 2018 Plans:</b> Continue FWS-CS and FWS-S Engineering and Manufacturing Development (EMD) to design, build and deliver prototype systems for Government and Contractor testing. Complete FWS-CS and FWS-S EMD testing in preparation for Low Rate Initial Production (LRIP). Improve the manufacturing process of uncooled Focal Plane Arrays (FPA) and micro-Organic Light-Emitting Diode (OLED) displays that are key components of FWS</p> <p><b>FY 2019 Base Plans:</b> Complete FWS-S and FWS-CS Engineering and Manufacturing Development (EMD) testing in preparation for Low Rate Initial Production (LRIP). Improve the manufacturing process of uncooled FPA and micro-Organic Light-Emitting Diode (OLED) displays that are key components of FWS. Both FWS-S and FWS-CS will achieve MS C decision approval to enter LRIP Phase of the program. FWS-CS Light contract award for EMD to redesign, build and deliver prototypes systems for government and contractor testing.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> This decrease is due FWS-CS Light contract award for Engineering and Manufacturing Development to redesign, build and deliver prototypes systems for government and contractor testing.</p>						<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p><b>Title:</b> Small Tactical Optical Rifle Mounted (STORM) II</p> <p><b>Description:</b> The AN/PSQ-23 STORM Micro-Laser Range Finder (MLRF) is a weapon-mounted multi-function laser system. It provides an eye safe laser range finder, digital compass, Infrared (IR) and visible aiming lights, and an IR illuminator for far target location with continuous range, accuracy, weight and power performance enhanced capabilities. Funding supports qualifying smaller, lighter, and a less expensive STORM variant (STORM II) for Soldiers.</p> <p><b>FY 2018 Plans:</b> Multiple contracts will be awarded to procure competing, updated STORM systems, STORM II. STORM II test systems will capitalize on improved laser and electro-optical technologies to develop a lighter, lower cost, multi-function laser system for the individual Soldier. This effort incrementally funds the procurement and qualification of STORM II test systems for future procurements.</p> <p><b>FY 2019 Base Plans:</b></p>						-	4.850	7.128	-	7.128

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
This effort continues to fund the qualification of STORM II test systems in support of future procurements. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> This increase is due to maturing research and development of STORM II test systems laser and electro-optical technologies for future procurements.					
<b>Title:</b> Family of Vision and Mobility Capabilities (FVMC) <b>Description:</b> The FVMC (Day Display) is the next generation vision system for day and night that will reduce the Soldier's burden and allow hands free operation. The FVMC will provide automatic adjustment of imagery and matched sensor fields of view. The FVMC will provide day/night Rapid Target Acquisition (RTA) capability by interfacing with FWS-I, day/night data display for the Soldier Network Warrior End User Device/Computer (EUD), and ability to send/receive data to the EUD to support advanced EUD applications to process the sensor video, integrate it with external data sources, and produced advanced processed imagery with overlay data display. <b>FY 2018 Plans:</b> Initiate development of system prototypes for the FVMC. <b>FY 2019 Base Plans:</b> Initiate development of system prototype for FVMC; Finalize Interface Control Document (ICD) to support interoperability between FVMC systems. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> This increase is due to maturing research and development of system prototype for FVMC Finalize ICD interoperability in preparation for subsequent Low -Rate Initial Production.	-	2.100	12.210	-	12.210
<b>Title:</b> Pre-Shot Threat Detection (PTD) <b>Description:</b> The PTD is a compact, lightweight, mounted multi-function laser system designed to detect threat Snipers, Forward Observers and Scouts equipped with direct view optics. The PTD functions include laser illumination, optical augmentation and pointing. The PTD capabilities will be developed in two parallel paths to allow for technology insertions when available. PTD (Overt) provides the maneuver element with an initial solution (overt) that improves the Soldier's capability to conduct pre-shot threat detection, obtain situational awareness, and verification of threat. PTD combines the capability of the Multi-Function Aiming Light and the Green Laser Interdiction System, thereby reducing redundancy and the total load. PTD (Covert) provides the maneuver element with an enhanced solution (covert) that improves the Soldier's capability to conduct pre-shot	-	1.497	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>threat detection, obtain situational awareness, and verification of threat, while remaining undetected by enemy optics.</p> <p><b>FY 2018 Plans:</b> Finalize production representative system and conduct Limited User Tests (LUT) for the Overt PTD prototypes. Draft and release RFP. Further develop covert capability.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> This decrease is due PTD considered once a stand alone system is now a capability of the Family of Target Acquisition Laser (FTAL) and FY 2019 funding was moved to support the Small Tactical Optical Rifle Mounted II system.</p>					
<p><b>Title:</b> Enhanced Night Vision Goggle - Binocular (ENVG-B)</p> <p><b>Description:</b> The ENVG-B system is a modular helmet-mounted, passive electro-optical night vision and long wave infrared (LWIR) imaging device in a binocular configuration. The system integrates dual Image Intensification (I2) sensors with the LWIR imagery into a single viewing display. The LWIR sensor provides the Soldier with the capability to rapidly detect and recognize human-sized targets in adverse weather and obscurants and in varying light conditions. The dual I2 sensors provide the Soldier with depth perception for ease of low-light level maneuvers and the ability to detect rifle-mounted aiming lights to engage targets. The ENVG-B can also be operated in a monocular configuration by moving one of the two individually rotating monoculars. The ENVG-B has a near infrared (NIR) emitting light source that provides illumination for close-up viewing. The ENVG-B mounts on current Soldier equipment, including the Advanced Combat Helmet (ACH), the Enhanced Combat Helmet (ECH) and Integrated Head Protection System (IHPS). The ENVG-B has a multi-point wireless interface to the FWS-I weapon mounted LWIR sensor and to Nett Warrior in order to support information assurance requirements. The ENVG-B wirelessly operates with the FWS-I to provide Rapid Target Acquisition (RTA) capability. RTA is the capability to view the boresighted/zeroed weapon sight reticle in the ENVG-B display, enabling the Soldier to accurately engage targets without having to bring the weapon to eye level and without the use of active lasers, all while remaining in defilade.</p> <p><b>FY 2019 Base Plans:</b> FY 2019 will begin with the ENVG-B Engineering and Manufacturing Development (EMD) contract award. Two vendors will begin designing, building and deliver prototype systems for Government and Contract Testing. EMD Government testing will include an Engineering Characterization Test (ECT), a Reliability Growth Test - 1</p>	-	-	20.000	-	20.000



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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>
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**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
(RGT-1), a Production Quality Test - Government (PQT-G) and a Limited User Test (LUT). ENVG-B EMD testing is in preparation for Low Rate Initial Production (LRIP).					
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> ENVG-B award will be a full and open competition which will require Research Development Test and Evaluation funding for Engineering and Manufacturing Development to qualify at least two vendors.					
<b>Accomplishments/Planned Programs Subtotals</b>	23.054	32.504	60.060	-	60.060

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• VT7: <i>Night Vision Systems Advanced Development</i>	9.930	12.347	7.350	-	7.350	6.529	6.574	7.184	7.153	Continuing	Continuing
• K36400: <i>Helmet Mounted Enhanced Vision Devices (HMEVD)</i>	118.187	144.644	109.724	0.027	109.751	105.661	58.047	61.783	116.345	Continuing	Continuing
• K22002: <i>Family of Weapons Sights - Individual (FWS-I)</i>	49.536	49.887	94.932	-	94.932	81.544	79.213	19.124	22.473	Continuing	Continuing
• K35110: <i>Small Tactical Optical Rifle Mounted (STORM)</i>	18.843	14.007	22.882	0.060	22.942	22.906	23.218	26.825	26.389	Continuing	Continuing
• B53800: <i>Laser Target Locators (LTL)</i>	33.983	22.226	34.960	0.436	35.396	20.138	26.231	21.136	24.072	Continuing	Continuing
• K22003: <i>Family of Weapons Sights - Crew Serve (FWS-CS)</i>	-	1.033	30.581	0.525	31.106	77.345	84.818	93.886	75.758	Continuing	Continuing
• K36400: <i>Helmet Mounted Enhanced Vision Devices</i>	118.187	144.644	109.724	0.027	109.751	105.661	58.047	61.783	116.345	0.000	714.418
• K22004: <i>FWS-SNIPER</i>	-	8.185	15.224	-	15.224	25.800	16.001	1.350	1.364	0.000	67.924

**Remarks**

**D. Acquisition Strategy**

The various developmental programs in this project continue to exercise competitively awarded contracts using best value source selection procedures.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / Night Vision Systems - Eng Dev	<b>Project (Number/Name)</b> L67 / Soldier Night Vision Devices
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PROGRAM MGMT	MIPR	Various : Various	5.010	3.087	Feb 2017	3.005	Feb 2018	0.110	Feb 2019	-		0.110	Continuing	Continuing	-
<b>Subtotal</b>			5.010	3.087		3.005		0.110		-		0.110	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Family of Weapon Sights-Crew Served (FWS-CS)	C/CPFF	DRS RSTA, Inc BAE Systems : Dallas, TX/Nashua, NH	-	11.262	Jan 2017	14.499	Dec 2017	-		-		-	0.000	25.761	-
Family of Weapon Sights-Sniper (FWS-S)	Allot	N2 Imaging Systems : Irvine, CA	-	4.122	Jan 2017	0.607	Dec 2017	-		-		-	0.000	4.729	-
Family of Vision and Mobility Capabilities (FVMC)	MIPR	NVESD : Ft Belvoir, VA	-	-		2.100	Feb 2018	10.684	Feb 2019	-		10.684	0.000	12.784	Continuing
Pre-Shot Threat Detection	Various	Various : Various	-	-		0.847	Feb 2018	-		-		-	0.000	0.847	Continuing
STORM II Test Systems (Vendor A)	C/FFP	TBD : TBD	-	-		2.125	Feb 2018	3.314	Jan 2019	-		3.314	0.000	5.439	Continuing
STORM II Test Systems (Vendor B)	C/FFP	TBD : TBD	-	-		2.125	Feb 2018	3.314	Jan 2019	-		3.314	0.000	5.439	Continuing
Enhanced Night Vision Google - Binocular (ENVG-B) (Vendor A)	C/CPFF	TBD : TBD	-	-		-		6.500	Feb 2019	-		6.500	0.000	6.500	Continuing
Enhanced Night Vision Google - Binocular (ENVG-B) (Vendor B)	C/CPFF	TBD : TBD	-	-		-		6.500	Feb 2019	-		6.500	0.000	6.500	Continuing
Thermal Weapon Sights (TWS) (Vendor A)	C/CPFF	TBD : TBD	-	-		-		6.100	Feb 2019	-		6.100	0.000	6.100	Continuing
Thermal Weapon Sights (TWS) Vendor B)	C/CPAF	TBD : TBD	-	-		-		6.100	Feb 2019	-		6.100	0.000	6.100	Continuing
<b>Subtotal</b>			-	15.384		22.303		42.512		-		42.512	0.000	80.199	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604710A / Night Vision Systems - Eng Dev					Project (Number/Name) L67 / Soldier Night Vision Devices				

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Matrix Support	MIPR	NVESD : Ft Belvoir, VA	5.241	1.549	Feb 2017	2.429	Feb 2018	6.228	Feb 2019	-		6.228	Continuing	Continuing	-
<b>Subtotal</b>			5.241	1.549		2.429		6.228		-		6.228	Continuing	Continuing	N/A









Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Government Test Support Activity	MIPR	Army Test and Evaluation Command : Various	47.159	3.034	Jun 2017	4.767	Jun 2018	11.210	Jun 2019	-		11.210	Continuing	Continuing	-
<b>Subtotal</b>			47.159	3.034		4.767		11.210		-		11.210	Continuing	Continuing	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	57.410	23.054	32.504	60.060	-	60.060	Continuing	Continuing	N/A

**Remarks**



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023															
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4												
FWS-CS Engineering and Manufacturing Development																																								
	EMD																																							
FWS-CS MS C																	3																							
																	MS C																							
FWS-S Engineering and Manufacturing Development																																								
	EMD																																							
FWS-S MS C																	4																							
																	MS C																							
Family of Vision and Mobility Capabilities (FVMC)																																								
																					Development																			
LTLM II Development and Operational Testing																																								
STORM II Contract Award - Qualification Systems																	1																							
																	Contract Award																							
STORM II Developmental and Operational Testing																																								
PTD Overt Technology Development																																								
PTD Limited User Testing (LUT)																																								
ENVG-B Engineering and Manufacturing Development																					5																			
																					Contract Award																			
ENVG-B Developmental and Operational Testing																																								
Thermal Weapon Sight (TWS) Improvements																	2																							
																	Contract Award																							

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
TWS Engineering and Manufacturing Development									Development																							
Thermal Weapon Sight																	LRIP															
Next Generation Smart Sensor (NGSS)																													 Contract Award			
NGSS Engineering and Manufacturing Development																													 Development			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
ENVG Production Qualification Testing (PQT)	3	2014	3	2015
FAMILY OF WEAPON SIGHTS (FWS)	2	2011	2	2011
FWS-CS Engineering and Manufacturing Development	3	2016	2	2019
FWS-CS MS C	2	2019	2	2019
FWS-S Engineering and Manufacturing Development	3	2016	2	2019
FWS-S MS C	2	2019	2	2019
Family of Vision and Mobility Capabilities (FVMC)	3	2019	4	2022
LTLM II Development and Operational Testing	4	2017	1	2018
SMALL TACTICAL OPTICAL RIFLE MOUNTED (STORM)	2	2011	2	2011
STORM II Contract Award - Qualification Systems	3	2018	3	2018
STORM II Developmental and Operational Testing	1	2019	4	2019
PTD Overt Technology Development	4	2016	3	2018
PTD Limited User Testing (LUT)	2	2018	1	2019
ENVG-B Engineering and Manufacturing Development	3	2019	3	2019
ENVG-B Developmental and Operational Testing	3	2019	2	2022
Thermal Weapon Sight (TWS) Improvements	2	2019	2	2019
TWS Engineering and Manufacturing Development	2	2019	3	2020
Thermal Weapon Sight	3	2020	3	2021
Next Generation Smart Sensor (NGSS)	2	2023	2	2023
NGSS Engineering and Manufacturing Development	2	2023	4	2023

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>				<b>Project (Number/Name)</b> L70 / <i>Night Vision Dev Ed</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L70: <i>Night Vision Dev Ed</i>	-	37.346	52.900	53.737	-	53.737	40.075	22.855	14.071	9.300	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project performs Engineering and Manufacturing Development (EMD) on high performance night vision, Reconnaissance, Surveillance, and Target Acquisition (RSTA) systems and other related systems that allow forces to locate and track enemy units in day, night, and all battlefield conditions, and through natural and man-made structures and obscurants. It also develops and integrates suites of these sensors to provide well-defined surveillance and targeting capabilities, as well as architectures for these sensors to communicate automatically. These efforts focus on meeting the requisite night vision and RSTA capabilities required for evolving Current Force, Modular Force, and Future Force systems.

The project supports the 3rd Generation Forward Looking Infrared (3GEN FLIR) B-Kit EMD program, which incorporates the next generation of forward looking infrared technologies. The 3GEN FLIR EMD program will develop a common 3GEN FLIR B-Kit for integration into US Army FLIR sensor systems in accordance with the approved Improved Forward Looking Infrared (I-FLIR) Capability Development Document (CDD). The common 3GEN FLIR B-Kit prescribed by the I-FLIR CDD will allow the Army to achieve economies of scale and avoid duplicative engineering and development costs. As a result, 3GEN FLIR capabilities can be delivered at a lower cost to the Abrams, Bradley, and Long Range Advanced Scout Surveillance System (LRAS3), while potentially leveraging 3GEN FLIR components for airborne applications. The 3GEN FLIR B-Kit provides Mid Wave Infrared and Long Wave Infrared digital video and the electronic interfaces required to integrate the 3GEN FLIR technology with the host platform sensor. When integrated in current sensor packages, 3GEN FLIR technology enhances the war-fighters' survivability and lethality through increased identification range performance, while enabling the detection of difficult or obscured targets and faster threat detection through automated processes. The 3GEN FLIR B-Kit EMD program is also a key element in maintaining the Army's FLIR industrial base.

The project supports LRAS3 Modification Work Order (MWO) to integrate 3GEN FLIR B-Kit. The LRAS3 MWO effort includes integration of 3GEN FLIR B-Kit technology, an Inertial Measurement Unit (IMU), and an M-code Global Positioning System (GPS) receiver. Collectively, these capabilities will improve the Far Target Location (FTL) accuracy of the LRAS3 and enhance the scout's survivability and lethality through increased detection, recognition and identification range performance. Plan to transition 3GEN LRAS3 from BA5 funding to BA7 funding in future years.

This project also executes the Army Sensor Computing Environment (CE) effort which is part of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA-ALT) Common Operating Environment (COE) program. The Sensor CE effort focuses on increasing sensor interoperability across the enterprise and improving the Soldier-machine interface. This is done by defining, demonstrating and standardizing Sensor interfaces across the Army networks. Standardized interfaces delivered from this effort will be incorporated into current and future sensor systems and programs.

FY 2019 Base Funding in the amount of \$53.737 million supports the 3GEN FLIR B-Kit EMD program activities as well as the initiation of the 3GEN LRAS3 Modification Work Order (MWO) effort to integrate 3GEN FLIR B-Kit, an IMU, and an M-code GPS receiver. Additionally, FY 2019 Base Funding supports the continued activities

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018				
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L70 / <i>Night Vision Dev Ed</i>					
associated with meeting sensor interoperability requirements and improving the Soldier-machine interface in support of the Army's vision of the Common Operating Environment (COE).							
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>			<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> 3GEN FLIR B-Kit EMD <b>Description:</b> 3GEN FLIR EMD requirements and contract awards.  <b>FY 2018 Plans:</b> FY 2018 Base Funding supports the continuation of 3GEN FLIR Prototype Fabrication, Test Readiness Review (TRR) preparation, initiation of software Formal Qualification Testing (FQT), and program management support. <b>FY 2019 Base Plans:</b> FY 2019 Base Funding supports 3GEN FLIR Prototype Fabrication, B-Kit CDR, TRR, and Design Verification Testing (DVT). <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Minor economic adjustments.			35.230	43.919	42.683	-	42.683
<b>Title:</b> Common Operating Environment (COE) <b>Description:</b> This effort supports the Common Operating Environment vision by improving the sensor interoperability requirement and the Soldier-machine interface. Resultant improvements to be made on a program by program basis.  <b>FY 2018 Plans:</b> FY 2018 Base Funding supports continued development of the COE program to include meeting the sensor interoperability requirement and improving the soldier-machine interface. Specific FY 2018 activities include continued demonstrations and experimentation for transition into Army programs. <b>FY 2019 Base Plans:</b> FY 2019 Base Funding supports continued development of the COE program to include meeting the sensor interoperability requirement and improving the soldier-machine interface. Specific FY 2019 activities include continued demonstrations and experimentation for transition into Army programs.			0.100	0.100	0.100	-	0.100
<b>Title:</b> 3GEN LRAS3 ECP to integrate 3GEN FLIR B-Kit <b>Description:</b> This effort supports the sensor enhancement activities required to integrate 3GEN FLIR B-Kit technology into the LRAS3.			2.016	8.881	10.954	-	10.954



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L70 / <i>Night Vision Dev Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p><b><i>FY 2018 Plans:</i></b> FY 2018 Base Funding supports completion of the performance specification and solicitation documentation; and initiation of the Modification Work Order (MWO) to integrate 3GEN FLIR B-Kit, an IMU, and an M-code GPS receiver.</p> <p><b><i>FY 2019 Base Plans:</i></b> FY 2019 Base Funding supports contract solicitation and the specification development activities associated with integration of the 3GEN FLIR B-Kit, an Inertial Measurement Unit (IMU), and an M-code GPS receiver.</p> <p><b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> FY 2019 funding increase over FY 2018 due to planned award of the Modification Work Order contract in FY 2019.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	37.346	52.900	53.737	-	53.737

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• 330: <i>Abrams Tank Improvement Program (PE 0203735A)</i>	117.707	108.570	164.840	-	164.840	105.901	66.332	58.338	53.425	Continuing	Continuing
• 371: <i>Bradley Improvement Program (PE 0203735A)</i>	107.330	130.863	166.985	-	166.985	152.705	87.933	80.389	48.851	Continuing	Continuing
• K38300: <i>Long Range Advanced Scout Surveillance System (LRAS3) (K38300) OPA2</i>	-	-	0.000	2.861	2.861	-	2.963	49.397	93.015	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**  
3GEN FLIR: Materiel Development Decision (MDD) was received from the Army Acquisition Executive (AAE) and the Acquisition Decision Memorandum (ADM) was signed on 22-Dec-2014. Per the ADM, 3GEN FLIR entered the acquisition lifecycle at Milestone B (MS B) in 2Q FY 2016. After a successful MS B decision, competitive EMD contracts were awarded to design, develop, integrate and test the 3GEN FLIR B-Kit prior to production and mitigate the industrial base risk. The host platforms are responsible for integration of the 3GEN FLIR B-Kit.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Army Date: February 2018

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
2040 / 5	PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	L70 / <i>Night Vision Dev Ed</i>

3GEN Long Range Advanced Scout Surveillance System (LRAS3): After a Milestone Decision Authority (MDA) review, 3GEN LRAS3 will perform technical trade studies to determine modifications required to the current LRAS3 to integrate 3GEN FLIR B-Kit technology, an Inertial Measurement Unit (IMU), and an M-coded Global Positioning System (GPS) receiver. Contract preparation activities for the Modification Work Order (MWO) award are planned for 2Q FY 2020.

Sensor CE: Additional Fiscal Year 2019 activities include continued development of the sensor interoperability requirement and improving the Soldier-machine interface in support of the Army's vision of the Common Operating Environment (COE).

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L70 / <i>Night Vision Dev Ed</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Project Management	MIPR	PM TS : Ft. Belvoir, VA	13.114	0.978	Jan 2017	3.006	Jan 2018	2.369	Jan 2019	-		2.369	0.000	19.467	9.454
<b>Subtotal</b>			13.114	0.978		3.006		2.369		-		2.369	0.000	19.467	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FY 2012-FY 2013: Develop, Fab, and Qual of a common Ground Platform Engine with Block II EOCCM	C/Variou	Various : Various	0.049	-		-		-		-		-	0.000	0.049	-
3GEN FLIR B-Kit Engineering/Document Prep	C/Variou	Various : Various	21.685	-		-		-		-		-	0.000	21.685	-
3GEN FLIR B-Kit EMD	C/CPIF	Various : Various	17.191	33.123	Nov 2016	40.030	Dec 2017	39.008	Dec 2018	-		39.008	0.000	129.352	-
3GEN LRAS3: Tech Trade Studies	C/TBD	Various : Various	0.499	1.112	May 2017	-		-		-		-	0.000	1.611	-
3GEN LRAS3: ECP Integration	C/TBD	Various : Various	-	-		7.486	Mar 2018	9.055	Jan 2019	-		9.055	0.000	16.541	-
PSS P3I: CE COE	C/FP	Various : Various	19.162	-		-		-		-		-	0.000	19.162	-
<b>Subtotal</b>			58.586	34.235		47.516		48.063		-		48.063	0.000	188.400	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
3GEN FLIR B-Kit Support	C/TBD	Various : Various	30.383	1.683	Feb 2017	1.154	Feb 2018	1.964	Feb 2019	-		1.964	0.000	35.184	-
3GEN LRAS3 - Spec development and solicitation prep	C/TBD	Various : Various	-	0.350	Feb 2017	1.124	Feb 2018	1.241	Feb 2019	-		1.241	0.000	2.715	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L70 / <i>Night Vision Dev Ed</i>
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
COE Support	C/CPFF	Various : Various	1.194	0.100	Feb 2017	0.100	Feb 2018	0.100	Feb 2019	-		0.100	0.000	1.494	-
<b>Subtotal</b>			31.577	2.133		2.378		3.305		-		3.305	0.000	39.393	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Other Test Support	MIPR	Various : Various	15.850	-		-		-		-		-	0.000	15.850	15.850
<b>Subtotal</b>			15.850	-		-		-		-		-	0.000	15.850	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	119.127	37.346	52.900	53.737	-	53.737	0.000	263.110	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L70 / <i>Night Vision Dev Ed</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
3GEN FLIR B-Kit Development, Test, and Integration																																
3GEN FLIR B-Kit MS C																																
3GEN LRAS3 ECP to Integrate 3GEN FLIR B-Kit: Perform Tech Trade Stu																																
3GEN LRAS3 ECP to Integrate 3GEN FLIR B-Kit: Spec Development & Solicitation																																
3GEN LRAS3 ECP to Integrate 3GEN FLIR B-Kit: ECP Development, Test & Integration																																
Common Operating Environment, Development																																

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L70 / <i>Night Vision Dev Ed</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
3GEN FLIR - Spec Development, Trade Studies, Analyses, & Milestone Prep	1	2012	2	2016
3GEN FLIR B-Kit Development, Test, and Integration	2	2016	4	2022
3GEN FLIR B-Kit MS C	4	2022	4	2022
3GEN LRAS3 ECP to Integrate 3GEN FLIR B-Kit: Perform Tech Trade Studies	2	2017	4	2017
3GEN LRAS3 ECP to Integrate 3GEN FLIR B-Kit: Spec Development & Solicitation	1	2018	1	2020
3GEN LRAS3 ECP to Integrate 3GEN FLIR B-Kit: ECP Development, Test & Integration	2	2020	2	2024
Common Operating Environment, Development	2	2012	4	2019

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L75 / <i>Profiler</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
L75: <i>Profiler</i>	-	3.736	0.000	0.000	-	0.000	0.000	0.000	0.000	2.107	0.000	5.843
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Profiler Virtual Module (PVM) provides meteorological (MET) data that includes wind speed, wind direction, temperature, barometric pressure, and humidity information required for use in the Advanced Field Artillery Tactical Data System (AFATDS). The correctional information is necessary for precise targeting and terminal guidance to Field Artillery assets. PVM improves accuracy of predictive fires solutions and allows for first round effects on target and reduces the risk of fratricide. This capability increases the lethality of indirect fire systems such as the rocket launchers, self-propelled or towed howitzers, and mortars.

FY 2019 Base funding is \$0.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<b>Title:</b> Profiler Virtual Module COE V2/3 development	2.486	-	-	-	-
<b>Description:</b> Implementation of COE V2/3 requirements and Digital Terrain and Elevation Data (DTED) upgrades and improved elevation algorithms.					
<b>Title:</b> Support cost for conversion of the MET model for Profiler Virtual Module	0.650	-	-	-	-
<b>Description:</b> Conversion of the MET model for Profiler Virtual Module					
<b>Title:</b> Formal Qualification Testing/Developmental Testing (FQT/DT)	0.300	-	-	-	-
<b>Description:</b> Conduct and complete FQT/DT					
<b>Title:</b> Program Support Costs for Profiler software development	0.300	-	-	-	-
<b>Description:</b> Cost for Project Management Office efforts.					
<b>Accomplishments/Planned Programs Subtotals</b>	3.736	-	-	-	-

**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• K27910: <i>Profiler</i>	-	0.070	0.000	-	0.000	-	-	-	-	0.000	0.070

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L75 / <i>Profiler</i>

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• K27900: <i>Profiler</i>	-	-	0.171	-	0.171	0.019	-	-	-	0.000	0.190

**Remarks**

**D. Acquisition Strategy**

The Profiler Acquisition Strategy was approved by the MDA on 28 March 2012 for a product improvement to the Profiler Block III for a Virtual Module supporting the Command Post Computing Environment of the Common Operating Environment (COE). PVM 1.0 was completed in FY15. PVM 1.0.1 reflects continued updates for weather model changes and to meet directed COE compliance.

The Profiler product was transitioned to PEO C3T per the transition plan signed by the Army Acquisition Executive (AAE) dated 14 May 2015. The APB dated 30 Sep 2010, reflecting efforts to develop Profiler Block 3, was closed out 3 Apr 2015. Profiler will transition to sustainment in FY17/18.

**E. Performance Metrics**

N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L75 / <i>Profiler</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Support for Profiler (Core)	Sub Allot	PM Mission Command : APG, MD	3.293	0.300		-		-		-		-	0.000	3.593	-
<b>Subtotal</b>			3.293	0.300		-		-		-		-	0.000	3.593	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Profiler Virtual Module COE V2/V3 development and data gathering	IA	SEC/C3T/FD : Ft. Sill, OK	1.963	2.486		-		-		-		-	0.000	4.449	-
<b>Subtotal</b>			1.963	2.486		-		-		-		-	0.000	4.449	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Conversion of MET model for Profiler Virtual Module	MIPR	ARL, Various : WSMR, NM	2.673	0.650		-		-		-		-	0.000	3.323	-
<b>Subtotal</b>			2.673	0.650		-		-		-		-	0.000	3.323	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Formal Qualification Test/ Developmental Test and test ramp up activities	IA	ATEC, CTSF : Various	0.400	0.100		-		-		-		-	0.000	0.500	-
Limited User Test	MIPR	ATEC : Ft. Sill, OK	1.552	0.100		-		-		-		-	0.000	1.652	-



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L75 / <i>Profiler</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Profiler Virtual Module 1.0.1 Development	[Bar]				[Bar]																							
PVM 1.0.1 FQT	[Bar]				[Bar]																							
PVM 1.0.1 Customer Test																												
PVM 1.0.1 AIC Testing																												
PVM 1.0.1 Software Release																												
PVM 1.0.1 Fielding																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L75 / <i>Profiler</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Profiler Virtual Module 1.0.1 Development	1	2015	1	2017
PVM 1.0.1 FQT	1	2017	1	2017
PVM 1.0.1 Customer Test	2	2017	2	2017
PVM 1.0.1 AIC Testing	2	2017	2	2017
PVM 1.0.1 Software Release	3	2017	3	2017
PVM 1.0.1 Fielding	3	2017	1	2018

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604710A / Night Vision Systems - Eng Dev				<b>Project (Number/Name)</b> L76 / Dismounted Fire Support Laser Targeting Systems			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L76: Dismounted Fire Support Laser Targeting Systems	-	5.562	14.957	15.341	-	15.341	5.880	5.292	5.496	5.921	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

NA

**A. Mission Description and Budget Item Justification**

This project matures technologies and capabilities which benefit the Lightweight Laser Designator Rangefinder (LLDR, AN/PED-1, AN/PED-1A, and AN/PED-1B) and the Joint Effects Targeting System (JETS). These precision targeting and next generation systems are used by dismounted Soldiers to locate, identify, and target enemy assets. This project focuses on reducing size, weight, power and cost, improving imaging performance, and increasing targeting accuracy. Targeting accuracy improvements will focus on developing and integrating affordable, non-magnetic, high accuracy, full-time (24/7), and all weather Precision Azimuth and Vertical Angle Measurement (PAVAM) devices, with reduced size, weight, and power characteristics into the LLDR system. Long term goals include improving current celestial navigation systems to increase operational availability, developing precision targeting capabilities that will operate in a Global Positioning System (GPS) denied environment to improve situational awareness, and to integrate Military Global Positioning System (GPS) User Equipment (M-Code) (next-generation GPS) receivers into LLDR and JETS, when available.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Precision Azimuth and Vertical Angle Measurement (PAVAM) development	3.302	-	-	-	-
<b>Description:</b> PAVAM is a non-magnetic based inertial navigation materiel solution for targeting devices in order to provide 24/7 precision target capability. This PAVAM effort improves azimuth accuracy leading to reduced collateral damage and improved target engagement. Celestial navigation systems provide a supplemental high accuracy, low cost azimuth measurement capability.					
<b>Title:</b> Laser Development	0.250	-	0.300	-	0.300
<b>Description:</b> Development of lightweight, low cost, multi-spectral, and more efficient lasers, and to develop laser stabilization technologies.					
<b>FY 2019 Base Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L76 / <i>Dismounted Fire Support Laser Targeting Systems</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Continue the efforts for the development of lightweight, low cost, multi-spectral, and more efficient lasers, and to develop laser stabilization technologies. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 supports Night Vision Lab work developing more efficient lasers and evaluations.					
<b>Title:</b> Target Acquisition Development <b>Description:</b> Focuses on development of improvements to optical detection, recognition, and identification of targets for precision targeting systems. <b>FY 2019 Base Plans:</b> Continue efforts to improve optical detection, recognition, and identification of targets for precision targeting systems. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 supports Night Vision Lab efforts for improvements in optical detection and recognition.	1.235	-	0.250	-	0.250
<b>Title:</b> Integration of M-Code GPS Receivers <b>Description:</b> Integrates M-Code GPS Receivers into the LLDR System. <b>FY 2018 Plans:</b> Initiate integration of M-Code GPS receivers into LLDR. <b>FY 2019 Base Plans:</b> Integrates M-code GPS Receivers into the LLDR system. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 decreased funding reflects ramped down integration efforts while focusing on qualifying LLDR 3 and waiting for additional hardware samples.	0.278	0.838	0.300	-	0.300
<b>Title:</b> Design, Integration, & Qualification of Improved LLDR Systems <b>Description:</b> One contract will be competitively awarded to procure updated LLDR systems with improved imaging performance and 24/7 precision targeting capability. This effort procures and qualifies improved LLDR systems for production beginning in FY20. <b>FY 2018 Plans:</b>	0.497	14.119	14.491	-	14.491

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L76 / <i>Dismounted Fire Support Laser Targeting Systems</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Initiate procurement of competing, improved LLDR systems.					
<b><i>FY 2019 Base Plans:</i></b> Continue integration of improved LLDR systems and initiate qualification testing.					
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> FY 2019 increase due to Qualification and Government Testing.					
<b>Accomplishments/Planned Programs Subtotals</b>	5.562	14.957	15.341	-	15.341

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• KA3100: <i>Lightweight Laser Designator Rangefinder (LLDR) Modification-of-In-Service</i>	28.058	9.172	20.783	4.050	24.833	36.328	74.380	86.180	65.567	Continuing	Continuing
• K32101: <i>Joint Effects Targeting System (JETS)</i>	48.375	48.664	66.574	-	66.574	89.772	93.511	90.660	97.345	Continuing	Continuing
• L79: <i>Joint Effects Targeting System (JETS)</i>	6.793	8.143	10.476	-	10.476	7.811	5.572	5.609	6.041	Continuing	Continuing
• VT8: <i>SOLDIER PRECISION TARGETING DEVICES - ADV DEV</i>	-	-	0.000	-	0.000	1.483	2.767	2.767	-	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**  
This project continues to exercise competitively awarded contracts using value adjusted total evaluated price (VATEP) source selection procedures.

**E. Performance Metrics**  
N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / Night Vision Systems - Eng Dev	<b>Project (Number/Name)</b> L76 / Dismounted Fire Support Laser Targeting Systems
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<b>Management Services (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Program Management Support	MIPR	PM-SSL : Ft. Belvoir VA 22060	0.057	0.047	Nov 2016	0.075	Nov 2017	0.075	Nov 2018	-		0.075	Continuing	Continuing	Continuing
<b>Subtotal</b>			0.057	0.047		0.075		0.075		-		0.075	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
PAVAM Development and Integration	SS/CPFF	Northrop Grumman : Apopka, FL	7.328	1.420	Jan 2017	-		-		-		-	Continuing	Continuing	-
Laser Development	SS/CPFF	TBD : Alexandria, VA 22310	1.180	0.250	Mar 2017	-		0.300	Mar 2019	-		0.300	Continuing	Continuing	-
Target Acquisition Development	SS/CPFF	CACI Technologies, INC : Chantilly, VA 20151	0.100	0.619	Feb 2017	-		0.250	Nov 2018	-		0.250	Continuing	Continuing	-
M-Code Integration	SS/CPFF	Johns Hopkins University : Laurel, MD	-	-		0.657	Jan 2018	0.300	Jan 2019	-		0.300	Continuing	Continuing	-
LLDR Qualification	C/CPFF	TBD : TBD	-	-		13.625	Apr 2018	13.000	Mar 2019	-		13.000	Continuing	Continuing	-
<b>Subtotal</b>			8.608	2.289		14.282		13.850		-		13.850	Continuing	Continuing	N/A

**Remarks**  
Anticipate awarding to one contractor.

<b>Support (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Matrix Support	MIPR	Various : Various	-	0.180	Nov 2016	-		0.180	Nov 2018	-		0.180	Continuing	Continuing	-
Science and Engineering Support	SS/CPFF	Johns Hopkins University : Laurel, MD	0.787	3.046	Nov 2016	0.600	Jan 2018	0.435	Jan 2019	-		0.435	Continuing	Continuing	-



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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army													Date: February 2018		
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604710A / Night Vision Systems - Eng Dev				L76 / Dismounted Fire Support Laser Targeting Systems							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
<b>Subtotal</b>			0.787	3.226		0.600		0.615		-		0.615	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation Support	MIPR	Army Test and Evaluation Command, WSMR, NM : MIPR	-	-		-		0.801	Jun 2019	-		0.801	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	-		-		0.801		-		0.801	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract				
<b>Project Cost Totals</b>			9.452	5.562	14.957	15.341	-	15.341	Continuing	Continuing	N/A				
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L76 / <i>Dismounted Fire Support Laser Targeting Systems</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Azimuth and Vertical Angle Measurement (PAVAM) Development	[Redacted]																											
Integration & Production Award - LLDR 3	[Redacted]																											
Build Improved LLDR Systems for Testing	[Redacted]																											
Contractor Testing of Improved LLDR Systems	[Redacted]																											
Government Testing of Improved LLDR Systems	[Redacted]																											
Improved Laser Development and Laser Stabilization	[Redacted]																											
LLDR Laser Stabilization cut-in	[Redacted]																											
Improved Target Acquisition Development	[Redacted]																											
M-Code Integration Development (LLDR)	[Redacted]																											
M-Code Cut-in	[Redacted]																											
Future Dismounted Fire Support Sensor Development	[Redacted]																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L76 / <i>Dismounted Fire Support Laser Targeting Systems</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Azimuth and Vertical Angle Measurement (PAVAM) Development and Integration	2	2014	4	2022
Integration & Production Award - LLDR 3	4	2018	4	2018
Build Improved LLDR Systems for Testing	4	2018	3	2019
Contractor Testing of Improved LLDR Systems	3	2019	3	2020
Government Testing of Improved LLDR Systems	2	2020	2	2021
Improved Laser Development and Laser Stabilization	2	2014	4	2022
LLDR Laser Stabilization cut-in	2	2020	2	2020
Improved Target Acquisition Development	1	2015	4	2017
M-Code Integration Development (LLDR)	2	2017	2	2021
M-Code Cut-in	3	2021	3	2021
Future Dismounted Fire Support Sensor Development	3	2020	4	2023

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>			<b>Project (Number/Name)</b> L79 / <i>Joint Effects Targeting Systems (JETS)</i>				
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L79: <i>Joint Effects Targeting Systems (JETS)</i>	-	6.793	8.143	10.476	-	10.476	7.811	5.572	5.609	6.041	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Joint Effects Targeting System (JETS) is an Army program with joint information (Air Force and Marine Corps). JETS will meet the one-man, hand-held precision targeting gap identified by the Fires Center of Excellence (FCoE). JETS is a light-weight, handheld system that will provide the single dismounted observer and Joint Terminal Attack Controller (JTAC) with a common, enhanced day and night thermal capability to rapidly acquire, accurately locate, positively identify, and precisely designate targets. JETS Target Location and Designation System (TLDS) will be able to interface with existing and future Forward Entry Systems (FESs) and operate in environments where global positioning system (GPS) capabilities are degraded or denied including the integration of military GPS user equipment (M-Code) GPS receivers, when they become available. This project will address continued development and integration of improved precision targeting components to reduce size, weight, power, and cost of systems for dismounted precisions Fires mission.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Joint Effects Targeting System (JETS) Low-Rate Initial Production Qualification Testing	1.865	1.730	0.650	-	0.650
<b>Description:</b> This projects supports the Initial Operational Test & Evaluations ( IOT&E) for the JETS production representative test systems.					
<b>FY 2018 Plans:</b> Conduct IOT&E.					
<b>FY 2019 Base Plans:</b> Conduct follow-on testing and evaluation.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 funding decrease reflects reduced testing requirements.					
<b>Title:</b> Precision Azimuth and Vertical Angle Measurement (PAVAM) Development	3.424	4.850	2.102	-	2.102
<b>Description:</b> Focuses on developments to improve size, weight, power and cost for inertial navigation PAVAM solutions which provide a 24/7 precision targeting capability. Develop improvements to celestial navigation PAVAM solutions to improve availability of precision measurements over a wider range of environments.					
<b>FY 2018 Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L79 / <i>Joint Effects Targeting Systems (JETS)</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Continue improvements to current PAVAM technology. Continue development of reduced size, weight, power and cost of PAVAM. Continue development of improved celestial navigation PAVAM.  <b>FY 2019 Base Plans:</b> Continue improvements to current PAVAM technology. Continue development of reduced size, weight, power, and cost for the PAVAM. Continue development of improved celestial navigation PAVAM.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 funding reduction due to limiting and consolidating PAVAM improvements efforts.					
<b>Title:</b> Joint Effects Targeting System (JETS) Threat Mitigation Development and Integration  <b>Description:</b> Focuses on developing and integrating technologies to counter battlefield threats to the system and the Soldier. This includes technologies and techniques to allow JETS to operate in GPS denied environments, incorporating counter sensor detection, and continuing to improve targeting sensors and lasers to operate in adverse conditions.  <b>FY 2018 Plans:</b> Continue development of technologies to mitigate GPS denied environments. Continue counter sensor development. Initiate development of improved thermal imager for JETS.  <b>FY 2019 Base Plans:</b> Continue development of technologies to reduce size, weight, and power (SWAP) and to mitigate the impact when operating in GPS denied environments. Continue counter sensor development. Continue development of improved thermal imager and initiate integration into JETS.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> This increase is due to maturing research and development improved technologies of thermal imager and integration into JETS.	1.504	1.563	7.724	-	7.724
<b>Accomplishments/Planned Programs Subtotals</b>	6.793	8.143	10.476	-	10.476

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• K32101: <i>Joint Effects Targeting System (JETS)</i>	48.375	48.664	66.574	-	66.574	89.772	93.511	90.660	97.345	Continuing	Continuing

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L79 / <i>Joint Effects Targeting Systems (JETS)</i>

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• L76: <i>Dismounted Fire Support Laser Targeting Systems</i>	5.562	14.957	15.341	-	15.341	5.880	5.292	5.496	5.921	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

This project continues to exercise competitively awarded contracts using best value source selection procedures.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604710A / Night Vision Systems - Eng Dev				L79 / Joint Effects Targeting Systems (JETS)								
<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Management Support	MIPR	PM-SSL : Ft Belvoir, VA 22060	3.400	0.347	Dec 2016	0.180	Dec 2017	0.180	Dec 2018	-		0.180	Continuing	Continuing	Continuing	
<b>Subtotal</b>			3.400	0.347		0.180		0.180		-		0.180	Continuing	Continuing	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
PAVAM 2 Development	C/CPFF	Various : Various	4.042	3.220	Nov 2016	3.543	Mar 2018	2.102	Mar 2019	-		2.102	Continuing	Continuing	Continuing	
Threat Mitigation Development	C/CPFF	Various : Various	-	1.415	Mar 2017	1.000	Mar 2018	5.569	Mar 2019	-		5.569	Continuing	Continuing	Continuing	
<b>Subtotal</b>			4.042	4.635		4.543		7.671		-		7.671	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Matrix Support	MIPR	Night Vision Electronics Sensors Directorate : Ft. Belvoir, VA	11.985	0.375	Dec 2016	0.375	Dec 2017	0.375	Dec 2018	-		0.375	Continuing	Continuing	-	
Science and Engineering Support	SS/CPFF	Johns Hopkins University : Laurel, MD	3.019	-		1.508	Apr 2018	1.600	Apr 2019	-		1.600	Continuing	Continuing	-	
<b>Subtotal</b>			15.004	0.375		1.883		1.975		-		1.975	Continuing	Continuing	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Testing	MIPR	Various : Various	2.215	1.436	Feb 2017	1.537	Dec 2017	0.650	Dec 2018	-		0.650	Continuing	Continuing	-	

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / Night Vision Systems - Eng Dev	<b>Project (Number/Name)</b> L79 / Joint Effects Targeting Systems (JETS)
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
<b>Subtotal</b>			2.215	1.436		1.537		0.650		-		0.650	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			24.661	6.793		8.143		10.476		-		10.476	Continuing	Continuing	N/A

**Remarks**



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L79 / <i>Joint Effects Targeting Systems (JETS)</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Low Rate Initial Production (LRIP)	[Redacted]				[Redacted]																							
Full Materiel Release (FMR)	LRIP				1 FMR																							
Full Rate Production (FRP)	[Redacted]				[Redacted]				FRP																			
Initial Operational Capability (IOC)	[Redacted]				2 IOC																							
Reduce SWAP-C PAVAM development and integration	[Redacted]				[Redacted]				[Redacted]																			
SWAP-C PAVAM cut-in	[Redacted]				[Redacted]				[Redacted]				3 PAVAM CUT-IN															
Threat Mitigation development and integration	[Redacted]				[Redacted]				[Redacted]				[Redacted]															
Threat Mitigation technology cut-in	[Redacted]				[Redacted]				[Redacted]				[Redacted]				4 Threat Mitigation											
M-code integration development	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]											
M-code cut-in	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				5 M-CODE CUT-IN							
Future Dismounted Fire Support Sensor Development	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L79 / <i>Joint Effects Targeting Systems (JETS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
JOINT EFFECTS TARGETING SYSTEMS (JETS) TARGET LOCATION DESINGATION SYSTEM (TLDS)	2	2011	2	2011
Engineering & Manufacturing Development (EMD)	2	2013	3	2016
Low Rate Initial Production (LRIP)	1	2017	4	2018
Full Materiel Release (FMR)	3	2018	3	2018
Full Rate Production (FRP)	1	2019	1	2023
Initial Operational Capability (IOC)	4	2018	4	2018
Reduce SWAP-C PAVAM development and integration	3	2016	3	2020
SWAP-C PAVAM cut-in	2	2020	2	2020
Threat Mitigation development and integration	2	2017	3	2021
Threat Mitigation technology cut-in	2	2021	2	2021
M-code integration development	2	2020	2	2022
M-code cut-in	2	2022	2	2022
Future Dismounted Fire Support Sensor Development	3	2020	4	2023

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / Combat Feeding, Clothing, and Equipment
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	1.975	3.702	4.507	-	4.507	6.141	4.863	4.740	4.510	0.000	30.438
548: Mil Subsistence Sys	-	0.730	0.700	1.093	-	1.093	1.893	1.942	1.817	1.531	0.000	9.706
EL2: Army Field Feeding Equipment	-	1.245	3.002	3.414	-	3.414	4.248	2.921	2.923	2.979	0.000	20.732

**A. Mission Description and Budget Item Justification**

Projects under this Program Element support the development, demonstration and Non-Developmental Item (NDI) Commercial Off The Shelf (COTS) evaluation of combat feeding equipment to enhance soldier efficiency, improve soldier survivability, and reduce food service logistics requirements for all four services. These Projects support multi-fuel, rapidly deployable field food service equipment initiatives. Efforts also support the Engineering and Manufacturing Development (EMD) phase of programs to improve equipment, enhance safety in food service, and decrease fuel and water requirements. The Projects develop critical enablers that support the Joint Future Capabilities and Joint Expeditionary mindset, by maintaining readiness through integrating new equipment, enhancing the field soldier's well-being, and providing soldiers usable equipment. The Projects also reduce sustainment requirements, related Combat Support/Combat Service Support (CS/CSS) demands on lift, the combat zone footprint, and costs for logistical support.

This PE/Project supports Field Feeding programs for all the services.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	2.054	3.702	4.141	-	4.141
Current President's Budget	1.975	3.702	4.507	-	4.507
Total Adjustments	-0.079	0.000	0.366	-	0.366
• Congressional General Reductions	-0.001	-	-	-	-
• Congressional Directed Reductions	-	-	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	-	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-	-	-	-	-
• SBIR/STTR Transfer	-0.078	-	-	-	-
• Adjustments to Budget Years	-	-	0.366	-	0.366

**Change Summary Explanation**

FY 2017 variation due to FFRDC (-1K) and STTR/SBIR reduction (\$78K).

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b>	<b>R-1 Program Element (Number/Name)</b>
2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>

The FY 2019 funding request was increased by \$0.366 million. Project EL2 increased by \$0.123 million and Project 548 increased by \$0.243 million.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
548: <i>Mil Subsistence Sys</i>	-	0.730	0.700	1.093	-	1.093	1.893	1.942	1.817	1.531	0.000	9.706
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This Project enables system development and demonstration of Joint Service combat rations and field feeding equipment/systems designed to improve warfighter performance and reduce the logistics burden of subsistence support. Efforts funded in this Project support all four Services, the Special Operations Command, and the Defense Logistics Agency (DLA). The Army serves as the Executive Agent for this Department of Defense (DoD) program, with oversight and coordination provided by the DoD Combat Feeding Research and Engineering Board (CFREB) as required by DoD Directive (DoDD) 3235.02E. Centralized execution of the DoD Combat Feeding Research and Engineering Program (CFREP) with Joint Service review and approval eliminates unnecessary duplication of efforts across the Services and maximizes use of common materiel solutions.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019
<p><b>Title:</b> Fielded Individual Ration Improvement Project (FIRIP)</p> <p><b>Description:</b> Continuous product improvement project for the Meal Ready to Eat (MRE). Integrate prototype components/ technologies into the MRE menu systems to improve operational effectiveness. Demonstrate system integration and producibility, develop component specifications and transition to Defense Logistics Agency ? Troop Support (DLA-Troop Support) for procurement.</p> <p><b>FY 2018 Plans:</b> Based on field test results, present recommendations to Joint Services (2Q18) for continued product improvement of ration components/packaging/technologies for MRE (2020 date of pack). Finalize MRE procurement documents and initiate transition to DLA-Troop Support. Obtained Surgeon General approval of revised MRE menus. Execute production testing with industry to ensure consistent ration quality, understand Performance Contract Requirements (PCR), and resolved vendor/supplier issues. Obtain selected new items for field test. Conduct field evaluation of new candidate ration components for MRE (2021 date of pack) to improve quality, acceptability, nutrition and expand variety.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Effort as titled ended in FY 2018.</p>	0.115	0.075	-
<p><b>Title:</b> Assault/Special Purpose Ration Improvement Project (ASPIP)</p> <p><b>Description:</b> Continuous product improvement of special purpose rations by the integration of new technologies in nutrition, processing and packaging. Special purpose rations include the Meal, Cold Weather/Long Range Patrol (MCW/LRP), First Strike Ration (FSR), and Modular Operational Ration Enhancement (MORE).</p>	0.056	0.039	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p><b><i>FY 2018 Plans:</i></b> Integrate prototype components/technologies into FSR, MCW/LRP and/or MORE menu systems to improve quality, acceptability, nutrition and expand variety. Execute production testing with industry to ensure consistent ration quality, understand Performance Contract Requirements (PCR), and resolve vendor/supplier issues. Continue to populate Combat Rations Database with nutritional/menu data.</p> <p><b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> Effort as titled ended in FY 2018.</p>			
<p><b><i>Title:</i></b> Fielded Group Ration Improvement Project (FGRIP)</p> <p><b><i>Description:</i></b> Continuous product improvement project to update/improve group ration components, menus, and packaging by integrating state-of-the-art military/commercial packaging and technology base transitions. The family of Unitized Group Rations (UGRs) includes the Unitized Group Ration - Heat &amp; Serve (UGR-H&amp;S), Unitized Group Ration - Express (UGR-E), Unitized Group Ration - A (UGR-A), and Unitized Group Ration - M (UGR-M).</p> <p><b><i>FY 2018 Plans:</i></b> Finalize UGR (A, H&amp;S, E) procurement documents and standards for verification and initiated transition to DLA-Troop Support based on BA4 Joint Service approvals. Obtain Surgeon General approval of revised UGR menus. Support DLA-Troop Support Limited First Article production testing of new H&amp;S and E items with industry to ensure consistent ration quality, understand PCR requirements, resolve vendor/supplier issues, and conduct confirmatory sensory, chemical, physical and shelf life testing.</p> <p><b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> Effort as titled ended in FY 2018.</p>	0.108	0.078	-
<p><b><i>Title:</i></b> Group Ration Airdrop Survivability Project (GRASP)</p> <p><b><i>Description:</i></b> Quantify baseline airdrop performance characteristics for current group combat ration (UGR-H&amp;S/M/E) configurations/designs; identify survival rates (based on caloric loss and packaging damage/loss) under defined operational conditions; provide knowledge base and supporting data to generate executable load configuration changes; identify capability gaps that might warrant product/package/assembly configuration redesign and reengineering.</p>	0.039	-	-
<p><b><i>Title:</i></b> Block Upgrades and Operational Improvements for Expeditionary Field Feeding Equipment</p> <p><b><i>Description:</i></b> Eliminate the sole sourcing of tray ration heater component parts. Reduce overall water consumption through the use of non-immersive cooking technologies and more efficient ware-washing equipment. Increase Kitchen flexibility through</p>	0.079	0.154	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
appliance upgrades. To reduce the overall fuel consumption of Expeditionary Field Feeding Equipment through enhanced combustion technologies.				
<p><b>FY 2018 Plans:</b> Develop reports, Engineering Change Proposals (ECP)s and logistical data to facilitate integration of cooking appliances into USMC EFK, ETRHS, and/or TRH. Transition prototype equipment and technical data to USMC.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Effort as titled ended in FY 2018.</p>				
<p><b>Title:</b> Support to Air Force Field Feeding Modernization Efforts</p> <p><b>Description:</b> Provide continuous R&amp;D efforts for all Expeditionary Air Force squadrons. Modernize and standardize field foodservice equipment to reduce labor, maintenance, pack-out volume and cost. Increase reliability, efficiency and sustainability. Develop comprehensive specifications and technical data packages for recommended Food Service Equipment (FSE) items; test and evaluate newer commercial FSE items for expeditionary use and smaller transportation footprint; develop total overall life cycle cost of each system; test Energy Star certified FSE items that use less power; and investigate/develop appliances that use less water, increase competition on standardized designs</p> <p><b>FY 2018 Plans:</b> Complete T&amp;E of Energy Management System prototype. Transition performance results to the Basic Expeditionary Airfield Resources (BEAR) Program Management Office. Integrate heat recovery system technical data into the BEAR Kitchen System Technical Data Package.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Effort as titled ended in FY 2018.</p>		0.158	0.147	-
<p><b>Title:</b> Navy Food Storage Analysis Tool (NFSAT)</p> <p><b>Description:</b> Software analysis tool for Navy Foodservice that will automatically calculate all storage space factors and requirements for naval vessels based off the specific Navy Standard Core Menu (NSCM), crew size, Naval Ship's Technical Manual 096, Weights and Stability, Naval Vessel Requirements Food Service Facility Design Manual, Build Specifications 671, 672, and Type Commander established endurance levels. Develop automated subsistence inventory management, tracking and storeroom locations for all storage areas with mobile scanning technology capability.</p>		0.175	-	-
<p><b>Title:</b> Modular Integrated Kitchen System (MIKS)</p>		-	0.207	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p><b>Description:</b> Design a standardized mounting system for all Galley equipment to significantly reduce technical labor skills required to complete deck modifications. MIKS will standardize electrical and water requirements, enhance procurement options, decrease operating and support (O&amp;S) costs, and increase the speed of installing new technologies into the Galley/Scullery areas.</p> <p><b>FY 2018 Plans:</b> Conduct land-based user evaluation of new integrated mounting system, prepare technical data package (TDP), and provided documentation to Navy (USN) for procurement.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Effort as titled ended in FY 2018.</p>				
<p><b>Title:</b> Joint Service Combat Ration System Development</p> <p><b>Description:</b> This effort integrates and demonstrates mature Joint Service combat ration systems that enable warfighter maneuver, readiness and effectiveness during highly mobile, dispersed operations. Prototypes are transitioned from PE 0603747/Project 610 to develop combat rations with improved capabilities including improved warfighter physical and cognitive performance through optimized nutrition and reduced logistics burden through weight and cube reduction. This effort completes operational test and evaluation (OT&amp;E) to confirm system level performance, and develops ration specifications for transition to Defense Logistics Agency - Troop Support (DLA - Troop Support) for procurement.</p> <p><b>FY 2019 Plans:</b> Will integrate prototype components/technologies into menu systems to improve quality, optimize nutritional content, decrease weight/cube and/or improve modularity; conduct OT&amp;E on ration systems to validate system level performance; present recommendations to the Joint Services Operational Ration Forum for Milestone C approval; finalize procurement documents and initiate transition to DLA-Troop Support; obtain Surgeon General approval of revised menus; execute production testing with industry to ensure consistent ration quality, understand Performance Contract Requirements (PCR), and resolve vendor/supplier issues; and conduct confirmatory sensory, chemical, physical and shelf life testing.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Lines of effort previously reported separately (i.e., FIRIP; ASPIP and FGRIP) have been merged into a single line starting in FY 2019 titled ?Joint Service Combat Ration System Development?.</p>		-	-	0.633
<p><b>Title:</b> Joint Service Field Feeding Systems Development</p> <p><b>Description:</b> This effort integrates and demonstrates field feeding equipment systems in support of the Navy (USN), Air Force (USAF), and Marine Corps (USMC) that reduce the logistics burden, improve efficiency, and decrease operation and support costs as directed by the DoD CFREB and Joint Service partners. Validated systems, specifications, and technical data</p>		-	-	0.460



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
packages are transitioned to the appropriate Service partner for procurement and fielding. Service partners include Product Manager Combat Support Equipment (PdM-CSE), Naval Sea Systems Command (NAVSEA), Naval Supply Systems Command (NAVSUP), and USAF Basic Expeditionary Airfield Resources (BEAR) Program Office.			
<b><i>FY 2019 Plans:</i></b> Will conduct OT&E of new integrated mounting system for galley equipment to reduce operation and support costs in support of the USN; support integration and demonstration of efficient refrigeration assets and an Energy Management System (EMS) in support of the USAF BEAR Type I & II kitchen systems; develop reports, Engineering Change Proposals (ECPs) and logistical data to reduce overall fuel and water consumption in support of the USMC; transition validated prototype equipment and technical data to USN, USMC and USAF.			
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> Lines of effort previously reported separately (i.e., Block Upgrades and Operational Improvements for Expeditionary Field Feeding Equipment; Support to Air Force Field Feeding Modernization Efforts; NFSAT; MIKS) have been merged into a single line starting FY 2019 titled ?Joint Service Field Feeding Equipment and Menu Development?.			
<b>Accomplishments/Planned Programs Subtotals</b>	0.730	0.700	1.093

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• 610: <i>Food Adv Development</i>	5.095	6.548	4.599	-	4.599	4.110	4.223	4.175	4.972	0.000	33.722

**Remarks**

**D. Acquisition Strategy**  
Complete Engineering and Manufacturing Development (EMD) and Demonstration of food items and equipment for transition into competitive procurement contract. Complete advanced research efforts to support Engineering Change Proposals for previously developed equipment.

**E. Performance Metrics**  
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)						
2040 / 5				PE 0604713A / Combat Feeding, Clothing, and Equipment					548 / Mil Subsistence Sys						
<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Combat Feeding Program Management	C/FP	RDECOM : Natick, MA	2.827	0.175	Oct 2016	0.139	Oct 2017	0.235	Oct 2018	-		0.235	0.000	3.376	Continuing
<b>Subtotal</b>			2.827	0.175		0.139		0.235		-		0.235	0.000	3.376	N/A
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Joint Service Rations and Combat Feeding Equipment	Various	Various : Various	5.155	0.381	Oct 2016	0.444	Oct 2017	0.698	Oct 2018	-		0.698	Continuing	Continuing	Continuing
<b>Subtotal</b>			5.155	0.381		0.444		0.698		-		0.698	Continuing	Continuing	N/A
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Joint Service Rations and Combat Feeding Equipment	Allot	RDECOM, NSRDEC : Natick, MA	-	0.174	Oct 2016	0.117	Oct 2017	0.160	Oct 2018	-		0.160	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	0.174		0.117		0.160		-		0.160	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			7.982	0.730		0.700		1.093		-		1.093	Continuing	Continuing	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Conduct operational testing of combat ration systems					█				█				█				█				█				█			
Transition combat ration procurement documents to DLA									█				█				█				█				█			
Transition prototype equipment, ECPs and technical data to USMC	█				█																							
Conduct in-house T&E of Beta version and transition NFSAT to USN	█				█																							
Prepare TDP and obtain high fidelity MIKS prototype system	█				█																							
Conduct OT&E of BEAR Type II kitchen system and transition to USAF	█				█				█																			
Conduct land-based user evaluation of MIKS and transition data to USN	█				█				█																			
Transition Mobile Feeding Galley to USN	█				█								█															
Transition labor & energy saving galley/scullery upgrades to USN	█				█								█				█											
Conduct OT&E of Improved Tray Ration Heater and transition to USMC	█				█								█				█											
Obtain Aerial Delivery Certification of Inflatable Refrigerated Space (IRefS)	█				█								█				█											
Conduct OT&E of intuitive kitchen equipment and transition to Services	█				█												█											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Conduct operational testing of combat ration systems	1	2018	4	2023
Transition combat ration procurement documents to DLA	1	2018	4	2023
Transition prototype equipment, ECPs and technical data to USMC	1	2017	4	2018
Conduct in-house T&E of Beta version and transition NFSAT to USN	2	2017	4	2017
Prepare TDP and obtain high fidelity MIKS prototype system	1	2018	4	2018
Conduct OT&E of BEAR Type II kitchen system and transition to USAF	3	2018	4	2019
Conduct land-based user evaluation of MIKS and transition data to USN	2	2019	4	2019
Transition Mobile Feeding Galley to USN	1	2020	3	2020
Transition labor & energy saving galley/scullery upgrades to USN	1	2020	4	2021
Conduct OT&E of Improved Tray Ration Heater and transition to USMC	1	2020	4	2021
Obtain Aerial Delivery Certification of Inflatable Refrigerated Space (IRefS)	1	2020	4	2021
Conduct OT&E of intuitive kitchen equipment and transition to Services	1	2021	4	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>				<b>Project (Number/Name)</b> EL2 / <i>Army Field Feeding Equipment</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EL2: <i>Army Field Feeding Equipment</i>	-	1.245	3.002	3.414	-	3.414	4.248	2.921	2.923	2.979	0.000	20.732
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This Project supports the development, demonstration and Non-Developmental Item (NDI) Commercial Off The Shelf (COTS) evaluation of combat feeding equipment to enhance Soldier efficiency, improve Soldier survivability, and reduce food service logistics requirements for the Army. The Project supports multi-fuel, rapidly deployable field food service equipment initiatives. Efforts also support the Engineering and Manufacturing Development (EMD) phase of programs to improve equipment, enhance safety in food service, and decrease fuel and water requirements. The Projects develop critical enablers that support the Army's Strategic Planning Guidance by developing and integrating critical expeditionary capabilities that maintain readiness, providing effective solutions that reduce the resource and operational energy footprint, providing modernized equipment, and enhancing the field Soldier's well being. This project reduces sustainment requirements, related Combat Support/ Combat Service Support (CS/CSS) demands on lift, the combat zone footprint, and costs for logistical support.

This PE/Project supports Field Feeding programs for the Army.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Battlefield Kitchen (BK)	1.245	3.002	1.484
<b>Description:</b> Provide replacement of the obsolete Mobile Kitchen Trailer (MKT) system. The BK shall replace the MKT with a kitchen that provides fuel efficient, thermally controlled, closed combustion appliances within an environmentally controlled workspace. The BK shall provide rations for up to 300 Soldiers within 4 hours of setup. The BK provides refrigeration, running water and a heated serving line using the same off-road prime mover as the MKT as well as transportability by rail, sea, fixed and rotary wing aircraft.			
<b>FY 2018 Plans:</b> Complete integration of BK subsystems and fabricate final BK system prototypes. Conduct Production Prove-out Testing and initiate Limited User Test in accordance with approved Test& Evaluation Master Plan.			
<b>FY 2019 Plans:</b> Complete Limited User Test. Complete logistics documentation and prepare Milestone C package to obtain Milestone C decision and transition program into Low Rate Initial Production (LRIP).			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> EL2 / <i>Army Field Feeding Equipment</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Significant hardware development, fabrication, and testing efforts in FY18 to meet accelerated program schedule. Decreased funding in FY19 supports completion of testing and transition into production.				
<p><b>Title:</b> Containerized Food Sanitation Center</p> <p><b>Description:</b> Develop, test and field a containerized food sanitation center using the modular burner and the modular appliance concept that meets the requirements of Tri Service Food Code and the Force Provider Expeditionary (FPE) Capabilities Production Document (CPD).</p> <p><b>FY 2019 Plans:</b> Prototype target sanitation sinks using commercially available sinks and the Army's modular burner technology. Develop performance specification for complete development of the required sinks and burners integrated into TRICON sized containers. Award development contract or delivery order for comprehensive prototyping.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> New RDT&amp;E start for modification to field equipment incorporating new technology.</p>		-	-	0.788
<p><b>Title:</b> Containerized Kitchen, Modular</p> <p><b>Description:</b> Integrate the Anny's new Modular Appliance Burner and modular appliances developed for the Battlefield Kitchen into the Containerized Kitchen Platform. Replacing the open combustion appliances on the CK eliminates a key safety issue and the modular appliances are 20-40% more fuel efficient. Sharing the modular concept across all Army Field Feeding Platforms cuts the life cycle support costs significantly.</p> <p><b>FY 2019 Plans:</b> Use the government owned technical data package developed by the Army and updated by the BK kitchen development effort to award an integration contract to govern integration of modular burners and appliances onto the Containerized Kitchen Platform. Oversee the Systems Engineering required to develop a comprehensive design for a Containerized Kitchen, Modular.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase in funding required to support transition of effort from 6.4 RDT&amp;E due to technology maturity and initiation of EMD.</p>		-	-	1.142
<b>Accomplishments/Planned Programs Subtotals</b>		1.245	3.002	3.414

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> EL2 / <i>Army Field Feeding Equipment</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• EL1: <i>Army Field Feeding Programs</i>	1.873	0.447	1.362	-	1.362	0.504	1.646	2.100	1.500	Continuing	Continuing
• R62830: <i>Battlefield Kitchen, Field Feeding</i>	-	-	2.049	-	2.049	6.749	10.838	14.954	16.581	Continuing	Continuing
• M65801: <i>Refrigerated Container Systems</i>	10.124	10.877	8.177	-	8.177	6.527	7.300	3.726	3.723	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

Complete Engineering Manufacturing Decisions (EMD) of food items and equipment for transition into competitive procurement contract. Complete advanced research efforts to support Engineer Change Proposals for previously developed equipment.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> EL2 / <i>Army Field Feeding Equipment</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Project Management Support	Various	PMFSS : Natick, MA	0.115	0.125		0.250		0.437		-		0.437	0.000	0.927	-
<b>Subtotal</b>			0.115	0.125		0.250		0.437		-		0.437	0.000	0.927	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Battlefield Kitchen	Various	PMFSS : Natick, MA	-	1.120		1.081		1.302		-		1.302	0.000	3.503	-
Containerized Food Sanitation Center (FSC)	Various	PMFSS : Natick, MA	-	-		-		0.460		-		0.460	0.000	0.460	-
Deployable Sustainable Efficient Refrigeration Technology	Various	Various : Various	-	-		-		1.054		-		1.054	0.000	1.054	-
<b>Subtotal</b>			-	1.120		1.081		2.816		-		2.816	0.000	5.017	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Ice Making System	Various	ATC/Ft Lee : Virginia	0.205	-		-		-		-		-	0.000	0.205	-
Battlefield Kitchen	Various	ATC/FT Lee : Virginia	-	-		1.671		0.161		-		0.161	0.000	1.832	-
<b>Subtotal</b>			0.205	-		1.671		0.161		-		0.161	0.000	2.037	N/A

			Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			0.320	1.245	3.002	3.414	-	3.414	0.000	7.981	N/A

**Remarks**



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> EL2 / <i>Army Field Feeding Equipment</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Design and build Battlefield Kitchen prototypes	█				█																							
Conduct PPT on the Battlefield Kitchen	█				█																							
Conduct Limited User Testing on the Battlefield Kitchen	█				█																							
Complete Milestone C and transition Battlefield Kitchen into LRIP	█				█				▲ 2																			
Develop FSC-III prototype and logistics support materials	█				█				█																			
Conduct required developmental testing on FSC III	█				█				█				█															
Conduct Limited User Testing and log demo on FSC III	█				█				█				█				█											
Complete ECP and transition a containerized FSC to FPE	█				█				█				█				▲ 4											
Prepare technical data package from BK program for use in CK Modular development	█				█				█																			
Award development contract for modification of fielded CK	█				█				▲ 1																			
Develop testable system prototypes for CK	█				█				█				█															
Develop logistics support and TM modification support packages for CK	█				█				█				█															
Comprehensive production verification testing for CK	█				█				█				█															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> EL2 / <i>Army Field Feeding Equipment</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Conduct log demo and operational testing for CK																												
Develop ECP and finalize Logistics and MWO configuration for CK																												
Transition mature ECD technology into development and demonstration phase																												
Develop units for test of ECD for MTRCS																												
Conduct developmental testing to include reliability on ECD for MTRCS																												
Conduct limited user evaluation on ECD for MTRCS																												
Complete ECP for ECD and transition into Army refrigerated systems																												
Award AK prototype integration contract																												
Develop hardware to meet system requirements including UGR-A capability for AK																												
Execute production verification testing on approved hardware for AK																												
Conduct OT to verify effectiveness and suitability for AK																												
Develop ECP and modify ILS to allow insertion to ongoing AK production																												
Transition CO2 RU design into MTRCS																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> EL2 / <i>Army Field Feeding Equipment</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023																																																																																							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																																																																																				
Conduct production verification level testing on CO2 MTRCS																																																																																																																
Conduct suitable OT to verify suitability and effectiveness of CO2 MTRCS																																																																																																																
Develop contract change documentation for CO2 MTRCS																																																																																																																
Transition component development for ECD infused TRCS over road cooling capabili																																																																																																																
Conduct system testing																																																																																																																

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> EL2 / <i>Army Field Feeding Equipment</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Design and build Battlefield Kitchen prototypes	1	2017	1	2019
Conduct PPT on the Battlefield Kitchen	2	2018	4	2018
Conduct Limited User Testing on the Battlefield Kitchen	4	2018	1	2019
Complete Milestone C and transition Battlefield Kitchen into LRIP	3	2019	3	2019
Develop FSC-III prototype and logistics support materials	4	2019	2	2020
Conduct required developmental testing on FSC III	2	2020	4	2020
Conduct Limited User Testing and log demo on FSC III	1	2021	2	2021
Complete ECP and transition a containerized FSC to FPE	4	2021	4	2021
Prepare technical data package from BK program for use in CK Modular development	1	2019	2	2019
Award development contract for modification of fielded CK	2	2019	2	2019
Develop testable system prototypes for CK	3	2019	2	2020
Develop logistics support and TM modification support packages for CK	2	2020	4	2020
Comprehensive production verification testing for CK	4	2020	2	2021
Conduct log demo and operational testing for CK	2	2021	3	2021
Develop ECP and finalize Logistics and MWO configuration for CK	4	2021	2	2022
Transition mature ECD technology into development and demonstration phase	4	2019	4	2019
Develop units for test of ECD for MTRCS	1	2020	2	2020
Conduct developmental testing to include reliability on ECD for MTRCS	3	2020	1	2021
Conduct limited user evaluation on ECD for MTRCS	2	2021	3	2021
Complete ECP for ECD and transition into Army refrigerated systems	3	2021	4	2021
Award AK prototype integration contract	1	2022	1	2022
Develop hardware to meet system requirements including UGR-A capability for AK	2	2022	4	2022

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> EL2 / <i>Army Field Feeding Equipment</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
Execute production verification testing on approved hardware for AK	1	2023	2	2023
Conduct OT to verify effectiveness and suitability for AK	3	2021	4	2023
Develop ECP and modify ILS to allow insertion to ongoing AK production	4	2023	4	2023
Transition CO2 RU design into MTRCS	1	2022	2	2022
Conduct production verification level testing on CO2 MTRCS	3	2022	1	2023
Conduct suitable OT to verify suitability and effectiveness of CO2 MTRCS	2	2023	2	2023
Develop contract change documentation for CO2 MTRCS	3	2023	4	2023
Transition component development for ECD infused TRCS over road cooling capabili	1	2023	3	2023
Conduct system testing	4	2023	4	2023

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / Non-System Training Devices - Eng Dev
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	33.888	43.575	49.436	-	49.436	26.382	17.609	19.727	16.191	Continuing	Continuing
241: Nstd Combined Arms	-	30.850	43.575	49.436	-	49.436	26.382	17.609	19.727	16.191	Continuing	Continuing
573: Program Executive Office Simulation, Training Spt	-	3.038	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.038

**A. Mission Description and Budget Item Justification**

Program Element funds development of Non-System Training Devices to support force-on-force training at the Combat Training Centers (CTC), general military training, and training on more than one item/system, as compared with system devices which are developed in support of a specific item/weapon system. Army training devices and training simulations contribute to the modernization of the forces by enabling readiness and strengthening combat effectiveness through realistic training solutions for the Warfighter. Training devices maximize the transfer of knowledge, skills, and experience from the training situation to a combat situation. Force-on-force training at the National Training Center (NTC), Ft. Irwin, CA; Joint Readiness Training Center (JRTC), Ft. Polk, LA, and Joint Multinational Readiness Center (JMRC), formerly the Combat Maneuver Training Center (CMTC), Hohenfels, Germany; and battle staff training in Battle Command Training Program (BCTP) provide increased combat readiness through realistic collective training in low, mid, and high intensity scenarios. Project 241, Non-System Training Devices-Combined Arms, develops simulation training devices for Army-wide use, including the CTCs.

FY 2019 Project 241 funds significant development efforts in support of U.S. Army Training and Readiness on the Combat Training Center Instrumentation Systems (CTC-IS), Instrumentable-Multiple Integrated Laser Engagement System (I-MILES), Home Station Instrumentation Training System (HITS), Common Training Instrumentation Architecture (CTIA), Target Modernization, Medical Simulation Training Center (MSTC), Live, Virtual, Constructive Integrating Architecture (LVC-IA), OPFOR Integrated Air Defense System (IADS), Soldier and Squad Virtual Trainer (S/SVT), OPFOR Surrogate Wheeled Vehicles (OSWV) a new start, and Suicide Prevention.

<b>B. Program Change Summary (\$ in Millions)</b>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>
Previous President's Budget	35.807	43.575	46.260	-	46.260
Current President's Budget	33.888	43.575	49.436	-	49.436
Total Adjustments	-1.919	0.000	3.176	-	3.176
• Congressional General Reductions	-0.012	-	-	-	-
• Congressional Directed Reductions	-0.973	-	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	-	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-	-	-	-	-
• SBIR/STTR Transfer	-0.934	-	-	-	-
• Adjustments to Budget Years	-	-	3.176	-	3.176

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army Date: February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>
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**Change Summary Explanation**

FY 2019 Project 241 funds increased due to the OPFOR Surrogate Wheeled Vehicles (OSWV) new start.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
<i>241: Nstd Combined Arms</i>	-	30.850	43.575	49.436	-	49.436	26.382	17.609	19.727	16.191	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Common Training Instrumentation Architecture (CTIA) program is the foundation architecture of the Live Training Transformation Family of Training Systems (LT2-FTS). The program contains critical core product-line architecture which provides commonality across training instrumentation systems and interoperability across Live, Virtual, Constructive Integrated Training Environment (LVC-ITE) and joint training systems. CTIA includes Army owned software components, architecture services, standards, protocols and governance used by domain-specific Live Training Transformation (LT2) and Live Training Systems (LTS) to include instrumented Force-On-Force (FOF) and Force-On-Target (FOT) training requirements. The CTIA also provides Post Deployment Software Support (PDSS) and technology refresh for the LT2 family of LTS supporting over 21 live instrumented training products which are fielded at over 200 CONUS and OCONUS sites across the Army.

Combat Training Center Instrumentation System (CTC-IS) funds the continued development of the existing Instrumentation Systems (IS) at the National Training Center (NTC), Joint Readiness Training Center (JRTC) and Joint Multinational Readiness Center (JMRC). CTC-IS funds the continued development of the Range Communication System at the NTC and JRTC, to provide high-fidelity live, virtual, and constructive brigade training rotations which prepare Brigade Combat Teams (BCTs), Joint partners, and supporting units to deploy in support of the Army Sustainable Readiness Model (SRM). The CTCs primary goal is to develop agile and adaptive leaders at the tactical, operational and strategic levels while providing BCTs the core training necessary to conduct decisive action in a dynamic operating environment.

The Instrumentable-Multiple Integrated Laser Engagement System (I-MILES) program provides realistic, real-time casualty effects for force-on-force tactical engagement training scenarios and its ability to integrate into training instrumentation systems provide for high fidelity combined arms combat exercises supporting the 39th Chief of the Staff of the Army #1 priority of "Readiness". Due to their modular design, I-MILES is required for use at the Home Station, the Combat Training Centers (CTCs) and in theater of operations to meet force-on-force training requirements. I-MILES program funding provides the Development and Integration of new vehicle and dismount weapon systems meeting the Common Operating Environment (COE) requirements, as well as embedded Tactical Engagement Simulation (TES) development. This includes development efforts of the Live Training Engagement Composition (LTEC), increasing simulation of Probability of Kill (Pk) for training realism and improving integration on new weapon platforms (i.e. Joint Light Tactical Vehicle (JLTV), Armored Multi-Purpose Vehicle (AMPV), M4A2 plus Rifle and Stryker Engineering Change Proposal (ECP) with 30mm Gun).

The Home Station Instrumentation Training System (HITS) provides a high-fidelity deployable instrumented training capability to support platoon thru battalion level Live Force-on-Force Training. HITS tracks location of soldiers and vehicles and simulates weapons' effects and engagements, allowing units to "Train as they Fight" against live opponents. HITS provides accurate feedback to training units. HITS consists of light deployable components that can be rapidly assembled/disassembled and transported to support deployed training. HITS integrates with future and legacy MILES. HITS is a member of the Live Training Transformation (LT2) family of training systems and shares several hardware and software components with the Instrumentation Systems (IS). HITS provides the Live domain for Live-Virtual-Constructive (LVC) training integration.



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>

The Medical Simulation Training Center (MSTC) provides realistic medical training to both medical and non-medical Soldiers in the Active, Reserve, and National Guard. MSTCs provide hands-on instruction on the latest battlefield trauma and critical care techniques based on Army Medical Department (AMEDD) approved performance oriented Program of Instruction (POI). Medical treatment validation exercises simulate the high stress of performing medical interventions in combat. MSTC supports Unit Medical Readiness by validating Combat Medic (68W) Emergency Medical Technician (EMT) biennial recertification requirements and provides Combat Lifesaver (CLS) training to non-medical Soldiers.

The Engagement Skills Trainer (EST) is the unit/institutional, indoor, multipurpose, multi-lane, small arms, crew-served and individual anti-tank training simulation that enables training across three different modes: individual marksmanship; small unit (collective) gunnery and tactical training; and judgmental use of force (shoot/don't shoot), which includes escalation of force/graduated response scenarios.

The Call for Fire Trainer (CFFT) family of systems is a lightweight, rapidly deployable, observed fire training system that provides simulated battlefield training for Fire Support Specialists (FSS), Joint Fires Observers (JFO), and Soldiers. The system provides simulated battlefield training to conduct Indirect Fires, Close Air Support, Close Combat Attack, and Naval Surface Fire Support. The CFFT Immersive System provides the capability for Army, Joint, Multinational and Special Operations Forces to conduct advanced, complex and realistic fires training at the FIRES Center of Excellence, Ft Sill, OK. CFFT is a critical training enabler to support Warfighters in applying precision fires on target to prevent fratricide and minimize collateral damage.

The Live, Virtual, Constructive Integrating Architecture (LVC-IA) provides a net-centric linkage that collects, retrieves and exchanges data among LVC Training Aids, Devices, Simulations, and Simulators (TADSS) (to include: AVCATT, CCTT, GFT, HITS, JLCCTC and SE Core) and Mission Command Systems. The LVC-IA defines "how" information is exchanged among the different LVC domains and the Mission Command Systems. The LVC-IA provides enterprise level tools for exercise control, after action review, and system information assurance. It develops hardware and software to interface the different Live, Virtual, Constructive and Gaming communication protocols and to provide a correlated common operating picture for the training audience on their organic Mission Command equipment. The integration of the LVC TADSS with the Mission Command equipment will enable larger and more robust training events, to better prepare U.S. Soldiers for their missions at an overall reduced cost. The end-state goal is to enable an LVC Integrated Training Environment that can replicate Operational Environments in a cost effective manner to provide a high level of value-added training and mission rehearsal opportunities to Army Commanders and their Soldiers. In FY18, the LVC-IA program will begin design and developmental activities for Version 4 which will allow for "cloud optimization"; inclusion of new simulations to the architecture; and concurrency with core system TADSS and Army Mission Command Systems. FY19 request will allow for the continued Version 4 developmental and integration activities as well as concurrency with mission command systems.

The Target Modernization program provides a common open architectural framework, standards, specifications, and interfaces for live fire target devices, a common target control system for all range types, and innovative technologies to enhance training realism and reduce life cycle costs on the ranges. The Target Modernization primary goal is the development of trackless target systems, high fidelity dynamic infrared representations, non-contact ballistic hit detections, and augmented reality on live fire ranges; increasing training realism and lowering life cycle costs.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>
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The Army identified an operational gap in the training strategy for the OPFOR Integrated Air Defense System (IADS). It's a collection of enemy weapons systems that engage Army aviation assets. Training Aircraft Survivability Equipment (ASE) Stimulation Suite (TASS) is a live training system consisting of aircraft components and ground emitters that replicate current and emerging enemy Air Defense systems. Its fidelity supports individual pilot training as well as the collective training requirements of the Brigade Combat Team to fully plan, prepare, execute and react against an enemy air defense weapons at the Combat Training Centers (CTC).

The Digital Range Training System (DRTS) provides new and modern ranges capable of training, evaluating and stressing Soldiers and their modern equipment in a realistic train-as-you-fight environment. The system consists of four standard training ranges: Digital Multi-Purpose Range Complex (DMPRC), Digital Multi-Purpose Training Range (DMPTR), Battle Area Complex (BAX) and Digital Air Ground Integration Range (DAGIR) which utilize all available combat systems capabilities, and digitally integrate them to manage all forces undergoing individual and collective live-fire training and qualification. These training systems replace obsolete, inadequate training methods and equipment in order to simulate new weapon systems, challenge Soldiers, incorporate the modern digital force, and provide enhanced training data collection and After Action Review (AAR) capabilities. The system incorporates digital system training, as well as integrates multiple ranges and training environments for the training units.

The Army identified a requirement for a Soldier and Squad Virtual Trainer (S/SVT) to replace the Engagement Skills Trainer (EST) II and Call for Fire Trainer (CFFT) III program capabilities, while also providing immersive collective training capability to maneuver squads. The S/SVT program will enable Army Readiness through dismounted collective maneuver capability; will provide individual and crew-served weapons skill development, will enable Joint fires training, and will exercise Use of Force decision making. The requirement will integrate with the Synthetic Training Environment (STE), which is the next generation holistic collective training capability that will train units at the point of need within the entire range of Multi-Domain Battle tasks in support of Unified Land Operations in a complex operational environment.

OPFOR Surrogate Wheeled Vehicles (OSWV) provides a collection of wheeled vehicles, used as training aids to portray threat vehicles including tactical vehicles, technical vehicles, and Civilian on the Battlefield vehicles (COB-V). The program supports the CTC OPFOR/COE Pillar capability through technical vehicles, unique VISMODs, and COB-Vs. This capability provides for an accurate replication of OPFOR and COB-Vs environment that rotational units must train against.

FY 2019 Project 241 funds significant development efforts in support of U.S. Army Training and Readiness on the Combat Training Center Instrumentation Systems (CTC-IS), Instrumentable-Multiple Integrated Laser Engagement System (I-MILES), Home Station Instrumentation Training System (HITS), Common Training Instrumentation Architecture (CTIA), Target Modernization, Medical Simulation Training Center (MSTC), Live, Virtual, Constructive Integrating Architecture (LVC-IA), OPFOR Integrated Air Defense System (IADS), Soldier Virtual Trainer Program (SVT), OPFOR Surrogate Wheeled Vehicles (OSWV) a new start, and Suicide Prevention.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Common Training Instrumentation Architecture (CTIA) program.</p> <p><b>Description:</b> Continue EMD phase contract activities for the CTIA program to provide common architecture capabilities.</p> <p><b>FY 2018 Plans:</b></p>	2.608	2.910	2.707

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>Continue development of CTIA to provide the common architecture capabilities that are essential for development, fielding, technology and capability insertion for Live Training Systems (LTS) to include: the Combat Training Centers-Instrumentation Systems (CTC-IS), Integrated Military Operations in Urbanized Terrain Training System (IMTS), Home Station Instrumentation Systems (HITS), Digital Ranges Training System (DRTS) training instrumentation programs and the Live, Virtual, Constructive-Integrated Training Environment (LVC-ITE) interoperability initiatives.</p> <p><b>FY 2019 Plans:</b> Continue development of CTIA to provide the common architecture capabilities that are essential for development, fielding, technology and capability insertion for Live Training Systems (LTS) to include: the Combat Training Centers-Instrumentation Systems (CTC-IS), Integrated Military Operations in Urbanized Terrain Training System (IMTS), Home Station Instrumentation Systems (HITS), Digital Ranges Training System (DRTS) training instrumentation programs and the Live, Virtual, Constructive-Integrated Training Environment (LVC-ITE) interoperability initiatives.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY2019 estimated costs for development, fielding, technology and capability efforts.</p>				
<p><b>Title:</b> Government Program Management for the Common Training Instrumentation Architecture (CTIA) program.</p> <p><b>Description:</b> Government Program Management for the CTIA program.</p> <p><b>FY 2018 Plans:</b> Program Management for the Common Training Instrumentation Architecture (CTIA) program.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Per Office of the Under Secretary of Defense (Comptroller), civilian manpower costs were transferred from RDTE to OMA SAG 435 effective FY2019.</p>		0.276	0.283	-
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Combat Training Center Instrumentation System (CTC-IS).</p> <p><b>Description:</b> Continue EMD phase contract activities for the CTC-IS.</p> <p><b>FY 2018 Plans:</b> Combat Training Center Instrumentation System (CTC-IS) will fund the continued development of the existing Instrumentation Systems (IS) at the National Training Center (NTC), Joint Readiness Training Center (JRTC) and Joint Multinational Readiness Center (JMRC). Funding will also be used to establish a deliberate approach to Life Cycle Management (LCM) of Live Training Family of Systems, providing the framework for future Life Cycle Efforts for the Hardware Product Line Framework.</p> <p><b>FY 2019 Plans:</b></p>		4.998	3.362	5.052

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>FY19 Base RDTE dollars in the amount of \$4.000 million will fund the Life Cycle Management (LCM) of Live Training Family of Systems, developing the architecture framework for future Life Cycle Efforts for the Hardware Product Line Framework.</p> <p>FY19 Base RDTE dollars in the amount of \$1.052 million will fund post deployment software support to pursue changes to current software to stimulate sensors, replicate counter measures that US forces will use against small Unmanned Aerial Systems (UAS), support selective jamming of GPS without impacting the instrumentation use of GPS, and selectively jam radars such as support for suppression of enemy Air Defense Artillery.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> The FY 2019 increase is due to the post deployment software support requirement which wasn't included in FY 2018.</p>				
<p><b>Title:</b> Government Program Management for the Combat Training Center Instrumentation System (CTC-IS) program.</p> <p><b>Description:</b> Government Program Management for the CTC IS program.</p> <p><b>FY 2018 Plans:</b> Program Management for the Combat Training Center Instrumentation System (CTC-IS) program.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Per Office of the Under Secretary of Defense (Comptroller), the civilian manpower was transferred in FY 2019 from RDTE to OMA SAG 435.</p>		1.536	1.440	-
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Instrumentable-Multiple Integrated Laser Engagement System (I-MILES).</p> <p><b>Description:</b> EMD phase contract activities for the I-MILES program.</p> <p><b>FY 2018 Plans:</b> RDTE funding will assist in analyzing, developing and testing the Live Training Engagement Composition (LTEC) and integration of the Tactical Engagement Simulation (TES) Componentized Architecture into existing and new I-MILES capabilities to improve training realism during Force on Force (FoF) training increasing performance and reducing overall lifecycle costs. RDTE reduces the risk of integration into vehicle weapon platforms and Vehicular Integration for C4ISR/EW Interoperability (VICTORY) Architecture while maintaining relevancy into emerging Weapon Systems (Joint Lite Tactical Vehicle (JLTV), Armored Multi-Purpose Vehicle (AMPV), Stryker Engineering Change Proposal (ECP) with 30mm Gun). RDTE will assist in maintaining I-MILES relevancy as the Army premier Live Force-on-Force training system. This is the second year of RDTE for the I-MILES program.</p> <p><b>FY 2019 Plans:</b></p>		1.041	2.611	2.525

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>RDTE funding will continue our efforts in analyzing, developing, testing, and implementing the Live Training Engagement Composition (LTEC). LTEC supports integration of the Tactical Engagement Simulation (TES) Componentized Architecture into existing and new I-MILES capabilities to improve training realism during Force on Force (FoF) training increasing performance and reducing overall lifecycle costs. RDTE supports the ability to provide Technical Refreshment for Tactical Vehicle System (TVS) and Combat Vehicle Tactical Engagement Simulation System (CVTESS) vehicle Software Updates, to include LTEC Pk updates. Requirements exist to continue Implementation integration into vehicle weapon platforms and vehicular Integration for Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance/Electronic Warfare (C4ISR/EW) Interoperability to include the (VICTORY) Architecture while maintaining relevancy into emerging Weapon Systems: (Joint Light Tactical Vehicle (JLTV), Armored Multi-Purpose Vehicle (AMPV), Abrams, Bradley and small arms platform.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 estimated cost for development.</p>			
<p><b>Title:</b> Government Program Management for the Instrumentable-Multiple Integrated Laser Engagement System (I-MILES) Program.</p> <p><b>Description:</b> Government Program Management for the I-MILES program.</p> <p><b>FY 2018 Plans:</b> Government Program Management cost for the Instrumentable-Multiple Integrated Laser Engagement System (I-MILES) Program. This is the second year of RDTE for the I-MILES program.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Per Office of the Under Secretary of Defense (Comptroller), the civilian manpower was transferred in FY 2019 from RDTE to OMA SAG 435.</p>	0.304	0.319	-
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Home Station Instrumentation Training System (HITS) program.</p> <p><b>Description:</b> EMD phase contract activities for the HITS program.</p> <p><b>FY 2018 Plans:</b> Integrate and test the interface between HITS (v3 and V4) and the latest versions of the Live, Virtual and Constructive Integrating Architecture (LVC-IA 3.0) to sustain the Integrated Training Environment (ITE) at Home Stations.</p> <p><b>FY 2019 Plans:</b> Continued integration and testing of the interface between HITS and the latest versions of the Live, Virtual and Constructive Integrating Architecture (LVC-IA), which ensures continued interoperability with other simulation system for combined arms,</p>	1.683	1.646	1.044

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
collective training. Additionally, will improve HITS Exercise Planning and Scenario Development to assist the unit leader in being able to rapidly, readily and easily conduct exercise planning and scenario development through cloud based technologies for on demand and at point-of-need access. The cloud based access allows the unit leader to prepare for the training of over 1,000 Soldiers and vehicles before arriving at the site of training with HITS.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 estimated cost for development.				
<b>Title:</b> Government Program Management for the Home Station Instrumentation System (HITS) program. <b>Description:</b> Government Program Management for the Home Station Instrumentation System (HITS) program.  <b>FY 2018 Plans:</b> Program Management for the Home Station Instrumentation System (HITS) program.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Per Office of the Under Secretary of Defense (Comptroller), the civilian manpower was transferred in FY 2019 from RDTE to OMA SAG 435.		0.307	0.316	-
<b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Medical Simulation Training Center (MSTC). <b>Description:</b> EMD phase contract activities for the MSTC program.  <b>FY 2018 Plans:</b> Enhancement of the Instructor Support System (ISS) by improving the combat training environments to enhance the Soldier's training experience through more realistic training scenarios.  <b>FY 2019 Plans:</b> Complete enhancement of the Instructor Support System (ISS) by improving the combat training environments to enhance the Soldier's training experience through more realistic training scenarios.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 required costs to complete enhancement of Instructor Support System (ISS).		0.489	0.200	0.487
<b>Title:</b> Government Program Management for the Medical Simulation Training Center (MSTC) program. <b>Description:</b> Government Program Management for the MSTC program.  <b>FY 2018 Plans:</b>		0.167	0.167	-

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Government Program Management for the Medical Simulation Training Center (MSTC) program. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Per Office of the Under Secretary of Defense (Comptroller), the civilian manpower was transferred in FY 2019 from RDTE to OMA SAG 435.				
<b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Engagement Skills Trainer (EST) program. <b>Description:</b> EMD phase contract activities for the Engagement Skills Trainer (EST) program.		0.932	-	-
<b>Title:</b> Call For fire Trainer (CFFT) Program Government System Test and Evaluation. <b>Description:</b> Government System Test and Evaluation for the Call For fire Trainer (CFFT) Program.		1.242	-	-
<b>Title:</b> Soldier and Squad Virtual Trainer Program (S/SVT) Engineering, Support, Test & Evaluation <b>Description:</b> Engineering, support, and any related test and evaluation for the development of the S/SVT Program. <b>FY 2019 Plans:</b> Develop and demonstrate prototype designs to reduce technical risk, validate designs, validate cost estimates, evaluate processes, and refine requirements. Based on refined requirements and demonstrated prototype designs in User Assessments, integrated system design of the end-item system can be initiated. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY2019 is the first year of S/SVT acquisition development. This funding will provide for demonstrated prototype and integrated systems design of the end-item system.		-	-	5.540
<b>Title:</b> Government Program Management for the Soldier Virtual Trainer Program (SVT) <b>Description:</b> Government program management for SVT (New start in FY18). <b>FY 2018 Plans:</b> Government Program Management costs for the Soldier Virtual Trainer (SVT) Program which is a new start in FY18. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Per Office of the Under Secretary of Defense (Comptroller), the civilian manpower was transferred in FY 2019 from RDTE to OMA SAG 435. Additionally, the SVT program has been incorporated into the S/SVT program in FY19.		-	0.051	-
<b>Title:</b> Live, Virtual, Constructive Integrating Architecture (LVC-IA) Engineering and Manufacturing Development (EMD) phase contract activity.		4.232	2.762	2.774

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p><b>Description:</b> Continue EMD phase contract activities for the LVC-IA program.</p> <p><b>FY 2018 Plans:</b> Live, Virtual, and Constructive ? Integrating Architecture (LVC-IA) program will complete system development, integration and demonstration of the LVC-IA Version 3 capability. Additionally, LVC-IA will perform concurrency activities in support of LVC-IA interoperability with TADSS and other Mission Command Systems. The program will begin design and development of LVC-IA Version 4 capability.</p> <p><b>FY 2019 Plans:</b> Live, Virtual, and Constructive-Integrating Architecture (LVC-IA) program will continue system development, integration and demonstration of the LVC-IA Version 4 capability which includes the developmental activities for "cloud optimization"; inclusion of new simulations to the architecture; and concurrency with core system TADSS and Army Mission Command Systems.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase between FY18 to FY19 is due to supporting Version 4 development efforts.</p>				
<p><b>Title:</b> Live, Virtual, Constructive Integrating Architecture (LVC-IA) Program Government System Test and Evaluation.</p> <p><b>Description:</b> Government System Test and Evaluation for the LVC-IA Program.</p> <p><b>FY 2018 Plans:</b> LVC-IA will finalize Federation Integration, Functional Verification and System Measurement of Performance (SMP) events, complete Test Readiness Review (TRR) and Government Acceptance Testing for Version 3; the program will begin efforts for Version 4 in FY18 once Version 3 efforts are completed. Additionally, LVC-IA will continue integration testing and evaluation activities in support of LVC-IA interoperability with TADSS and other Mission Command Systems.</p> <p><b>FY 2019 Plans:</b> LVC-IA will perform Federation Integration, Functional Verification and System Measurement of Performance (SMP) events, and commence Test Readiness Review (TRR) and Government Acceptance Testing for Version 4. Additionally, LVC-IA will continue integration testing and evaluation activities in support of LVC-IA interoperability with TADSS and other Mission Command Systems.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease between FY18 to FY19 is due to the completion of test activities supporting Version 3.</p>		2.199	2.372	1.619
<p><b>Title:</b> Government Program Management for the Live, Virtual, Constructive Integrating Architecture (LVC-IA) Program.</p> <p><b>Description:</b> Government Program Management for the LVC-IA Program.</p>		1.782	1.679	0.803



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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p><b>FY 2018 Plans:</b> Will provide program management, engineering and technical oversight, contract support, and travel for the LVC-IA Program.</p> <p><b>FY 2019 Plans:</b> Will provide program management, engineering and technical oversight, contract support, and travel for the LVC-IA Program.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Per Office of the Under Secretary of Defense (Comptroller), the civilian manpower was transferred in FY 2019 from RDTE to OMA SAG 435.</p>				
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Target Modernization program.</p> <p><b>Description:</b> EMD phase contract activities for the Target Modernization program.</p> <p><b>FY 2018 Plans:</b> Finalization of the trackless moving type target effort initiated in FY16 via development and testing of Technology Readiness Level (TRL) 9 prototype systems. Prepare system for transition into low rate initial production, and eventual transition to various programs of record. Start the design and development of a dynamic infrared representation capability to display real-time posture based, high fidelity IR/thermal images on target silhouettes. Advance thermal threat images to match thermal sight capabilities. Removes thermal generation systems from line of fire on ranges. Bridge technology transition from an on-going SBIR effort that began in FY15.</p> <p><b>FY 2019 Plans:</b> RDTE of \$.250 million provides for the design, development, and testing of the Trackless Moving Target - Vehicle (TMT-V) platform system. The TMT-V effort will design and prototype an inexpensive trackless vehicle/armor moving type target that can be utilized on unimproved terrain. The TMT-V is capable of replicating behaviors based on training doctrine, skills, readiness and style of learning to enhance realism and feedback for the trainee.</p> <p>RDTE of \$1.670 million provides for the design and development of the Dynamic Infrared Projection (DIRP) system. The DIRP system will provide for an inexpensive and ruggedized infrared projection system that can be utilized to create accurate real-time dynamic thermal representations on target silhouettes or other mediums based on training doctrine within the various live and virtual training applications to enhance realism and feedback for the trainee. The DIRP system technology would support the creation of a high fidelity, time and posture based, thermal replication system for live fire target systems. Current solutions are heating pads adhered to the target silhouette. The shapes are not accurate, get damaged with live fire engagements, and create thermal bleeding; the shapes are static with respect to time, and do not support changes in thermal intensity over time, movement or posture changes. The DIRP solution will remove the threat signature thermal generation from the line of fire (damage), and</p>		2.054	2.237	1.920

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>support the recognition of combat vehicles with high resolution imaging. The thermal images will support time or movement based increases in temperature, and enhanced thermal representation (muzzle flash, burning vehicle), resulting in enhanced training realism. The FY19 efforts include conducting a domain analysis, completing the detail design, and image modeling and development.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 estimated cost for development</p>				
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Digital Range Training System (DRTS)</p> <p><b>Description:</b> EMD Phase for the DRTS Program</p> <p><b>FY 2018 Plans:</b> RDTE funding will be used to begin the development of a prototype for the Digital Range Training System (DRTS) at Ft. Benning of the Service Oriented Architecture (SOA) based Common Training Instrumentation Architecture (CTIA) version 4 software product line. Effort will focus on prototyping and validating the new software on IT equipment and demonstrating that the DRTS capabilities are still supported. In addition, funding will be used to develop a prototype Integrated Player Unit (IPU) for the DRTS system that combines the multiple boxes used today into one unit, makes the IPU more rugged to withstand the operational environment, and makes the system easier and faster to install. This will make the DRTS more usable by the training units and easier to support. This is the first year of RDTE for the DRTS program.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> DRTS has no FY 2019 funding.</p>		-	1.600	-
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for OPFOR Surrogate Wheeled Vehicles (OSWV)</p> <p><b>Description:</b> EMD phase contract activities for the OSWV program.</p> <p><b>FY 2019 Plans:</b> RDTE Funding will assist in technical vehicle studies, engineering, prototype design, technical integration, first article tests and integration tests of the Visual Modifications to the Tactical Vehicles. This is the first year of RDTE for the OSWV program.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> OPFOR Surrogate Wheeled Vehicles (OSWV) is a new start.</p>		-	-	3.226
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the OPFOR Integrated Air Defense System (IADS)</p>		4.812	15.946	9.597

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p><b>Description:</b> EMD phase contract activities for the IADS Program</p> <p><b>FY 2018 Plans:</b> RDTE funding will support the ongoing modification of the Apache Helicopter capability to train against the OPFOR Integrated Air Defense System (IADS). Funding will also support the addition of embedded software to model the Aircraft Survivability Equipment (ASE) and stimulate the helicopter display to inform pilots of opposing threats. Modification efforts will also expand the capability to the Blackhawk and Chinook Helicopters while integrating the software into the Combat Training Centers (CTC), to support force on force collective training exercises.</p> <p><b>FY 2019 Plans:</b> RDTE funding will support the continuing development, integration, test and evaluation of the IADS embedded software to model the Aircraft Survivability Equipment (ASE) and stimulate the helicopter display to inform pilots of opposing threats, and for the Ground Threat Emitter (GTE) to simulate Threat air defense weapons. Modification efforts will also integrate the software into the Combat Training Centers (CTC) Instrumentation System (IS) to support force on force collective training exercises.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> The FY19 decrease in RDTE is due to transitioning from a high intensity development year to the testing phase in FY19.</p>				
<p><b>Title:</b> Radar Signal Emulator Development for Integrated Air Defense Systems (IADS)</p> <p><b>FY 2019 Plans:</b> Engineering and development of a dedicated SAM/HIMAD threat solution for the Combat Training Center (CTCs), supporting multiple threat configurations. This funding will develop four Radar Signal Emulators (RSEs) fully integrated with CTC Instrumentation System (IS) providing a fielded capability for replicating an enemy multi-layered, short-range, medium and high altitude air-defense system to execute unified land operations against a current and projected peer/near peer threat in accordance with current and emerging doctrine.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> This is the first year of RDTE funding for the Radar Signal Emulators (RSEs) requirement which is included in the IADS program.</p>		-	-	9.893
<p><b>Title:</b> Government Program Management for the OPFOR Integrated Air Defense System (IADS) Program</p> <p><b>FY 2018 Plans:</b> Will provide program management, engineering and technical oversight, contract support, and travel for the IADS Program.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b></p>		0.188	0.554	-

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Per Office of the Under Secretary of Defense (Comptroller), the civilian manpower was transferred in FY 2019 from RDTE to OMA SAG 435.			
<b>Title:</b> Suicide Prevention Program <b>FY 2018 Plans:</b> Dollars belong to the Suicide Prevention Program. <b>FY 2019 Plans:</b> Dollars belong to the Suicide Prevention Program. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> new cost estimate	-	2.228	2.249
<b>Title:</b> Soldier Fitness Program <b>Description:</b> Dollars belong to the Soldier Fitness Program. <b>FY 2018 Plans:</b> Dollars belong to the Soldier Fitness Program. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> The Soldier Fitness Program doesn't have any RDTE in FY 2019.	-	0.892	-
<b>Accomplishments/Planned Programs Subtotals</b>	30.850	43.575	49.436

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• MA6600: <i>Combat Training Centers Support</i>	75.359	88.888	123.228	-	123.228	139.436	87.750	99.611	72.707	0.000	686.979
• NA0100: <i>Training Devices, Nonsystem</i>	253.050	288.689	228.598	-	228.598	205.008	173.434	183.879	192.551	0.000	1,525.209

**Remarks**

**D. Acquisition Strategy**  
Competitive development efforts based on performance specifications.  
1. In FY17, Combat Training Center Instrumentation Systems (CTC-IS) System RDTE funded the development of a Cross Domain Solution (CDS) needed due to new IA requirements; awarded a new delivery order (DO) to General Dynamics Missions Systems under the Live Training Transformation Consolidated Product-line

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>
<p>Management Next (LT2 CPM Next) contract. CPM Next was completed as a Competitive 5 year Single Award Indefinite-Delivery/Indefinite-Quantity (IDIQ) Contract, the DO will have a one-year base and four single-year option period.</p> <p>FY18 and FY19, will be used to fund a Life Cycle Product-line Management (LCPM) contract structured as a 5 year Single Award Indefinite-Delivery/Indefinite-Quantity (IDIQ) for the implementation of a Hardware Product Line (HPL), the contractor is to be selected. The strategy is to establish a deliberate approach to Life Cycle Management (LCM) of Live Training Family of Systems, providing the framework for future Life Cycle Efforts for the Hardware Product Line Framework.</p> <p>2. In FY17, Instrumentable-Multiple Integrated Laser Engagement System (I-MILES) awarded a new delivery order (DO) to General Dynamics Mission Systems on the Live Training Transformation Consolidated Product-line Management Next (LT2 CPM Next) contract which will provide flexibility for unknown requirements and will address the known requirements that fall within multiple categories: Architecture Maturation; Common Operating Environment (COE); Embedded Training; System level testing of existing and future Live Training Engagement Composition (LTEC) services for dismount and vehicle use cases; Architecture Verification/Validation of LTEC and a componentized architecture; Retrofitting I-MILES systems (Individual Weapons System 1 &amp; 2 (IWS), Tactical Vehicle System (TVS), Combat Vehicle Tactical Engagement Simulation System (CVTESS)) with LTEC and Live Player Area Network (LPAN); Development, Integration, Form, Fit &amp; Function for new vehicles/systems platforms. In FY18, I-MILES will award a new Competitive 5 year Single Award Indefinite-Delivery/Indefinite-Quantity (IDIQ) Contract for relevancy.</p> <p>3. In FY16, the Home Station Instrumentation Training System (HITS) program awarded a delivery order (DO) to General Dynamics Missions Systems under the LT2 CPM Next contract. The DO has a one-year base and four single-year option periods beginning in January 2016.</p> <p>4. In FY15, the Common Training Instrumentation Architecture (CTIA) program awarded a contract to General Dynamics Mission Systems which has a one-year base and four single-year option periods through FY20.</p> <p>5. In FY17, the Target Modernization (Target Mod) program incrementally funded the Phase III SBIR contract to Pratt and Miller Engineering Trackless Moving Target (TMT) contract which has a one year base and two year options periods. The contract provides for the continued product development (from TRL 7 to TRL 9). The original effort was initiated under a Small Business Innovation Research (SBIR) contract. In FY18, Target Mod will award a Phase III SBIR to JRM Enterprises to initiate the maturation of the Dynamic Infrared Representation system (TRL 7 to TRL 9).</p> <p>6. The LVC-IA Enhanced Capability contract is the competitively awarded follow-on effort awarded in 3rd Quarter FY16. This contract has a two-year base and four single-year option periods to provide the additional capabilities for Versions 3, 4 and beyond. The contract was awarded to Cole Engineering and Science, Inc. (CESI) to provide for the development, fielding and training of each version capability for the designated Basis of Issue Plan (BOIP) sites and provide Post-Deployment Software Support (PDSS) for all currently fielded versions.</p> <p>7. The Soldier and Squad Virtual Trainer (S/SVT) program will employ an incremental acquisition strategy where the full capability will occur in multiple increments as new capability is developed and delivered. Competitive prototyping development efforts will be conducted through Other Transactional Authority.</p> <p>8. Digital Range Training System (DRTS) will award two standalone delivery orders (DO) to General Dynamics Mission Systems which will be 12-month prototyping efforts. This is the first year of RDTE for this program.</p> <p>9. In FY17, OPFOR Integrated Air Defense System (IADS) awarded a new standalone contract with a base, plus 4 option year periods.</p> <p>10. As of FY17, the Medical Simulation Training Center (MSTC) team will be performing TC3 Sim concurrency and ISS enhancement efforts using other Army agency fixed price contracts.</p> <p>11. In FY19, OPFOR Surrogate Wheeled Vehicles (OSWV) will pursue an organic solution to develop, integrate and test Visual Modifications for Tactical and Technical Vehicles.</p>		
<b>E. Performance Metrics</b>		
N/A		

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
OneTESS Program Management	Various	PEO STRI : Orlando, FL	8.046	-		-		-		-		-	0.000	8.046	8.046
OneTESS Program Management	Various	PEO STRI, : Orlando, FL	2.040	-		-		-		-		-	0.000	2.040	2.040
HITS Program Management	Various	PEO STRI : Orlando, FL	0.800	0.307	Jan 2017	0.316	Nov 2017	-		-		-	0.000	1.423	1.423
CTC-IS Program Management	Various	PEO STRI : Orlando, FL	6.225	1.536	Dec 2016	1.440	Nov 2017	-		-		-	0.000	9.201	9.201
MSTC Program Management	Various	PEO STRI : Orlando, FL	0.632	0.167	Mar 2017	0.167	Nov 2017	-		-		-	0.000	0.966	0.966
I-MILES Program Management	Various	PEO STRI : Orlando, FL	-	0.304	Dec 2016	0.319	Oct 2017	-		-		-	0.000	0.623	0.623
EST Program Management	Various	PEO STRI : Orlando, FL	0.214	-		-		-		-		-	0.000	0.214	0.214
LVC-IA Program Management	Various	PEO STRI : Orlando, FL	7.005	1.782	Dec 2016	1.679	Nov 2017	0.803	Nov 2018	-		0.803	Continuing	Continuing	Continuing
Target Modernization	Various	PEO STRI : Orlando, FL	0.614	-		-		-		-		-	0.000	0.614	0.614
ETC-IS Program Management	Various	PEO STRI : Orlando, FL	0.164	-		-		-		-		-	0.000	0.164	0.164
CTIA	Various	PEO STRI : ORLANDO, FL	0.364	0.276	Oct 2016	0.283	Oct 2017	-		-		-	0.000	0.923	0.923
Soldier Fitness Program	TBD	Mulitple : Various	1.254	-		0.892	Jun 2018	-		-		-	0.000	2.146	2.146
Suicide Prevention	TBD	Multiple : Various	-	-		2.228	Jun 2018	2.249	Jun 2019	-		2.249	Continuing	Continuing	Continuing
SVT Program Management	Various	PEO STRI : Orlando, FL	-	-		0.051	Oct 2017	-		-		-	0.000	0.051	0.051
OPFOR Integrated Air Defense System (IADS) Program Management	Various	PEO STRI : Orlando, FL	-	0.188	Aug 2017	0.554	Oct 2017	-		-		-	0.000	0.742	0.742
<b>Subtotal</b>			27.358	4.560		7.929		3.052		-		3.052	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604715A / Non-System Training Devices - Eng Dev				Project (Number/Name) 241 / Nstd Combined Arms							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
OneTESS	SS/CPFF	General Dynamics : Fairfax, VA	124.769	-		-		-		-		-	0.000	124.769	124.769
OneTESS	SS/CPFF	General Dynamics C4 Systems : Orlando, FL 32826	10.430	-		-		-		-		-	0.000	10.430	10.430
CTIA	Option/ IDIQ	General Dynamics Mission Systems : Orlando, FL	13.489	2.608	Jan 2017	2.910	Jan 2018	2.707	Jan 2019	-		2.707	Continuing	Continuing	Continuing
CTIA	C/CPFF	Lockheed Martin Inc. : Orlando, FL	57.091	-		-		-		-		-	0.000	57.091	57.091
I-MILES	Option/ IDIQ	General Dynamics Mission Systems : Orlando, FL	-	1.041	Mar 2017	-		0.511	May 2019	-		0.511	Continuing	Continuing	Continuing
I-MILES RELEVANCY	SS/IDIQ	TBD : Orlando, FL	-	-		2.611	May 2018	2.014	May 2019	-		2.014	Continuing	Continuing	Continuing
CTC-IS	C/IDIQ	General Dynamics Mission Systems : Orlando, FL	35.146	2.232	Jan 2017	-		1.052	Mar 2019	-		1.052	Continuing	Continuing	Continuing
CTC-IS	C/IDIQ	TBS : Orlando, FL	-	2.766	Jul 2017	3.362	Jul 2018	4.000	Mar 2019	-		4.000	Continuing	Continuing	Continuing
HITS	C/FFP	Riptide : Orlando, FL	1.379	-		-		-		-		-	0.000	1.379	1.379
HITS	C/IDIQ	General Dynamics Mission Systems : Orlando, FL 32826	3.109	-		-		-		-		-	0.000	3.109	3.109
HITS	Option/ IDIQ	General Dynamics Mission Systems (GDMS) : Orlando, FL 32826	-	1.683	Jan 2017	1.646	Jan 2018	1.044	Jan 2019	-		1.044	Continuing	Continuing	Continuing
MSTC Development	C/FP	Multiple : Various	4.439	0.489	Mar 2017	0.200	Mar 2018	0.487	Jun 2019	-		0.487	Continuing	Continuing	Continuing
EST Development	C/FP	Cubic Simulation Systems, Inc. : Orlando, FL 32809-3813	1.528	-		-		-		-		-	0.000	1.528	1.528

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604715A / Non-System Training Devices - Eng Dev				241 / Nstd Combined Arms							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
EST	C/FP	Nova Technologies : Panama City, FL 32404-6747	0.609	-		-		-		-		-	0.000	0.609	0.609
EST Enhanced Capabilities	C/FFP	Meggitt Training Systems, Inc. : Suwanee, GA 30024-1247	1.143	0.932	Mar 2017	-		-		-		-	0.000	2.075	2.075
EST Enhanced Capabilities Adaptive Marksmanship and Intelligent Tutoring	C/FFP	Dignitas Technologies : Orlando, FL 32817	0.776	-		-		-		-		-	0.000	0.776	0.776
CFFT Enhanced Joint Fires Observer (JFO) Training and Certification Requirements	C/IDIQ	Nova Technologies : Panama City, FL 32404-6747	-	1.242	Apr 2017	-		-		-		-	0.000	1.242	1.242
LVC-IA Development	C/CPFF	Cole Engineering Services, Inc : Orlando, FL	29.822	-		-		-		-		-	0.000	29.822	29.822
LVC-IA Enhanced Capability	C/CPFF	Cole Engineering Services, Inc (CESI) : Orlando, FL	5.706	-		-		-		-		-	0.000	5.706	5.706
LVC-IA Enhanced Capability	Option/CPFF	Cole Engineering Services, Inc (CESI) : Orlando, FL	-	4.232	Feb 2017	2.762	Nov 2017	2.774	Nov 2018	-		2.774	Continuing	Continuing	Continuing
Target Modernization	C/IDIQ	Pratt and Miller Engineering : Orlando, FL	6.600	-		-		-		-		-	0.000	6.600	6.600
Target Modernization	Option/IDIQ	Pratt and Miller Engineering (P&M) : Orlando, FL	-	2.054	Feb 2017	1.000	Feb 2018	-		-		-	0.000	3.054	3.054
Target Modernization	C/CPFF	JRM Enterprises : Fredericksburg, VA	-	-		1.237	Jul 2018	0.250	Oct 2018	-		0.250	Continuing	Continuing	Continuing
Target Modernization	C/CPFF	JRM Technologies : Orlando	-	-		-		1.670	Dec 2018	-		1.670	Continuing	Continuing	Continuing



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>
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<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Congressional Add Center of Excellence for Military Operations in Urban Terrain and Cultural Trn	C/FP	Multiple : Various	2.996	-		-		-		-		-	0.000	2.996	2.996
ETC-IS	SS/CPFF	General Dynamics C4 Systems : Orlando, FL 32826	4.836	-		-		-		-		-	0.000	4.836	4.836
Digital Range Training System (DRTS)	C/FFP	General Dynamics Mission Systems : Orlando, FL	-	-		1.600	Mar 2018	-		-		-	0.000	1.600	1.600
OPFOR Integrated Air Defense System (IADS)	MIPR	PEO IEWS, PM Aircraft Survivability Equipment (ASE) : Huntsville, AL	-	2.046	Sep 2017	14.346	Jan 2018	6.628	Feb 2019	-		6.628	Continuing	Continuing	Continuing
OPFOR Integrated Air Defense System (IADS)	MIPR	Target Systems Management Office, PEO STRI, PEO STRI : Huntsville, AL	-	0.915	Nov 2017	-		-		-		-	0.000	0.915	0.915
Radar Signal Emulator Development for IADS	C/TBD	To Be Determined : Orlando, FL	-	-		-		9.893	Feb 2019	-		9.893	Continuing	Continuing	Continuing
Soldier and Squad Virtual Trainer (S/SVT) Program	C/TBD	PEO STRI : Orlando, FL	-	-		-		5.540	Apr 2019	-		5.540	Continuing	Continuing	Continuing
OPFOR Surrogate Wheeled Vehicles (OSWV)	SS/ Various	TBD : TBD	-	-		-		3.226	Mar 2019	-		3.226	Continuing	Continuing	Continuing
<b>Subtotal</b>			303.868	22.240		31.674		41.796		-		41.796	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
OneTESS	Various	Various : Orlando, FL	6.596	-		-		-		-		-	0.000	6.596	6.596
OneTESS	Various	Various : Various	0.262	-		-		-		-		-	0.000	0.262	0.262

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CTIA	Various	Various : Various	12.844	-		-		-		-		-	0.000	12.844	12.844
Target Modernization	Various	Various : Various	0.192	-		-		-		-		-	0.000	0.192	0.192
<b>Subtotal</b>			19.894	-		-		-		-		-	0.000	19.894	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
OneTESS Development & Test	Various	Multiple : Orlando, FL	4.162	-		-		-		-		-	0.000	4.162	4.162
OneTESS Test Support	Various	Multiple : Orlando, FL	1.280	-		-		-		-		-	0.000	1.280	1.280
HITS	Various	Various : Orlando, FL	0.740	-		-		-		-		-	0.000	0.740	0.740
LVC-IA Test Support	Various	Multiple : Orlando, FL	5.302	2.199	Feb 2017	2.372	Nov 2017	1.619	Nov 2018	-		1.619	Continuing	Continuing	Continuing
IEDES	Various	Multiple : Orlando, FL	0.519	-		-		-		-		-	0.000	0.519	0.519
OPFOR Integrated Air Defense System (IADS)	SS/CPFF	Inter-Coastal Electronics, Inc. : Mesa, AZ	-	1.851	Sep 2017	1.600	Jul 2018	2.969	Aug 2019	-		2.969	Continuing	Continuing	Continuing
<b>Subtotal</b>			12.003	4.050		3.972		4.588		-		4.588	Continuing	Continuing	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
	<b>Project Cost Totals</b>		363.123	30.850	43.575	49.436	-	49.436	Continuing	Continuing

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
CTIA Development and Architectural Evolution	[Redacted]																											
CTC IS Development	[Redacted]																											
I-MILES Development	[Redacted]																											
I-MILES RELEVANCY	[Redacted]																											
HITS Development	[Redacted]																											
MSTC MT-C2 Development	[Redacted]																											
MSTC Trainer Developments	[Redacted]																											
EST Enhanced Capabilities	[Redacted]																											
CFFT Enhanced Joint Fires Observer (JFO) Training and Certification Rec	[Redacted]																											
LVC-IA - Version 3 (Development, Integration, Demonstration and Testing)	[Redacted]																											
LVC-IA - Version 4 (Development, Integration, Demonstration and Testing)	[Redacted]																											
LVC-IA - Concurrency with Mission Command Systems	[Redacted]																											
Target Modernization Development	[Redacted]																											

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
S/SVT - Development																												
Digital Range Training System (DRTS)																												
OPFOR Integrated Air Defense System (IADS)																												
OPFOR Surrogate Wheeled Vehicles (OSWV)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
OneTESS Development	1	2013	4	2014
CTIA Development and Architectural Evolution	1	2012	4	2024
CTC IS Development	1	2010	4	2023
I-MILES Development	2	2017	4	2021
I-MILES RELEVANCY	2	2018	4	2024
HITS Development	3	2012	4	2024
MSTC MT-C2 Development	2	2016	3	2018
MSTC Trainer Developments	2	2017	4	2023
EST Enhanced Capabilities Adaptive Marksmanship and Intelligent Tutoring	3	2015	2	2016
EST Enhanced Capabilities	3	2016	2	2018
CFFT Enhanced Joint Fires Observer (JFO) Training and Certification Requirements	2	2017	3	2018
LVC-IA - Version 2 (Development, Integration, Demonstration and Testing)	1	2014	3	2016
LVC-IA - Version 3 (Development, Integration, Demonstration and Testing)	4	2016	3	2018
LVC-IA - Version 4 (Development, Integration, Demonstration and Testing)	4	2018	3	2020
LVC-IA - Concurrency with Mission Command Systems	4	2020	4	2023
Target Modernization Development	1	2016	4	2023
CSF2	1	2015	4	2016
S/SVT - Development	3	2019	4	2021
Digital Range Training System (DRTS)	2	2018	2	2019
OPFOR Integrated Air Defense System (IADS)	4	2017	4	2024
OPFOR Surrogate Wheeled Vehicles (OSWV)	2	2019	4	2024

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>			<b>Project (Number/Name)</b> 573 / <i>Program Executive Office Simulation, Training Spt</i>				
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
573: <i>Program Executive Office Simulation, Training Spt</i>	-	3.038	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.038
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

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**A. Mission Description and Budget Item Justification**

In support of Non-System Training Devices (NSTD), this project funds the US Army Program Executive Officer Simulation, Training and Instrumentation (PEO STRI) core operations supporting development of Army training devices and simulations by PEO STRI project managers (PM TRADE, PM ITTS, and PM ITE).

FY 2018, per Program Decision Memorandum (PDM) directed Major Army Headquarters Realignment, is the first year that realigns Government authorizations and associated funding to an Army Management Headquarter Account (AMHA), which zeroed out the funding in FY 2018.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Government Program Management to support PEO STRI.	3.038	-	-
<b>Description:</b> Government Program Management to support PEO STRI.			
<b>Accomplishments/Planned Programs Subtotals</b>	3.038	-	-

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / Non-System Training Devices - Eng Dev	<b>Project (Number/Name)</b> 573 / Program Executive Office Simulation, Training Spt
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<b>Management Services (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Government Program Management- PEO STRI	Various	PEO STRI : Orlando, FL	24.227	3.038	Oct 2016	-		-		-		-	0.000	27.265	27.265
<b>Subtotal</b>			24.227	3.038		-		-		-		-	0.000	27.265	N/A
			<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	
<b>Project Cost Totals</b>			24.227	3.038	0.000		-		-		-	0.000	27.265	N/A	

**Remarks**

**UNCLASSIFIED**

<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date: February 2018</b>		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>		<b>Project (Number/Name)</b> 573 / <i>Program Executive Office Simulation, Training Spt</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Government Program Management	[Redacted]				[Redacted]																							



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 573 / <i>Program Executive Office Simulation, Training Spt</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Government Program Management	1	2010	4	2017

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	200.205	28.726	95.172	119.300	214.472	15.577	9.310	2.915	29.489	Continuing	Continuing
126: <i>PEO Electronic Protect</i>	-	16.419	0.000	0.000	-	0.000	0.000	0.000	0.000	28.261	0.000	44.680
146: <i>Air &amp; Msl Defense Planning Control Sys</i>	-	14.987	24.306	24.326	-	24.326	14.300	8.401	2.915	1.228	Continuing	Continuing
149: <i>Counter-Rockets, Artillery &amp; Mortar</i>	-	24.899	4.420	1.846	-	1.846	1.277	0.909	0.000	0.000	Continuing	Continuing
FG5: <i>Counter Unmanned Aerial Systems (CUAS)</i>	-	143.900	0.000	69.000	119.300	188.300	0.000	0.000	0.000	0.000	0.000	332.200

**A. Mission Description and Budget Item Justification**

The Advanced Electronic Protection Enhancement (AEPE) Program funds efforts to assess and initiate development of solutions to Army Air and Missile Defense (AMD) vulnerabilities from Advanced Electronic Attack (AEA). Army AMD sensors, Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS) Command and Control (C2), and Radio Frequency (RF) data and voice networks will be assessed against current and postulated AEA systems and techniques. Potential Electronic Protection (EP) solutions developed by the Army will be demonstrated and assessed in live and simulated AEA environments. Similarly, EP solutions developed by the Joint services and other Agencies (e.g., the Missile Defense Agency) will also be assessed for potential incorporation into Army AMD systems.

The Air and Missile Defense Planning and Control System (AMDPCS) is an Army Objective Force System that provides integration of Air and Missile Defense (AMD) operations at all echelons. AMDPCS systems are deployed with Air Defense Artillery (ADA) Brigades (BDEs), Army Air and Missile Defense Commands (AAMDCs), and Air Defense and Airspace Management (ADAM) Cells at the Brigade Combat Teams (BCT's), Multi Functional Support Brigades and Divisions/Corps. AMDPCS systems also provide air defense capabilities to Homeland Defense systems. ADAM Cells provide the Commander at BCTs, BDEs and Divisions with air defense situational awareness and airspace management capabilities. They also provide the interoperability link with Joint, multinational and coalition forces. AMDPCS components are vital in the transformation of ADA units and the activation of the Air & Missile Defense (AMD) Battalions. AMDPCS has three major components: (1) The Air and Missile Defense Workstation (AMDWS) is an automated defense and staff planning tool that displays the common tactical and operational 3-dimensional air picture. AMDWS is the air picture provider for the Army, producing an integrated and correlated air picture at all tactical levels and locations. AMDWS is also an integral component of Integrated Base Defense. AMDWS provides an interoperability link to multinational air defense forces; (2) The Air Defense System Integrator (ADSI) is a communications data link processor and display system that provides near-real time, 3-dimensional and joint airspace situational awareness; (3) The Army Air Defense shelter configurations use automated data processing equipment, tactical communications, Common Hardware Systems, standard vehicles and tactical power to provide AMD unit commanders and staffs with the capabilities to plan missions, direct forces, and manage airspace. The integration of the Passive Identification, Friend or Foe (PIFF) capability into sheltered systems enables AMDPCS to track self-reporting aircraft. PIFF receives position and identification data from self-reporting aircraft, to include UAS, within 250 nautical miles.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>
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The Counter-Rocket, Artillery, Mortar (C-RAM) system-of-systems (SoS) is an evolutionary, non-developmental program that detects RAM launches; provides localized warning to the defended area, with sufficient time for personnel to take appropriate action; intercepts rounds in flight, thus preventing damage to ground forces or facilities; and enhances response to and defeat of enemy forces. The C-RAM capability is comprised of a combination of multi-service fielded and non-developmental item (NDI) sensors, command and control (C2) equipment, a commercial industry-produced warning system, and a modified U.S. Navy intercept system (Land-based Phalanx Weapon System (LPWS)), all connected via a wireless local area network. The Forward Area Air Defense Command and Control (FAAD C2) system, also under the management of the C-RAM Program Directorate, provides the C-RAM C2 functionality and has been enhanced to integrate the sensors, weapons, and warning systems for the C-RAM SoS. C-RAM C2 software correlates RAM sensor data, evaluates the threat, provides early warning, directs engagements, and cues counterfire systems and reaction forces. The C-RAM SoS capability is currently deployed at multiple sites in Afghanistan and Iraq providing correlated air and ground pictures to the Army Mission Command and the Joint Defense Networks, and using various forms of communications to provide situational awareness and exchange of timely and accurate information to synchronize and optimize automated Shape, Sense, Warn, Intercept, Respond, and Protect decisions.

Multiple acquisition efforts are associated with the C-RAM program, including C-RAM Intercept, which fields existing LPWS guns to two Indirect Fire Protection Capability (IFPC)/Avenger composite Battalions, and RAM Warn, a horizontal technology insertion, using current C-RAM warning capability to provide early, localized warning to all Maneuver Brigade Combat Teams (BCT).

The Counter-Unmanned Aircraft Systems (C-UAS) capability is being developed in response to a Joint Operational Needs (JUON), CC-0558 approved by the Joint Rapid Acquisition Cell (JRAC) in June 2016. Project FG5 was created in FY 2017 to support the identification, development, testing, evaluation and integration of technologies to provide an overall evolutionary capability to defeat small Unmanned Aircraft Systems (UAS) threats. The C-UAS system will provide the capability for the warfighter to comprehensively detect, track, identify and defeat enemy Groups 1 and 2 light weight, Commercial Off-The-Shelf (COTS) UAS. The C-UAS system development involves a phased development and testing approach of C-UAS systems.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	205.432	28.726	28.320	-	28.320
Current President's Budget	200.205	28.726	95.172	119.300	214.472
Total Adjustments	-5.227	0.000	66.852	119.300	186.152
• Congressional General Reductions	-0.025	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	5.000	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.002	-			
• Adjustments to Budget Years	-	-	66.852	119.300	186.152
• RAA not appropriated	-8.200	-	-	-	-

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>
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**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 149: *Counter-Rockets, Artillery & Mortar*

Congressional Add: *C-RAM Capability Enhancement - Network Security Enhancements (Next Gen)*

Congressional Add Subtotals for Project: 149

Congressional Add Totals for all Projects

	FY 2017	FY 2018
	5.000	-
	5.000	-
	5.000	-

**Change Summary Explanation**

FY 2017 funding adjustment of -\$5.227 million includes a reduction of \$8.200 million originally requested in the Request for Additional Appropriations (RAA) for Passive Identification, Friend or Foe (PIFF) system engineering (including cyber, data at rest, and a new Identification Friend or Foe (IFF) Response Processor (IRP) card design), a \$5.000 million Congressional add for C-RAM network security enhancements, -\$2.002 million for SBIR/STTR, and -\$0.025 million for FFRDC.

The FY 2019 base funding adjustment of +\$66.852 million includes an increase of \$69.000 million to C-UAS in support of JUON CC-0558, a rephasing of \$1.886 million to C-RAM to account for the availability of prior year execution balances and a reduction of \$0.262 million to AMDPCS due to revised economic assumptions.

FY 2019 OCO funding adjustment of +\$119.300 million supports C-UAS JUON CC-0558.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>					<b>Project (Number/Name)</b> 126 / <i>PEO Electronic Protect</i>		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
126: <i>PEO Electronic Protect</i>	-	16.419	0.000	0.000	-	0.000	0.000	0.000	0.000	28.261	0.000	44.680
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Advanced Electronic Protection Enhancement (AEPE) Program funds efforts to assess and initiate development of solutions to Army Air and Missile Defense (AMD) vulnerabilities from Advanced Electronic Attack (AEA). Army AMD sensors, Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS) Command and Control (C2), and Radio Frequency (RF) data and voice networks will be assessed against current and postulated AEA systems and techniques. Potential Electronic Protection (EP) solutions developed by the Army will be demonstrated and assessed in live and simulated AEA environments. Similarly, EP solutions developed by the Joint services and other Agencies (e.g., the Missile Defense Agency) will also be assessed for potential incorporation into Army AMD systems.

The initial assessment event was conducted in 2QFY15. Subsequent events will be conducted approximately every two (2) years. Analysis and implementation that provide AEA solutions will occur between events and will be assessed at the next event after implementation.

The following tasks were developed based on previous AEPE demonstration results and the following planned activities will assess the AEA impacts on AMD components and development of countermeasures. The tasks for AEPE are: (1) Plan and execute periodic AEPE demonstrations with Army AMD systems and perform post-demonstration analysis. Integrate Joint service and other Agency AMD systems into AEPE demonstrations as appropriate. (2) Upon completion of AEPE demonstration analyses, create EP concepts to mitigate Army AMD sensor, C2, and RF data link vulnerabilities. (3) Develop EP tools for use by Army AMD systems to improve overall system performance in AEA environments. (4) Develop effects-based AEA Modeling and Simulation (M&S) to assess Army AMD EP concepts in Hardware-In-The-Loop (HWIL) environment. (5) Continue to collaborate with United States Strategic Command (USSTRATCOM) Joint Electromagnetic Preparedness for Advanced Combat (JEPAC) to evaluate, modify, and field existing Army AMD EP Tactics, Techniques, and Procedures (TTPs) in a Joint environment. Evaluate and modify applicable Joint EP TTPs for use in Army AMD systems. (6) Continually interface with intelligence communities to maintain cognizance of emerging AEA threats and incorporate these threats in future AEPE demonstrations. (7) Develop a time-phased EP roadmap that identifies the investments needed to improve the EP capabilities of Army AMD sensors, C2, and RF data and voice networks.

The AEPE effort crosses all AMD System efforts of which only a portion is Air Defense Command and Control.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Advanced Electronic Protection Enhancements	16.419	-	-	-	-
<b>Description:</b> Funding is provided for conduct of AEPE planning efforts, conduct of demonstrations and post-mission analysis.					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	<b>Project (Number/Name)</b> 126 / <i>PEO Electronic Protect</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
	<b>Accomplishments/Planned Programs Subtotals</b>	16.419	-	-	-

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

Not applicable for this item.

**D. Acquisition Strategy**

Not applicable for this item.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev				126 / PEO Electronic Protect								
<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Other Government Agencies & Government Program Management	Various	Various : Various	2.252	0.692	Nov 2016	-		-		-		-	Continuing	Continuing	Continuing	
<b>Subtotal</b>			2.252	0.692		-		-		-		-	Continuing	Continuing	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
System Integration Assessment	Various	Various : Various	1.218	2.013	Dec 2016	-		-		-		-	Continuing	Continuing	Continuing	
Concept Solutions	Various	Various : Various	1.531	3.905	Dec 2016	-		-		-		-	Continuing	Continuing	Continuing	
<b>Subtotal</b>			2.749	5.918		-		-		-		-	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Component Assessments & Research and Trade Studies	Various	Various : Various	5.137	3.918	Feb 2017	-		-		-		-	Continuing	Continuing	Continuing	
Modeling and Simulation	Various	Various : Various	3.377	-		-		-		-		-	Continuing	Continuing	Continuing	
<b>Subtotal</b>			8.514	3.918		-		-		-		-	Continuing	Continuing	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Demonstration Planning and Execution	Various	Various : Various	-	5.891	Nov 2016	-		-		-		-	Continuing	Continuing	Continuing	
<b>Subtotal</b>			-	5.891		-		-		-		-	Continuing	Continuing	N/A	

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>						<b>Date: February 2018</b>	
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev			<b>Project (Number/Name)</b> 126 / PEO Electronic Protect	

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	13.515	16.419	0.000	-	-	-	Continuing	Continuing	N/A

**Remarks**



**UNCLASSIFIED**

<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	<b>Project (Number/Name)</b> 126 / <i>PEO Electronic Protect</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
P-11 Demonstration Planning Efforts	[REDACTED]				[REDACTED]																							
P-11 Demonstration	[REDACTED]								[REDACTED]																			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	<b>Project (Number/Name)</b> 126 / <i>PEO Electronic Protect</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
P-11 Demonstration Planning Efforts	1	2017	2	2018
P-11 Demonstration	2	2018	3	2018

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev					<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
146: Air & Msl Defense Planning Control Sys	-	14.987	24.306	24.326	-	24.326	14.300	8.401	2.915	1.228	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Air and Missile Defense Planning and Control System (AMDPCS) is an Army Objective Force System that provides integration of Air and Missile Defense (AMD) operations at all echelons. AMDPCS systems are deployed with Air Defense Artillery (ADA) brigades, Army Air and Missile Defense Commands (AAMDCs), and Air Defense and Airspace Management (ADAM) Cells at the Brigade Combat Teams (BCT's), Multi Functional Support Brigades and Divisions/Corps. AMDPCS systems also provide air defense capabilities to Homeland Defense systems. ADAM Cells provide the Commander at BCTs, Brigades and Divisions with air defense situational awareness and airspace management capabilities. They also provide the interoperability link with Joint, multinational and coalition forces. AMDPCS components are vital in the transformation of ADA units and the activation of the AMD Battalions. AMDPCS has three major components: (1) The Air and Missile Defense Workstation (AMDWS) is an automated defense and staff planning tool that displays the common tactical and operational three dimensional air picture. AMDWS is the air picture provider for the Army, producing an integrated and correlated air picture at all tactical levels and locations. AMDWS is also an integral component of Integrated Base Defense. AMDWS provides an interoperability link to multinational air defense forces; (2) The Air Defense System Integrator (ADSI) is joint data link communications processor and display system that provides near-real time, three dimensional and joint airspace situational awareness for AMD forces; (3) The Army Air Defense shelter configurations use automated data processing equipment, tactical communications, Common Hardware Systems, standard vehicles and tactical power to provide AMD unit commanders and staffs with the capabilities to plan missions, direct forces, and manage airspace. The integration of the Passive Identification, Friend or Foe (PIFF) capability into sheltered systems enables AMDPCS to track self-reporting aircraft. PIFF receives position and identification data from self-reporting aircraft, to include UAS, within 250 nautical miles.

\$24.326M FY 2019 funds the development, software engineering, testing and certification of AMDWS and PIFF software; Engineering, development, test and evaluation of the AMDPCS Family of Shelter (FoS) subsystems; and Software system certification testing, accreditation, and approval of authority-to-operate (ATO).

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> AMDWS Software Development	11.767	12.882	13.359	-	13.359
<b>Description:</b> AMDWS development and support of LandWarNet as well as various Common Operating Environments (COEs). AMDWS software engineering and development are consistent with COE requirements, evolving the air and missile defense planning and control requirements to a net-centric environment, and fulfilling the air defense force operations capabilities identified in the AMD TRADOC capabilities requirement list. Virtualize AMDWS software development and rehost onto COE Real-Time Computing Environment common					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>hardware systems. Support the evolving development of the Force Operations portion of the Integrated Air and Missile Defense (IAMD) System of Systems.</p> <p><b>FY 2018 Plans:</b> Continue AMDWS software engineering consistent with Capability Set 17-18 / COE v3 requirements. Integrate COE AMDWS version, which is the initial Server-client Capability. Integrate the COE AMDWS with the ADAM. Implement interface to the Cooperative Aircraft Surveillance System (CASS) in support of commercial aircraft de-confliction.</p> <p><b>FY 2019 Base Plans:</b> Continue AMDWS software engineering consistent with Capability Set 17-18 / COE v3 requirements. Finalize development of a Windows 10 version of AMDWS, test, and work material release for fielding to replace all Windows 7 AMDWS. Support COE v3 integration activities with both Real Time Safety Critical Embedded Computing Environment (RTSCE CE) and Command Post Computing Environment (CP CE). Continue to implement interface to the Passive Identification, Friend or Foe (PIFF) in support of commercial aircraft de-confliction.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 adjustment due to revised economic assumptions.</p>					
<p><b>Title:</b> Passive Identification, Friend or Foe (PIFF)</p> <p><b>Description:</b> PIFF receives position and identification data from self-reporting aircraft, to include UAS, within 250 nautical miles.</p> <p><b>FY 2018 Plans:</b> Continue system engineering which includes cyber, data at rest, and a new IFF Response Processor (IRP) Card design. This non-recurring engineering effort will support the development of the fielded product for the AMDPCS and Integrated Air and Missile Defense Battle Command Systems (IBCS). CASS components such as the IRP Card will be used to resolve obsolescence issues on the TPX family of Identification Friend or Foe (IFF) interrogators fielded with Patriot, Sentinel, and Air Traffic Navigation and Control Systems (ATNAVICS).</p> <p><b>FY 2019 Base Plans:</b> Continue system engineering which includes cyber, data at rest, and a new IFF Response Processor (IRP) Card design. This non-recurring engineering effort will support the development of a common product for AMDPCS and Integrated Air and Missile Defense Battle Command Systems (IBCS). PIFF components such as the</p>	-	8.200	8.211	-	8.211

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
IRP Card will be used to resolve obsolescence issues on the TPX family of Identification Friend or Foe (IFF) interrogators fielded with Patriot, Sentinel, and Air Traffic Navigation and Control Systems (ATNAVICS).  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 adjustment due to revised economic assumptions.					
<b>Title:</b> ADSI Software Engineering and Development  <b>Description:</b> ADSI software engineering and development of next software baseline (post-v15.0.4), including testing and certification of capabilities for TacView Situational Awareness, with air control support, scenario generation and three dimensional display across various tactical data links. Version 15.0.4 software upgrades the ADSI OS to use Windows 7 and Red Hat Linux. FY17 completes ADSI version 15.0.4 software development and test activities, including certification.	0.313	-	-	-	-
<b>Title:</b> Engineering, Development, Test and Evaluation  <b>Description:</b> Engineering, development, test, and evaluation of the AMDPCS Family of Shelter (FoS) subsystems objective configuration; evaluation and finalization of the AMDPCS tactical communications, data processing and vehicle/shelter/power generation/environmental system block upgrade program for fielded systems.  <b>FY 2018 Plans:</b> Continue evaluations of emerging technologies and obsolescence. Continue support and development of IBCS-ADAM COE configurations and CASS integration/testing at NIE 18.1, 18.2, 19.1 and 19.2.  <b>FY 2019 Base Plans:</b> Continue evaluations of emerging technologies and hardware interoperability. Continue support and development of IBCS-ADAM COE configurations and PIFF integration/testing at NIE 19.1, 19.2, 20.1 and 20.2. Assess system to ensure equipment meets Army requirements IAW Command Post Directed Requirement, 14 Dec 17.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 adjustment due to revised economic assumptions.	1.993	2.227	1.905	-	1.905
<b>Title:</b> Software System Certification Testing, Accreditation, and Approval of Authority-to-Operate (ATO)	0.914	0.997	0.851	-	0.851

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Description:</b> Software system certification testing, accreditation, and approval of ATOs for the various software systems, pursuit of approval of the Host Based Security System (HBSS), SolidCore or other authorized / approved G6 software; Army and Joint integration and interoperability assessments.					
<b>FY 2018 Plans:</b> Continue software systems certification testing, accreditation, and approval of ATOs as required by the DOD Risk Management Framework process. Continue Army and Joint integration and interoperability assessments.					
<b>FY 2019 Base Plans:</b> Continue software systems certification testing, accreditation, and approval of ATOs as required by the DOD Risk Management Framework process. Continue Army and Joint integration and interoperability assessments.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 adjustment due to revised economic assumptions.					
<b>Accomplishments/Planned Programs Subtotals</b>	14.987	24.306	24.326	-	24.326

<b>C. Other Program Funding Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• AD5070: AD5070, AMDPCS	126.539	35.735	33.837	-	33.837	24.983	49.385	68.021	63.273	Continuing	Continuing
• 149: PE 0604741A, Proj 149, Counter-Rockets, Artillery & Mortar	24.899	4.420	1.846	-	1.846	1.277	0.909	-	-	Continuing	Continuing
• H30503: SSN H30503, Rocket, Artillery, Mortar (RAM) Warn (Parent is IFPC Family of Systems: BZ0501)	39.680	11.380	4.131	0.262	4.393	-	-	-	-	0.000	55.453
• H30504: SSN H30504, C-RAM Enhancements (Parent is IFPC Family of Systems: BZ0501)	57.907	-	12.609	-	12.609	9.127	0.703	-	-	0.000	80.346
• DU3: PE 06043019A, Proj DU3, IFPC (FY12 PE0603305A IFPC II - Intercept)	-	11.303	51.030	-	51.030	146.731	132.361	156.732	21.528	Continuing	Continuing
• BZ5075: SSN BZ5075, IAMD Battle Command System	-	-	0.000	-	0.000	72.307	323.680	428.572	497.974	Continuing	Continuing

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys
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**C. Other Program Funding Summary (\$ in Millions)**

<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• E10: PE 0604820A, Proj E10, Sentinel	15.368	32.968	39.338	-	39.338	91.534	96.427	80.394	43.874	Continuing	Continuing
• FG5: PE 0604741A, Proj FG5, Counter Unmanned Aerial Systems (C-UAS)	143.900	-	69.000	119.300	188.300	-	-	-	-	0.000	332.200
• H30505: SSN H30505, Counter Unmanned Aerial Systems (C-UAS)	139.750	67.500	30.000	250.800	280.800	10.000	-	-	-	0.000	498.050

**Remarks**

This program is an integral part of the Army Integrated Air and Missile Defense (IAMD) architecture.

**D. Acquisition Strategy**

The acquisition strategy relies on non-development items (NDI) and evolutionary software development to rapidly meet the demands of air defense battle management command, control, communications, computers, and intelligence (BM/C4I) requirements and to keep pace with automated information technologies. The concept of evolutionary software development will be accomplished in a series of AMDWS Block releases and upgrades. AMDPCS is being developed for both the Army's Active and Reserve components.

AMDWS software development is contracted Sole Source (SS)/Cost Plus Fixed Fee (CPFF) to Northrop Grumman. PIFF development will be competitively awarded.

AMDWS is a prime component of C-RAM. It provides the Forward Operating Base (FOB) commander with clearance of fires display and enemy munitions flight paths.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys
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<b>Management Services (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Program Management Administration	Various	Various : Various	29.814	1.142	Dec 2016	1.094	Dec 2017	1.216	Dec 2018	-		1.216	Continuing	Continuing	Continuing
<b>Subtotal</b>			29.814	1.142		1.094		1.216		-		1.216	Continuing	Continuing	N/A

**Remarks**  
Not Applicable

<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
AMDWS Software Development and Engineering	SS/CPFF	Northrop Grumman : Huntsville AL	132.036	11.615	Oct 2016	13.208	Oct 2017	12.893	Oct 2018	-		12.893	Continuing	Continuing	Continuing
PIFF Development Engineering	C/TBD	To Be Determined : To Be Determined	-	-		6.806	Dec 2017	6.804	Dec 2018	-		6.804	Continuing	Continuing	Continuing
ADSI Software Development and Engineering	SS/T&M	Ultra Electronics : Austin, TX	6.811	0.048	Feb 2017	-		-		-		-	0.000	6.859	-
Developmental Engineering	Various	Various : Various	39.536	2.046	Dec 2016	2.883	Dec 2017	3.092	Dec 2018	-		3.092	Continuing	Continuing	Continuing
<b>Subtotal</b>			178.383	13.709		22.897		22.789		-		22.789	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Certification/Testing	Various	JITC : Ft Huachuca, AZ	1.127	0.055	Feb 2017	0.146	Feb 2018	0.148	Feb 2019	-		0.148	Continuing	Continuing	Continuing
Interoperability Assessment	Various	CTSF : Ft Hood, TX	1.486	0.081	May 2017	0.169	May 2018	0.173	May 2019	-		0.173	Continuing	Continuing	Continuing
<b>Subtotal</b>			2.613	0.136		0.315		0.321		-		0.321	Continuing	Continuing	N/A



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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Army							<b>Date:</b> February 2018				
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev				<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys				
	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>		
<b>Project Cost Totals</b>	210.810	14.987	24.306	24.326	-	24.326	Continuing	Continuing	N/A		

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
AMDWS Block V Contract	[Redacted]																											
AMDWS Software Block Development, Testing, Certification	[Redacted]																											
AMDWS Capability Set (CS) and COE Development / Test	[Redacted]																											
AMDWS AMD Interfaces: C2BMC, C2IS, C2AOS, AOC WS, etc	[Redacted]																											
Passive Identification, Friend or Foe (PIFF) Engineering/Integration	[Redacted]																											
ADSI Software Engineering Development and Test	[Redacted]																											
Army Warfighting Assessment (AWA) 17.1 / NIE 17.2	[Redacted]																											
AWA 18.1 / Network Integration Evaluation (NIE) 18.2	[Redacted]																											
AWA 19.1 / NIE 19.2	[Redacted]																											
AWA 20.1 / NIE 20.2	[Redacted]																											
AWA 21.1 / NIE 21.2	[Redacted]																											
AWA 22.1	[Redacted]																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	<b>Project (Number/Name)</b> 146 / <i>Air &amp; Msl Defense Planning Control Sys</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
AMDWS Block V Contract	2	2011	4	2021
AMDWS Software Block Development, Testing, Certification	3	2007	4	2023
AMDWS Capability Set (CS) and COE Development / Test	1	2013	4	2023
AMDWS AMD Interfaces: C2BMC, C2IS, C2AOS, AOC WS, etc	4	2012	4	2021
Passive Identification, Friend or Foe (PIFF) Engineering/Integration	3	2018	4	2019
ADSI Software Engineering Development and Test	1	2005	4	2017
AWA 16.1 (COE ADAM) DOTMLPF Eval / NIE 16.2	4	2015	3	2016
Army Warfighting Assessment (AWA) 17.1 / NIE 17.2	4	2016	3	2017
AWA 18.1 / Network Integration Evaluation (NIE) 18.2	4	2017	3	2018
AWA 19.1 / NIE 19.2	4	2018	3	2019
AWA 20.1 / NIE 20.2	4	2019	3	2020
AWA 21.1 / NIE 21.2	4	2020	3	2021
AWA 22.1	4	2021	4	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>				<b>Project (Number/Name)</b> 149 / <i>Counter-Rockets, Artillery &amp; Mortar</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
149: <i>Counter-Rockets, Artillery &amp; Mortar</i>	-	24.899	4.420	1.846	-	1.846	1.277	0.909	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Counter-Rocket, Artillery, Mortar (C-RAM) system-of-systems (SoS) is an evolutionary, non-developmental program that detects RAM launches; provides localized warning to the defended area, with sufficient time for personnel to take appropriate action; intercepts rounds in flight, thus preventing damage to ground forces or facilities; and enhances response to and defeat of enemy forces. The C-RAM capability is comprised of a combination of multi-service fielded and non-developmental item (NDI) sensors, command and control (C2) equipment, a commercial industry-produced warning system, and a modified U.S. Navy intercept system (Land-based Phalanx Weapon System (LPWS)), all connected via a wireless local area network. The Forward Area Air Defense Command and Control (FAAD C2) system, also under the management of the C-RAM Program Directorate, provides the C-RAM C2 functionality and has been enhanced to integrate the sensors, weapons, and warning systems for the C-RAM SoS. C-RAM C2 software correlates RAM sensor data, evaluates the threat, provides early warning, directs engagements, and cues counterfire systems and reaction forces. The C-RAM SoS capability is currently deployed at multiple sites in Afghanistan, Iraq, and Egypt, providing correlated air and ground pictures to the Army Mission Command and the Joint Defense Networks, and using various forms of communications to provide situational awareness and exchange of timely and accurate information to synchronize and optimize automated Shape, Sense, Warn, Intercept, Respond, and Protect decisions.

The deployment of the C-RAM SoS was accomplished through an incremental acquisition process driven by urgent operational needs, theater priorities, and emerging capability requirements to provide a counter-RAM capability to combat forces. The C-RAM SoS approach was initially validated by a Proof of Principle demonstration in December 2004 and has undergone more than 25 Army Test and Evaluation Command (ATEC)-supported operational assessments to incorporate multiple improvements in response to changes in threat tactics and lessons learned. C-RAM capabilities are currently deployed to locations in support of Operation Freedom's Sentinel (OFS), Operation Inherent Resolve (OIR), and Task Force Sinai (TFS). Continuing C-RAM SoS improvement efforts, required to meet emerging theater requirements, include C2 and LPWS software upgrades as well as integration and deployment of Ku band Radio Frequency System (KuRFS) radars for an enhanced detection capability against stressing threats. Base RDTE funding for FY 2015 and beyond supports maintenance of C-RAM C2 basic Air Defense functionality. Support of the existing C-RAM SoS capability deployed in theater has been through the Overseas Contingency Operations (OCO) process.

Recent directed enhancements to the C-RAM SoS capability included use of Army tactical communications rather than commercial systems; integration of Warn functionality into the C2 workstation to reduce complexity and footprint; and integration with Unmanned Aircraft Systems (UAS) Universal Ground Control Station (UGCS) for enhanced situational awareness, combat identification, and response options. Additional enhancements include testing and upgrade of dynamic clearance of unplanned fires (DCUF) in conjunction with the Advanced Field Artillery Tactical Data System (AFATDS) V2 for rapid and enhanced response, integration of sensor communications and legacy systems, development and integration of C-RAM network security enhancements, and completion of an LPWS cruise missile capability study and modification development effort.

FY 2019 Base RDT&E dollars in the amount of \$1.846 million provide C-RAM C2 development and enhancements.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 149 / Counter-Rockets, Artillery & Mortar

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p><b>Title:</b> C-RAM C2 Software Development and Enhancements</p> <p><b>Description:</b> Funds system-of-systems development and upgrades based on changes in threat, integration of emerging requirements from PMs within PEO MS as well as other PEOs (Aviation, Command Control Communications-Tactical (C3T), Intelligence Electronic Warfare &amp; Sensors (IEW), etc.) and other Services/agencies, technology insertions (IP-based communications), and interoperability requirements (Joint interoperability, MIL Standard), and provides development and regression testing to ensure C-RAM C2 enhancements do not negatively impact the performance of the other C-RAM pillars (Shape, Sense, Warn, Intercept, Respond, and Protect). Includes Host Based Security System (HBSS)/SolidCore (Information Assurance compliance).</p> <p><b>FY 2018 Plans:</b> Test and validate C-UAS interoperability requirements, continue Integrated Air and Missile Defense (IAMD) convergence, initiate Maneuver Short Range Air Defense (M-SHORAD) requirements planning, incorporate cyber security updates, and provide hardware and software upgrades to National Capital Region (NCR)/Homeland Defense.</p> <p><b>FY 2019 Base Plans:</b> Implement C-UAS and M-SHORAD initiatives and continue IAMD convergence and strategic planning.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 base funding was reduced to account for the availability of prior year execution balances.</p>	4.455	4.420	1.846	-	1.846
<p><b>Title:</b> Dynamic Clearance of Unplanned Fires (DCUF)</p> <p><b>Description:</b> Software enhancement within C-RAM C2 that provides automated airspace assessments to the Advanced Field Artillery Tactical Data System (AFATDS), enabling safer and more rapid clearance of artillery fires at the Brigade level. DCUF enables more effective engagements of unplanned targets, while reducing the risk of aerial fratricide in the prosecution of fire missions.</p>	6.701	-	-	-	-
<p><b>Title:</b> C-RAM Capability Enhancement - LPWS Cruise Missile Capability Study</p> <p><b>Description:</b> Funds capability enhancements to increase the overall effectiveness of the C-RAM system-of-systems through completion of an LPWS cruise missile capability study and modification development efforts.</p>	8.743	-	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	19.899	4.420	1.846	-	1.846

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 149 / Counter-Rockets, Artillery & Mortar
	<b>FY 2017</b>	<b>FY 2018</b>
<b>Congressional Add:</b> C-RAM Capability Enhancement - Network Security Enhancements (Next Gen)	5.000	-
<b>FY 2017 Accomplishments:</b> N/A		
<b>Congressional Adds Subtotals</b>	5.000	-

**C. Other Program Funding Summary (\$ in Millions)**

<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• H30503: SSN H30503, Rocket, Artillery, Mortar (RAM) Warn (Parent is IFPC Family of Systems: BZ0501)	39.680	11.380	4.131	0.262	4.393	-	-	-	-	0.000	55.453
• H30504: SSN H30504, C-RAM Enhancements (Parent is IFPC Family of Systems: BZ0501)	57.907	-	12.609	-	12.609	9.127	0.703	-	-	0.000	80.346
• 146: PE 0604741A, Proj 146, Air & Missile Defense Planning and Control System	14.987	24.306	24.326	-	24.326	14.300	8.401	2.915	1.228	Continuing	Continuing
• AD5070: SSN AD5070, Air & Missile Defense Planning and Control System	126.539	35.735	33.837	-	33.837	24.983	49.385	68.021	63.273	Continuing	Continuing
• DU3: PE 0604319A, Proj DU3, IFPC2 (FY12 PE0603305A IFPC II - Intercept)	-	11.303	51.030	-	51.030	146.731	132.361	156.732	21.528	Continuing	Continuing
• S40: PE 0605457A, Proj S40, Army Integrated Air and Missile Defense (AIAMD)	273.240	336.420	277.607	-	277.607	200.275	130.860	63.741	33.196	Continuing	Continuing
• BZ5075: SSN BZ5075, IAMD Battle Command System	-	-	0.000	-	0.000	72.307	323.680	428.572	497.974	Continuing	Continuing
• E10: PE 060482A, Proj E10, Sentinel	15.368	32.968	39.338	-	39.338	91.534	96.427	80.394	43.874	Continuing	Continuing
• L86: PE 0604823A, Proj L86, Lightweight Counter Mortar Radar (LCMR)	3.064	2.136	4.194	-	4.194	4.913	5.379	3.459	4.288	Continuing	Continuing

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 149 / Counter-Rockets, Artillery & Mortar
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**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• L88: PE 0604823A, Proj L88, Enhanced AN/TPQ-36	3.113	7.469	5.662	-	5.662	8.245	8.914	9.132	9.624	0.000	52.159
• B05201: SSN B05201, Lightweight Counter Mortar Radar (LCMR)	125.145	20.459	9.165	-	9.165	-	-	8.326	7.380	Continuing	Continuing
• B05310: SSN B05310, Enhanced AN/TPQ-36	297.509	329.057	162.121	165.200	327.321	11.120	5.972	6.279	30.244	Continuing	Continuing
• FG5: PE 0604741A, Proj FG5, Counter Unmanned Aerial Systems (C-UAS)	143.900	-	69.000	119.300	188.300	-	-	-	-	Continuing	Continuing
• H30505: SSN H30505, Counter Unmanned Aerial Systems (C-UAS) Efforts	139.750	67.500	30.000	250.800	280.800	10.000	-	-	-	Continuing	Continuing

**Remarks**

This program is an integral part of the Army Integrated Air and Missile Defense (IAMD) architecture.

**D. Acquisition Strategy**

The C-RAM program is following an evolutionary acquisition strategy for rapid fielding of mature technology to the user. The objective of the strategy is to balance needs, available technology, and resources to quickly provide a robust capability to engage RAM threats. Both C-RAM Intercept (LPWS) and RAM Warn have transitioned to acquisition programs and continue to capitalize on RDTE investments (e.g., reuse/repurpose of Navy interceptor, Future Combat Systems (FCS) sensor technology development for Ku band Radio Frequency System (KuRFS) radar, etc.). Development and upgrade of C-RAM C2 software, to include enhanced capability to support emerging Mission Command requirements, technology insertion, and interoperability, is accomplished through a five-year CPIF contract awarded in April 2015 to Northrop Grumman Mission Systems.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev				149 / Counter-Rockets, Artillery & Mortar							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration	Various	Various : Various	24.373	1.876	Nov 2016	0.353		0.149	Nov 2018	-		0.149	Continuing	Continuing	Continuing
<b>Subtotal</b>			24.373	1.876		0.353		0.149		-		0.149	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
C-RAM C2 Development and Enhancements	C/CPIF	Northrop Grumman : Redondo Beach, CA	95.844	8.795	Apr 2017	2.120		0.895	Apr 2019	-		0.895	Continuing	Continuing	Continuing
Secure Communications	SS/CPFF	Northrop Grumman : Huntsville, AL	9.578	-		-		-		-		-	0.000	9.578	-
Secure Communications (Next Gen)	C/CPFF	TBD : TBD	-	5.000	Mar 2018	-		-		-		-	0.000	5.000	-
LPWS Enhancements	C/CPIF	Raytheon Company : Tucson, AZ	3.500	6.807	Aug 2017	-		-		-		-	0.000	10.307	-
<b>Subtotal</b>			108.922	20.602		2.120		0.895		-		0.895	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Miscellaneous Test Support	Various	Various : Various	20.973	2.421	Nov 2016	0.574		0.242	Jan 2019	-		0.242	Continuing	Continuing	Continuing
End-to-End Modeling & Simulation	SS/CPFF	Northrop Grumman : Redondo Beach, CA	12.748	-		1.373		0.560	Sep 2019	-		0.560	0.000	14.681	-
<b>Subtotal</b>			33.721	2.421		1.947		0.802		-		0.802	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			167.016	24.899		4.420		1.846		-		1.846	Continuing	Continuing	N/A



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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Army							<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>			<b>Project (Number/Name)</b> 149 / <i>Counter-Rockets, Artillery &amp; Mortar</i>				
	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 149 / Counter-Rockets, Artillery & Mortar

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C-RAM System-of-Systems (SoS)	Develop/Enhance C-RAM SoS (Sense & Warn, Intercept) per Theater ONS / JUON																											
C-RAM C2 Development	C-RAM C2 Development, Updates, Virtualization, & Integration w/IAMD																											
C-RAM Directed Enhancements - Integration & Test					C2 & Warn Improvements, Dynamic Clearance of Unplanned Fire (DCUF)																							
C-RAM Enhancements - Integration & Test	Sensor Integ., LPWS Cruise Missile Defense Study, Network Security Enhancements																											
LPWS Sp. 6.4.1 Urgent Materiel Release (UMR)					1 LPWS Sp. 6.4.1 UMR																							
C-RAM C2 v5.5C-2.2p3 Full Software Release					2 v5.5C-2.2p3 Full S/W Release																							
C-RAM C2 v5.6A Full Materiel Release (FMR)					3 v5.6A FMR																							
C-RAM Intercept Logistics Demonstration																	4 C-RAM Intercept Log Demo											
LPWS Sp. 6.4.1 Operational Assessment (OA)																	4 LPWS Sp. 6.4.1 OA											
Transition to Sustainment																	Transition to Sustainment											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	<b>Project (Number/Name)</b> 149 / <i>Counter-Rockets, Artillery &amp; Mortar</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
C-RAM System-of-Systems (SoS)	1	2007	4	2019
C-RAM C2 Development	1	2013	4	2019
C-RAM Directed Enhancements - Integration & Test	1	2012	4	2017
C-RAM Enhancements - Integration & Test	1	2016	2	2019
LPWS Sp. 6.4.1 Urgent Materiel Release (UMR)	4	2017	4	2017
C-RAM C2 v5.5C-2.2p3 Full Software Release	2	2018	2	2018
C-RAM C2 v5.6A Full Materiel Release (FMR)	3	2018	3	2018
C-RAM Intercept Logistics Demonstration	4	2018	4	2020
LPWS Sp. 6.4.1 Operational Assessment (OA)	4	2019	4	2019
Transition to Sustainment	1	2020	4	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev			<b>Project (Number/Name)</b> FG5 / Counter Unmanned Aerial Systems (CUAS)				
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
FG5: Counter Unmanned Aerial Systems (CUAS)	-	143.900	0.000	69.000	119.300	188.300	0.000	0.000	0.000	0.000	0.000	332.200
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

For transparency and in support of the Counter Unmanned Aircraft System (C-UAS) Joint Operational Needs (JUON) CC-0558, Project FG5 was created in FY 2017 to support the identification, development, testing, evaluation and integration of technologies to provide an overall evolutionary capability to defeat small Unmanned Aircraft System (UAS) threats. The C-UAS effort will provide the capability for the warfighter to comprehensively detect, track, identify and defeat enemy Groups 1 and 2 light weight, low altitude Commercial Off-The-Shelf (COTS) UAS. The C-UAS effort involves a phased development and testing approach to spiral capability into CENTCOM. The incremental approach provides interim standalone capability within the first few months and achieves a full networked capability by end of the JUON period.

FY 2019 Base dollars in the amount of \$69.000 million and FY 2019 OCO dollars in the amount of \$119.300 million provides improvement to previously fielded material solutions to enhance capability to detect, track, identify and defeat enemy Groups 1 and 2 light weight, low altitude COTS UAS. Efforts include development, integration, and testing of kinetic, or hard kill, defeat solutions into Low-slow-small UAS Integrated Defeat System (LIDS): 1) development of Coyote medium range seeker; 2) development of lightweight flat panel radar; 3) increase range of mobile gun weapon; and 4) development and integration of multi-function Electronic Warfare (EW) with full On-The-Move (OTM) capability.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Counter UAS Engineering and Dismounted Options	78.700	-	-	-	-
<b>Description:</b> Perform system engineering, testing, integration, and overall support of the C-UAS JUON. Supports test events to inform modifications to deployed and planned systems as well as inform procurement decisions for dismounted systems.					
<b>Title:</b> Counter UAS Kinetic Kill Defeat Options	65.200	-	69.000	119.300	188.300
<b>Description:</b> Development, integration, and test of electronic warfare and kinetic kill defeat options for small UAS Integrated Defeat System.					
<b>FY 2019 Base Plans:</b> Develop, integrate, and test kinetic, or hard kill, defeat solutions into the Low-slow-small UAS Integrated Defeat System (LIDS): 1) develop Coyote medium range seeker; 2) develop lightweight flat panel radar; 3) increase					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> FG5 / Counter Unmanned Aerial Systems (CUAS)

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
range of mobile gun weapon; and 4) develop and integrate multi-function Electronic Warfare (EW) with full On-The-Move (OTM) capability.  <b>FY 2019 OCO Plans:</b> Develop, integrate, and test kinetic, or hard kill, defeat solutions into the Low-slow-small UAS Integrated Defeat System (LIDS): 1) develop Coyote medium range seeker; 2) develop lightweight flat panel radar; 3) increase range of mobile gun weapon; and 4) develop and integrate multi-function Electronic Warfare (EW) with full On-The-Move (OTM) capability.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 increase funds development and testing to provide improved C-UAS capabilities for evolving threats in support of the expansion of JUON CC-0558 which increases the number of CENTCOM sites requiring protection from 18 sites to 90 sites.					
<b>Accomplishments/Planned Programs Subtotals</b>	143.900	-	69.000	119.300	188.300

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• Rapid Acquisition Authority (RAA) 1: Rapid Acquisition Authority (RAA) 1 for Baseline Plan. Source: FY 2017 OCO OMA	65.500	-	0.000	-	0.000	-	-	-	-	0.000	65.500
• Rapid Acquisition Authority (RAA) 2: Rapid Acquisition Authority (RAA) 2 for Acceleration Plan. Source: FY 2017 OCO OMA	76.000	-	0.000	-	0.000	-	-	-	-	0.000	76.000
• H30505: SSN H30505, C-UAS OPA OCO	139.750	67.500	30.000	250.800	280.800	10.000	-	-	-	0.000	498.050

**Remarks**  
All funding supports Counter Unmanned Aircraft System (C-UAS) Joint Operational Needs (JUON) CC-0558.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	<b>Project (Number/Name)</b> FG5 / <i>Counter Unmanned Aerial Systems (CUAS)</i>

**D. Acquisition Strategy**

The C-UAS program is executing an acquisition strategy for rapid fielding of emerging technology and initial fielding to selected sites in CENTCOM. In Phase 1a testing of mature solutions and down selecting was made for entry criteria in Phase 2 which will test fully networked, fixed/mobile capability, sustainable solution and deploy full capability to identified locations. C-UAS is rapidly developing, integrating and deploying materiel solution through contracts awarded January 2017 to Syracuse Research Corporation (SRC) and June 2017 to DRS Sustainment Systems, Inc.

C-UAS will hold four distinct 1 month-long test events in FY19. The events will test system of systems C-UAS approach resulting in four spiral hardware/software development efforts. C-UAS improved capabilities will be delivered incrementally each quarter as they are ready for deployment.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> FG5 / Counter Unmanned Aerial Systems (CUAS)
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	Various	Various : Various	-	12.640	Mar 2017	-		3.547		6.383	Dec 2018	9.930	0.000	22.570	-
<b>Subtotal</b>			-	12.640		-		3.547		6.383		9.930	0.000	22.570	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Counter UAS Systems Development	Various	Various : Various	-	112.451	Jun 2017	-		54.924		94.957	Jan 2019	149.881	0.000	262.332	-
<b>Subtotal</b>			-	112.451		-		54.924		94.957		149.881	0.000	262.332	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test Support	Various	Various : Various	-	18.809	Jun 2017	-		10.529		17.960	May 2019	28.489	0.000	47.298	-
<b>Subtotal</b>			-	18.809		-		10.529		17.960		28.489	0.000	47.298	N/A

			Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	143.900	0.000	69.000	119.300	188.300	0.000	332.200	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	<b>Project (Number/Name)</b> FG5 / <i>Counter Unmanned Aerial Systems (CUAS)</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C-UAS System Development																												
C-UAS Phase 1a Engineering Test																												
C-UAS Phase 1a Record Test																												
C-UAS Phase 2 Engineering Test																												
C-UAS Phase 2 Record Test																												
C-UAS Follow-On Test 1Q																												
C-UAS Follow-On Test 2Q																												
C-UAS Follow-On Test 3Q																												
C-UAS Follow-On Test 4Q																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	<b>Project (Number/Name)</b> FG5 / <i>Counter Unmanned Aerial Systems (CUAS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
C-UAS System Development	1	2017	4	2019
C-UAS Phase 1a Engineering Test	3	2017	3	2017
C-UAS Phase 1a Record Test	4	2017	4	2017
C-UAS Phase 2 Engineering Test	4	2017	1	2018
C-UAS Phase 2 Record Test	2	2018	2	2018
C-UAS Follow-On Test 1Q	1	2019	1	2019
C-UAS Follow-On Test 2Q	2	2019	2	2019
C-UAS Follow-On Test 3Q	3	2019	3	2019
C-UAS Follow-On Test 4Q	4	2019	4	2019

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	17.363	18.562	22.628	-	22.628	10.978	6.986	5.844	5.858	0.000	88.219
361: <i>Intelligence Simulation Systems</i>	-	5.638	6.334	5.347	-	5.347	2.868	0.916	0.340	0.347	0.000	21.790
362: <i>Jnt Land Component Constructive Trng</i>	-	11.725	12.228	17.281	-	17.281	8.110	6.070	5.504	5.511	0.000	66.429

**A. Mission Description and Budget Item Justification**

This program element funds the development of constructive and wargame simulations used to realistically train commanders and their battle staffs on today's complex battlefield conditions.

Project 361 funds the development of the Intelligence Electronic Warfare Tactical Proficiency Trainer (IEWTPT). IEWTPT is a Non-System Training Device (NTSD) which supports intelligence soldier readiness by simulating and stimulating Military Intelligence (MI) organic or surrogate equipment. It enables sustainment of critical individual and collective tasks/skills and is the core of the United States Army Intelligence Center of Excellence (USAICoEs) military Intelligence (MI) holistic training strategy and includes both stand-alone and network enabled training capabilities. IEWTPT provides a realistic Intelligence target environment for Multi-Intelligence disciplines such as All Source Analysis, Signals Intelligence (SIGINT), Imagery Intelligence (IMINT), Human Intelligence (HUMINT), Counterintelligence (CI), Geospatial Intelligence (GEOINT) and must stimulate and emulate multiple Intelligence, Surveillance, Reconnaissance (ISR) platform systems such as: Prophet, Distributed Common Ground Station-Army (DCGS-A); Tactical Ground Station (TGS); and Aerial Intelligence assets such as Enhanced Medium Altitude Reconnaissance and Surveillance System (EMARSS), Airborne Reconnaissance Low-Enhanced (ARL-E), and Guardrail Common Sensor (GRCS). IEWTPT provides training capabilities supporting detailed ISR individual, crew, and collective level mission rehearsals/exercises. IEWTPT can utilize a constructive simulation feed or operate in a stand-alone mode. IEWTPT is composed of two major components: Technical Control Cell (TCC) and the HUMINT Control Cell (HCC). The IEWTPT TCC provides critical Intel enhancements to a constructive simulation to stimulate go-to-war or surrogate ISR systems where system operators/analysts are able to exploit exercise intelligence data during training, just as they would in a "real world" operation.

FY2019 funding supports U.S. Army readiness by developing interface capabilities with Intelligence, Surveillance, Reconnaissance (ISR) platform programs/systems of records to train detailed military intelligence mission essential tasks in a simulation environment. The funds provide the development of web-enabled capabilities and common operating environment/computing environment (COE/CE) migration for Command Post, Sensor, and Cloud requirements for both Human Control Cell (HCC) and Technical Control Cell (TCC).

Project 362, Joint Land Component Constructive Training Capability (JLCCTC) supports Army Title X training worldwide for Army Commanders and their staff at Mission Training Complexes (MTCs), Training and Doctrine Command (TRADOC) facilities, and other customer locations. JLCCTC trains Commanders and their staff in Decisive Actions to include offensive, defensive, stability, and civil support operations. JLCCTC is a software modeling and simulation capability that contributes to Army Training Mission Area by providing appropriate levels of model and simulation resolution and fidelity to support unit collective and combined arms training. The JLCCTC

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>
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provides a composable federation configurable to any combination of models and simulations, as required by training exercise intent/design. The JLCCTC provides accurate representations of tactically and operationally relevant land warfare operations executed in a contemporary Joint operating environment/context in support of Army Training and Readiness.

FY 2019 funding in the amount of \$9.047 million supports development, integration and test, and verification and validation activities of JLCCTC Version 9.0 of the Constructive Simulation Strategy implementation activities to train Commanders and their Staff. This Constructive Simulation Strategy will merge software from two Federations (Multi-Resolution Federation used for Brigade/Division and above exercises and Entity Resolution Federation used for Brigade and below exercises) into a single Federation solution. JLCCTC will continue to support emerging Common Operating Environment / Computing Environment (COE/CE), Mission Command (MC), Information Assurance (IA), and Concurrency warfighter requirements. In addition, JLCCTC will continue to support the integration activities with Live, Virtual, Constructive-Integrated Architecture (LVC-IA) and Combat Training Center Instrumentation System (CTC-IS) to accomplish a Single Federation solution.

FY 2019 funding in the amount of \$8.234 million supports JLCCTC mission command training program simulation upgrades. These upgrades will acquire the capabilities required (and identified by Division/Corps/Senior mentor) to properly replicate the operational environment in the simulation -- i.e. Aviation (Gray Eagle/Shadow/MUM-T); Electronic Warfare, Space, and Cyber. Funding also ensures program remains federated with other Joint capabilities, especially with the Air Force. These efforts will also support Combat Training Center (CTC) Enhancements.

<b>B. Program Change Summary (\$ in Millions)</b>	<b><u>FY 2017</u></b>	<b><u>FY 2018</u></b>	<b><u>FY 2019 Base</u></b>	<b><u>FY 2019 OCO</u></b>	<b><u>FY 2019 Total</u></b>
Previous President's Budget	17.887	18.562	16.792	-	16.792
Current President's Budget	17.363	18.562	22.628	-	22.628
Total Adjustments	-0.524	0.000	5.836	-	5.836
• Congressional General Reductions	-0.007	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.517	-			
• Adjustments to Budget Years	-	-	5.836	-	5.836

**Change Summary Explanation**

Project 362 increased to support JLCCTC mission command training program simulation upgrades required to acquire the capabilities to properly replicate the operational environment in the simulation and to ensure program remains federated with other Joint capabilities.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>					<b>Project (Number/Name)</b> 361 / <i>Intelligence Simulation Systems</i>		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
361: <i>Intelligence Simulation Systems</i>	-	5.638	6.334	5.347	-	5.347	2.868	0.916	0.340	0.347	0.000	21.790
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This program element funds the Intelligence & Electronic Warfare Tactical Proficiency Trainer (IEWTPT), a Non-System Training Device (NSTD), supports training intelligence soldiers by simulating and stimulating Military Intelligence (MI) organic or surrogate equipment. It enables sustainment of critical individual and collective tasks/skills and is the core of the United States Army Intelligence Center of Excellence (USAICoEs) Military Intelligence (MI) holistic training strategy and includes both stand-alone and network enabled training capabilities. IEWTPT provides a realistic Intelligence target environment for Multi-Intelligence disciplines such as Signals Intelligence (SIGINT), Imagery Intelligence (IMINT), Human Intelligence (HUMINT), Counterintelligence (CI), Geospatial Intelligence (GEOINT) and All Source intelligence. It stimulates multiple Intelligence, Surveillance, Reconnaissance (ISR) platform systems such as: PROPHET, Distributed Common Ground Station-Army (DCGS-A); Tactical Ground Station (TGS); and Aerial Intelligence assets such as: Enhanced Medium Altitude Reconnaissance and Surveillance System (EMARSS); Airborne Reconnaissance Low-Enhanced (ARL-E); and Guardrail Common Sensor (GRCS). IEWTPT provides static and dynamic training capabilities (interactive environment for individual, crew, collective, Live, Virtual, and Constructive integrated mission rehearsals/exercises utilizing a constructive simulation feed) in an integrated, playback, or stand-alone mode. IEWTPT is composed of two major components: Technical Control Cell (TCC) and the HUMINT Control Cell (HCC). The IEWTPT TCC provides critical Intel enhancements to a constructive simulation to stimulate go-to-war or surrogate ISR systems where system operators/analysts are able to exploit exercise intelligence data during training, just as they would in a "real world" operation.

FY 2019 funding supports U.S. Army readiness by developing interface capabilities with Intelligence, Surveillance, Reconnaissance (ISR) platform programs/systems of records to train detailed military intelligence mission essential tasks in a simulation environment. The funds provide the development of web-enabled capabilities and common operating environment/computing environment (COE/CE) migration for Command Post, Sensor, and Cloud requirements for both the Human Control Cell (HCC) and Technical Control Cell (TCC).

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> IEWTPT development, integration and support.	4.809	5.505	5.347
<b>Description:</b> Continue IEWTPT development, integration and support to the user community.			
<b>FY 2018 Plans:</b> Will support V8.0 release for the development of detailed simulation interface capabilities for Intelligence, Surveillance, Reconnaissance (ISR) platform programs/systems in the PEO Intelligence Electronic Warfare & Sensors portfolio to support home-station intelligence training. The main effort will be to expand all source intelligence development in IEWTPT that support the training requirements for the all source analysis mission. Expand HUMINT, point of need, web-based training capabilities.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 361 / <i>Intelligence Simulation Systems</i>

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019
<p>Refine SIGINT capabilities and evolve sensor emulation effects modeling as well as electronic intelligence replication for the simulation /user environment. Develop and integrate new Aerial ISR communications intelligence sensor emulation capabilities such as dismounted moving target indicator (DMTI) and improved synthetic aperture radar into program baseline representing Enhanced Medium Altitude Reconnaissance Surveillance System (EMARSS) and Guardrail Common Sensor (GRCS) capabilities. Will execute technology development and integration supporting product deliverables needed to meet Ft. Huachuca and Army G2 training strategy requirements. Develop linkages to migrate to designated Core Data Center/Common Operating Environment/ Computing Environments.</p> <p><b>FY 2019 Plans:</b> Will support V9.0 release and baseline improvements in development of detailed simulation interface capabilities for Intelligence, Surveillance, Reconnaissance (ISR) platform systems in the PEO Intelligence Electronic Warfare &amp; Sensors (PEO IEW&amp;S) portfolio to support home-station intelligence training. Additionally, FY19 will prototype a cloud enabled training portal for the TCC and multi-intelligence training in a distributed/federated environment. Key activities will be to develop All Source, SIGINT, and Electronic Warfare, prototypes and Open Source (OSINT) intelligence initial capabilities. Expand HUMINT, point of need, web-based, training capabilities, SIGINT scenario development tools, capabilities and evolve sensor emulation effects modeling as well as electronic intelligence replication for the simulation /user environment. Develop and integrate new Aerial ISR communications intelligence sensor emulation capabilities such as dismounted moving target indicator (DMTI) and improved synthetic aperture radar into program baseline representing Enhanced Medium Altitude Reconnaissance Surveillance System (EMARSS) and Guardrail Common Sensor (GRCS) capabilities. Will execute technology development and integration supporting product deliverables needed to meet Ft. Huachuca and Army G2 training strategy requirements. Develop linkages to migrate to designated Core Data Center/Common Operating Environment/Computing Environments.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funds realigned to higher priority requirements.</p>			
<p><b>Title:</b> Program Management for the Intelligence Electronic Warfare Tactical Proficiency Trainer (IEWTPT).</p> <p><b>Description:</b> Government Program Management for the IEWTPT program.</p> <p><b>FY 2018 Plans:</b> Will provide for the continuation of program oversight, lifecycle management planning, and Combat Developer support. Will enable the configuration control and oversight of interfaces with complementary programs. Will allow continuous participation in planning, integration, and testing of IEWTPT components in a federation (family of systems) environment. Will cover technology insertion studies and reviews of deliverables needed to be ready for contract award for the program.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b></p>	0.829	0.829	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 361 / <i>Intelligence Simulation Systems</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Decrease from FY18 to FY19 due to Dept of the Army Civilian labor costs moved to Operations & Maintenance, Army appropriation.			
<b>Accomplishments/Planned Programs Subtotals</b>	5.638	6.334	5.347

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• TBWG, OMA 121: TBWG, OMA 121	4.270	3.483	2.704	-	2.704	2.767	2.758	0.006	0.005	Continuing	Continuing
• NA0102: <i>NSTD INTELLIGENCE</i>	5.377	6.693	4.658	-	4.658	4.659	1.703	-	-	0.000	23.090

**Remarks**

**D. Acquisition Strategy**

A full and open competitive five (5) year, cost type procurement contract, was awarded to General Dynamics Mission Systems, Orlando, FL on 16 February 2017. The IEWTPT Increment I/Block II contract has a two (2) year base with three (3) one (1) year options. The contract continues the incremental development, integration, test and evaluation, production and fielding and exercise/technical/training support for the US Army Military Intelligence Corps. The FY19 funds will provide continued version 9.0 development, testing, cyber security, production, integration, fielding, training, hardware/software updates, and exercise support of the IEWTPT system. Software version releases are planned, as well as engineering for product improvement maintenance releases.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604742A / Constructive Simulation Systems Development				Project (Number/Name) 361 / Intelligence Simulation Systems							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	PEO STRI : Orlando, FL	9.360	0.829	Oct 2016	0.829		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			9.360	0.829		0.829		-		-		-	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
TCC Technology	C/CPFF	General Dynamics C4 Systems : Orlando, Florida	7.900	-		-		-		-		-	Continuing	Continuing	Continuing
TCC Technology	C/CPFF	General Dynamics Mission Systems : Orlando, Florida	-	4.809	Feb 2017	-		5.347	Feb 2019	-		5.347	Continuing	Continuing	Continuing
Eng & Manufacturing Dev.	Option/CPFF	General Dynamics C4 Systems : Orlando, FL	58.560	-		5.505		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			66.460	4.809		5.505		5.347		-		5.347	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering & Technical Support	Various	Various : Various	2.743	-		-		-		-		-	0.000	2.743	2.743
<b>Subtotal</b>			2.743	-		-		-		-		-	0.000	2.743	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>											<b>Date: February 2018</b>				
<b>Appropriation/Budget Activity</b> 2040 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>					<b>Project (Number/Name)</b> 361 / <i>Intelligence Simulation Systems</i>				

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>		<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>			
TEMP Support	Various	Multiple : Various	0.319	-		-		-		-		-	0.000	0.319	0.319	
Test Engineering Support	Various	Multiple : Various	1.313	-		-		-		-		-	0.000	1.313	1.313	
<b>Subtotal</b>			1.632	-		-		-		-		-	0.000	1.632	N/A	
<b>Project Cost Totals</b>			80.195	5.638		6.334		5.347		-		5.347	Continuing	Continuing	N/A	

**Remarks**



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 361 / <i>Intelligence Simulation Systems</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
TCC/HCC Development/Integration/Test																													
Version 7.0 Security Accred.	▲ 1																												
Version 7.0 Release		▲ 2																											
Version 8.0 Security Accred.					▲ 3																								
Version 8.0 Release							▲ 4																						
Version 9.0 Security Accred.									▲ 5																				
Version 9.0 Release										▲ 6																			
Version 10.0 Security Accred.											▲ 7																		
Version 10.0 Release												▲ 8																	
FOC															▲ 9														

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 361 / <i>Intelligence Simulation Systems</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
TCC/HCC Development/Integration/Test	4	2007	4	2023
Version 7.0 Security Accred.	2	2017	2	2017
Version 7.0 Release	3	2017	3	2017
Version 8.0 Security Accred.	3	2018	3	2018
Version 8.0 Release	4	2018	4	2018
Version 9.0 Security Accred.	3	2019	3	2019
Version 9.0 Release	4	2019	4	2019
Version 10.0 Security Accred.	3	2020	3	2020
Version 10.0 Release	4	2020	4	2020
FOC	4	2020	4	2020

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>				<b>Project (Number/Name)</b> 362 / <i>Jnt Land Component Constructive Trng</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
362: <i>Jnt Land Component Constructive Trng</i>	-	11.725	12.228	17.281	-	17.281	8.110	6.070	5.504	5.511	0.000	66.429
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Joint Land Component Constructive Training Capability (JLCCTC) supports Army Title X training worldwide for Army Commanders and their staff at Mission Training Complexes (MTCs), Training and Doctrine Command (TRADOC) facilities, and other customer locations. JLCCTC trains Commanders and their staff in Decisive Actions to include offensive, defensive, stability, and civil support operations. JLCCTC is a software modeling and simulation capability that contributes to Army Training Mission Area by providing appropriate levels of modeling and simulation resolution and fidelity to support unit collective and combined arms training. JLCCTC provides a composable federation configurable to any combination of models and simulations, as required by training exercise intent/design. JLCCTC provides accurate representations of tactically and operationally relevant land warfare operations executed in a contemporary Joint operating environment/context and in support of Army Training and Readiness.

FY 2019 funding in the amount of \$9,047 million supports development, integration and test, and verification and validation activities of JLCCTC Version 9.0 of the Constructive Simulation Strategy implementation activities to train Commanders and their Staff. This Constructive Simulation Strategy will merge software from two Federations (Multi-Resolution Federation used for Brigade/Division and above exercises and Entity Resolution Federation used for Brigade and below exercises) into a single Federation solution. JLCCTC will continue to support emerging Common Operating Environment / Computing Environment (COE/CE), Mission Command (MC), Information Assurance (IA), and Concurrency warfighter requirements. In addition, JLCCTC will continue to support the integration activities with Live, Virtual, Constructive-Integrated Architecture (LVC-IA) and Combat Training Center Instrumentation System (CTC-IS) to accomplish a Single Federation solution.

FY 2019 funding in the amount of \$8.234 million supports JLCCTC mission command training program simulation upgrades. These upgrades will acquire the capabilities required (and identified by Division/Corps/Senior mentor) to properly replicate the operational environment in the simulation -- i.e. Aviation (Gray Eagle/Shadow/MUM-T); Electronic Warfare, Space, and Cyber. Funding also ensures program remains federated with other Joint capabilities, especially with the Air Force. These efforts will also support Combat Training Center (CTC) Enhancements.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Improve JLCCTC software models to comply with emerging Common Operating Environment (COE)/Computing Environment (CE) requirements.	0.900	1.300	0.978
<b>Description:</b> Improve JLCCTC software models to comply with emerging COE/CE requirements.			
<b>FY 2018 Plans:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 362 / <i>Jnt Land Component Constructive Trng</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>Will continue improvements of JLCCTC software models to include common overlay development/modifications in support of COE compliance/standards.</p> <p><b>FY 2019 Plans:</b> Will continue improvements of JLCCTC software models to include common overlay development/modifications in support of COE compliance/standards.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Accomplished additional work in FY 18, which reduced FY 19 requirement.</p>				
<p><b>Title:</b> Improve JLCCTC software models to meet emerging Mission Command (MC) stimulation and Information Assurance (IA) requirements.</p> <p><b>Description:</b> Improve JLCCTC software models to meet emerging Mission Command (MC) stimulation and Information Assurance (IA) requirements.</p> <p><b>FY 2018 Plans:</b> Continue to evolve JLCCTC to support emerging Mission Command requirements and fully comply with the Information Assurance Risk Management Framework (RMF) requirement.</p> <p><b>FY 2019 Plans:</b> Continue to evolve JLCCTC to support emerging Mission Command requirements and fully comply with the Information Assurance Risk Management Framework (RMF) requirement.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Accomplished additional work in FY 18, which reduced FY 19 requirement.</p>		1.539	1.512	1.030
<p><b>Title:</b> Improve JLCCTC software models to meet emerging warfighter requirements for Concurrency of Commander and staff training (Battalion thru Theater Level).</p> <p><b>Description:</b> Improve JLCCTC software models to meet emerging warfighter requirements for Concurrency of Commander and staff training (Battalion thru Theater Level).</p> <p><b>FY 2018 Plans:</b> Continue to evolve JLCCTC software models to support additional emerging requirements in support of Commander and staff warfighter training exercises through Theater level.</p> <p><b>FY 2019 Plans:</b></p>		1.843	1.892	1.793

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 362 / <i>Jnt Land Component Constructive Trng</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Continue to evolve JLCCTC software models to support additional emerging requirements in support of Commander and staff warfighter training exercises through Theater level. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Accomplished additional work in FY 18, which reduced FY 19 requirement.				
<b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for Constructive Strategy Implementation <b>Description:</b> Constructive Strategy Implementation <b>FY 2018 Plans:</b> Complete the Live, Virtual, Constructive-Integrated Architecture (LVC-IA) integration and incorporate the Combat Training Center Instrumentation System (CTC-IS) capability in support of the Constructive Simulation Strategy (version 8.1 and beginning of version 9.0). <b>FY 2019 Plans:</b> Continue supporting the Live, Virtual, Constructive-Integrated Architecture (LVC-IA) integration and incorporate the Combat Training Center Instrumentation System (CTC-IS) capability in support of the Constructive Simulation Strategy. This will also complete the development of v9.0.		2.165	2.164	2.164
<b>Title:</b> Government System Test and Evaluation for the Joint Land Component Constructive Training Capability (JLCCTC) Program. <b>Description:</b> Government System Test and Evaluation for the Joint Land Component Constructive Training Capability (JLCCTC). <b>FY 2018 Plans:</b> Begin development and integration by conducting system test events (Integration and Testing) in support of a future JLCCTC v9.0 validation event. <b>FY 2019 Plans:</b> Continue conducting system test events (Integration and Testing) in support of the JLCCTC v9.0 validation event.		1.317	1.372	1.372
<b>Title:</b> Government Program Management for the Joint Land Component Constructive Training Capability (JLCCTC) Program. <b>Description:</b> Supports Government program management, engineering, logistics, contracting support and continues operational evaluation support for JLCCTC. <b>FY 2018 Plans:</b>		3.961	3.988	1.710

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 362 / <i>Jnt Land Component Constructive Trng</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019
Supports Government program management, engineering, logistics, contracting support and continues operational evaluation support for JLCCTC.  <b>FY 2019 Plans:</b> Includes costs for program management, which includes technical engineering and logistics to continue operational evaluation for JLCCTC. Government civilian labor moved to OMA SAG 435 MDEP level.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Civilian Pay funding was moved from RDTE to OMA.			
<b>Title:</b> JLCCTC mission command training program simulation upgrades  <b>FY 2019 Plans:</b> Funding to support JLCCTC mission command training program simulation upgrades that are required to properly replicate the operational environment in the simulation. These efforts will also support Combat Training Center (CTC) Enhancements.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding to support JLCCTC mission command training program simulation upgrades. These upgrades will acquire the capabilities required (and identified by Division/Corps/Senior mentor) to properly replicate the operational environment in the simulation; Electronic Warfare, Space, and Cyber. Funding also ensures program remains federated with other Joint capabilities.	-	-	8.234
<b>Accomplishments/Planned Programs Subtotals</b>	11.725	12.228	17.281

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• TBWG: OMA, 121	10.572	10.900	9.698	-	9.698	9.829	9.935	10.103	9.872	Continuing	Continuing
• NA0103: NSTD	41.959	35.578	38.113	-	38.113	30.467	30.564	31.599	31.050	Continuing	Continuing
<b>COMMAND &amp; CONTROL</b>											

**Remarks**

**D. Acquisition Strategy**

JLCCTC Indefinite Delivery/Indefinite Quantity (ID/IQ) contract was awarded to Lockheed Martin on 27 March 2013. This contract has a period of performance/ordering period of five years with a total ceiling amount not to exceed \$146M. The plan is to award a two-year Delivery Order through 2nd Quarter FY 20. Re-compete activities will begin during FY 18 with a planned award of a new contract by 2nd Quarter FY 20.

Activities under this contract include System Engineering, Software Development, Integration & Test, support to validation events and PDSS/P3I support.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 362 / <i>Jnt Land Component Constructive Trng</i>

JLCCTC produces a major software release/version every 18 to 24 months, which is then distributed/fielded to over 40 MTCs worldwide in support of Army Command and Staff Training.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604742A / Constructive Simulation Systems Development				362 / Jnt Land Component Constructive Trng							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	Various : Various	59.162	3.961	Oct 2016	3.988	Oct 2017	1.798	Oct 2018	-		1.798	Continuing	Continuing	Continuing
<b>Subtotal</b>			59.162	3.961		3.988		1.798		-		1.798	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Constructive Strategy Implementation	C/CPFF	Lockheed Martin : Orlando, FL	3.376	2.165	Jan 2017	2.164		2.076	Jan 2019	-		2.076	Continuing	Continuing	Continuing
Integration of JLCCTC	SS/FFP	Various : Various	56.851	-		-		-		-		-	Continuing	Continuing	Continuing
Improve JLCCTC to meet emerging warfighter requirements.	C/CPFF	Lockheed Martin : Orlando, FL	2.140	1.843	Jan 2017	1.892		1.793	Jan 2019	-		1.793	Continuing	Continuing	Continuing
MC Systems Stimulation and Information Assurance	C/CPFF	Lockheed Martin : Orlando, FL	3.451	1.539	Dec 2016	1.512		1.030	Jan 2019	-		1.030	Continuing	Continuing	Continuing
COE Compliance	C/CPFF	Lockheed Martin : Orlando, FL	1.890	0.900	Dec 2016	1.300		0.978	Jan 2019	-		0.978	Continuing	Continuing	Continuing
JLCCTC mission command training program simulation upgrades	C/CPFF	Lockheed Martin : Orlando, FL	-	-		-		8.234	Jan 2019	-		8.234	Continuing	Continuing	Continuing
<b>Subtotal</b>			67.708	6.447		6.868		14.111		-		14.111	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering & Tech Spt (SE, CM, Lab, Documentation)	Various	Various : Various	11.312	-		-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			11.312	-		-		-		-		-	Continuing	Continuing	N/A



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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army													Date: February 2018		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604742A / Constructive Simulation Systems Development					Project (Number/Name) 362 / Jnt Land Component Constructive Trng					
Test and Evaluation (\$ in Millions)					FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
System T&E (I&T, VE, ORE)	Various	Various : Various	20.798	1.317	Nov 2016	1.372		1.372	Jan 2019	-		1.372	Continuing	Continuing	Continuing
Verification, Validation and Accreditation	Various	Various : Various	13.244	-		-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			34.042	1.317		1.372		1.372		-		1.372	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			172.224	11.725		12.228		17.281		-		17.281	Continuing	Continuing	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 362 / <i>Jnt Land Component Constructive Trng</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
JLCCTC Version 8.1 System Engr / Develop / I&T / Validation	[Redacted]				[Redacted]																											
JLCCTC V8.1 Release	Version 8.1				JLCCTC V8.1 Release																											
JLCCTC Version 9.0 System Engr / Develop / I&T / Validation	[Redacted]				[Redacted]				[Redacted]																							
JLCCTC Version 9.0 Release	[Redacted]				Version 9.0				JLCCTC V9.0 Release																							
JLCCTC Version 10.0 System Engr / Develop / I&T / Validation	[Redacted]				[Redacted]				[Redacted]				[Redacted]																			
JLCCTC Version 10.0 Release	[Redacted]				[Redacted]				[Redacted]				Version 10.0				JLCCTC V10.0 Release															
JLCCTC Integration into LVC-IA	LVC-IA Integration																															
JLCCTC Constructive Strategy Implementation (Single Federation)	JLCCTC Constructive Strategy Implementation (Single Federation)																															
JLCCTC Version 11.0 Sys Engr/ Develop/ I&T/ Validation	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
JLCCTC Version 11.0 Release	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				Version 11.0				JLCCTC			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 362 / <i>Jnt Land Component Constructive Trng</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
JLCCTC V5.6 / V7.1 / V8.0 System Engr / Develop / I&T / Validation	4	2014	4	2016
JLCCTC Version 8.1 System Engr / Develop / I&T / Validation	4	2016	4	2017
JLCCTC V8.1 Release	4	2017	4	2017
JLCCTC Version 9.0 System Engr / Develop / I&T / Validation	1	2018	4	2019
JLCCTC Version 9.0 Release	4	2019	4	2019
JLCCTC Version10.0 System Engr / Develop / I&T / Validation	1	2020	4	2021
JLCCTC Version 10.0 Release	4	2021	4	2021
JLCCTC Integration into LVC-IA	1	2014	4	2022
JLCCTC Constructive Strategy Implementation (Single Federation)	2	2016	4	2019
JLCCTC Version 11.0 Sys Engr/ Develop/ I&T/ Validation	1	2022	4	2023
JLCCTC Version 11.0 Release	4	2023	4	2023

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	8.503	8.344	13.297	-	13.297	10.915	9.880	10.039	9.506	Continuing	Continuing
L59: <i>Diagnost/Expert Sys</i>	-	5.831	5.883	7.579	-	7.579	6.369	5.946	5.984	5.371	Continuing	Continuing
L65: <i>Test Equipment Development</i>	-	2.672	2.461	5.718	-	5.718	4.546	3.934	4.055	4.135	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

This program element (PE) provides for development and testing of general-purpose test equipment, state-of-the-art diagnostics and prognostics technologies, and software and systems to support the increasingly complex electronic components of the Army's new and upgraded weapon systems. It focuses on implementation of commercial test and diagnostic technologies across multiple weapon platforms to minimize the cost of troubleshooting and maintenance of Army equipment in the field.

Modular, reconfigurable automatic and semi-automatic systems are being developed under this program to satisfy weapon system test and diagnostics requirements. The Next Generation Automatic Test System (NGATS) provides state-of-the-art test and diagnostic capabilities to support current and future weapon systems. It is the platform for transitioning Agile Rapid Global Combat Support System (ARGCS) technologies into the Army weapon system support structure, and it will replace several aging automatic test systems (ATS) that are becoming prohibitively expensive to operate and maintain.

This PE also provides for continued development and improvement of general-purpose test equipment and calibration standards with emphasis on the incorporation of digital electronics and tailoring of configurations to improve deployability, mobility and survivability of the support equipment. It includes development, demonstration and testing of calibration standards and techniques to support new Army test equipment requirements. It provides for feasibility studies, market research, inventory analyses, bid sample testing and prototyping to support acquisition of calibration systems and general-purpose test and diagnostics equipment.

FY 2019 Base funding for this PE continues incremental development of the Army's standard NGATS which will improve deployability and mobility of test and diagnostic equipment. The NGATS provides state-of-the-art test and diagnostic capabilities and a means for reducing the Army's test equipment operating and support costs and the costs for supporting a number of the Army's vital warfighting systems. The FY 2019 funding will develop or significantly modify test equipment to satisfy modular force and homeland security support requirements that cannot be accommodated with test equipment currently available in the commercial marketplace such as radio frequency (RF) and electro-optic (EO) testing capability. It will also provide for technology enhancements to the Army's standard at-system tester to meet test and diagnostic requirements of the supported weapon systems, develop/redesign test program sets and hardware for support of legacy and emerging weapon systems, develop a network centric software framework for NGATS, and develop and test general-purpose test equipment and calibration standards to meet Army weapon system support requirements.

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	8.813	8.344	14.464	-	14.464
Current President's Budget	8.503	8.344	13.297	-	13.297
Total Adjustments	-0.310	0.000	-1.167	-	-1.167
• Congressional General Reductions	-0.004	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.306	-			
• Adjustments to Budget Years	-	-	-1.167	-	-1.167

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>				<b>Project (Number/Name)</b> L59 / <i>Diagnost/Expert Sys</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L59: <i>Diagnost/Expert Sys</i>	-	5.831	5.883	7.579	-	7.579	6.369	5.946	5.984	5.371	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This Project funds development of and system enhancements for the Next Generation Automatic Test System (NGATS) and the Maintenance Support Device (MSD). The NGATS is a general-purpose automatic test system (ATS) that provides test and diagnostic capabilities required to support current and future weapons and combat support systems and will facilitate retirement of aging and obsolete test equipment that is imposing increasing logistics and operations and support cost burdens. It is the platform for transitioning Agile Rapid Global Combat Support System (ARGCS) Advanced Concept Technology Demonstration (ACTD) technologies into the Army weapon system support structure. The ARGCS ACTD initiative was sponsored by the Department of Defense, and all Services are expected to transition demonstrated technologies into their ATS programs. The MSD is the Army's standard at-system tester and requires continuing upgrades to support technology advancements in the supported weapon systems. This Project funds development efforts to incorporate the most current relevant technology into the next generation MSD, supports capability enhancement of a wireless at-platform test set (WATS) connectivity, develops capabilities to minimize or eliminate Army dependency on expensive proprietary software to support tactical vehicles, and maintains compatibility with emerging platform hardware bus technology and software interface requirements. This Project also provides for continuing efforts in the development and testing of common procedures utilizing existing test program sets and software applications, and market surveys of commercially available test equipment, methods and procedures to determine applicability to Army requirements. The test and diagnostic systems and procedures developed under this Project are essential for ensuring the operational readiness, accuracy and effectiveness of the Army's warfighting systems.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Next Generation Automatic Test System (NGATS) Radio Frequency (RF) Test Capability	0.800	1.000	2.000	-	2.000
<b>Description:</b> Develop and integrate NGATS RF test capability					
<b>FY 2018 Plans:</b> Continue prototyping and integration of RF subsystem into the NGATS, specifically the RF Interface Unit and the full-rate production NGATS configuration. Develop RF software libraries to support programs such as Counter Radio-Controlled Improvised Explosive Device (RCIED) Electronic Warfare (CREW)/Duke, TPQ-53 Radar and other emerging weapons systems.					
<b>FY 2019 Base Plans:</b> Continue prototyping and integration of RF subsystem into the NGATS, specifically the RF Interface Unit and the full-rate production NGATS configuration. Develop RF software libraries to support programs such as Counter					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L59 / <i>Diagnost/Expert Sys</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Radio-Controlled Improvised Explosive Device (RCIED) Electronic Warfare (CREW)/Duke, TPQ-53 Radar and other emerging weapons systems.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase of \$1.000 million from FY2018 to FY2019 to meet schedule requirements for availability of the capabilities needed for weapon system support.					
<b>Title:</b> NGATS Increment 2  <b>Description:</b> Develop and test hardware and software for NGATS Increment 2 support capability  <b>FY 2018 Plans:</b> Continue development and testing of hardware and software for support of emerging required capabilities such as high-speed digital, fiber channel, high-speed Ethernet and serial busses, and high power test (600V). Develop new software libraries to utilize instrument functions.  <b>FY 2019 Base Plans:</b> Continue development and testing of hardware and software for support of emerging required capabilities such as high-speed digital, fiber channel, high-speed Ethernet and serial busses, and high power test (600V). Develop new software libraries to utilize instrument functions.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase of \$0.118 million from FY2018 to FY2019 to accommodate required efforts.	0.497	0.382	0.500	-	0.500
<b>Title:</b> NGATS Electro-Optics (EO) Subsystem  <b>Description:</b> Develop and test hardware and software for NGATS electro-optics (EO) subsystem (to include the capability to support new ground and aerial sensors for unmanned air and ground vehicles)  <b>FY 2018 Plans:</b> Continue integration/testing of EO subsystem.  <b>FY 2019 Base Plans:</b> Complete integration/testing of EO subsystem.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>	0.500	0.700	1.000	-	1.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army				<b>Date:</b> February 2018	
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>		<b>Project (Number/Name)</b> L59 / <i>Diagnost/Expert Sys</i>	
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Increase of \$0.300 million from FY2018 to FY2019 to allow completion of this effort as scheduled.					
<b>Title:</b> Developmental and Operational Follow-on Testing of NGATS Increment 1 Capability (provides Abrams/Bradley/Stryker support capability)					
<b>Description:</b> Complete developmental and operational follow-on testing activities					
<b>Title:</b> Additional Software Capabilities for Use with NGATS					
<b>Description:</b> Develop software capabilities to incorporate common logistics operating environment/netcentric and embedded diagnostics data collection and analysis for closed loop diagnostic maintenance in support of condition-based maintenance					
<b>FY 2018 Plans:</b> Develop new and emerging netcentric architecture. Develop software architecture that will define the transport protocol to interface to DoD common logistics environments and Logistics Modernization Program (LMP). Develop and improve data packages to include health management information.					
<b>FY 2019 Base Plans:</b> Continue development of new and emerging netcentric architecture. Continue development of software architecture that will define the transport protocol to interface to DoD common logistics environments and Logistics Modernization Program (LMP). Develop and improve data packages to include health management information.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase of \$0.073 million from FY2018 to FY2019 to accommodate required efforts.					
<b>Title:</b> NGATS Performance Enhancement					
<b>Description:</b> NGATS core instrument/software modifications to increase NGATS performance					
<b>FY 2018 Plans:</b> Continue obsolescence identification and mitigation; continue analysis of system reliability and performance; identify bad actors and propose and integrate upgrades to increase readiness. Analyze new requirements from emerging weapons systems and implement system upgrades through hardware and software to meet platform					



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army				<b>Date:</b> February 2018	
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>		<b>Project (Number/Name)</b> L59 / <i>Diagnost/Expert Sys</i>	
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
testing requirements. Implement and test controller upgrade to increase processor speed to support Win10 implementation. Redesign cables for better logistic support and cost savings.					
<b>FY 2019 Base Plans:</b> Continue obsolescence identification and mitigation; continue analysis of system reliability and performance; identify bad actors and propose and integrate upgrades to increase readiness. Analyze new requirements from emerging weapons systems and implement system upgrades through hardware and software to meet platform testing requirements. Continue implementation and test of controller upgrade to increase processor speed to support Win10 implementation. Redesign cables for better logistic support and cost savings.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase of \$0.200 million from FY2018 to FY2019 to enable timely identification and implementation of modifications needed to meet weapon system support requirements..					
<b>Title:</b> Abrams/Bradley Test Program Set (TPS) Design					
<b>Description:</b> Design, test and evaluate Abrams/Bradley TPSs to utilize modern core NGATS instrumentation vice continuing to execute on single-purpose instrumentation specifically developed to emulate Abrams/Bradley legacy test equipment (i.e., Direct Support Electrical System Test Set (DSESTS))					
<b>FY 2018 Plans:</b> Continue redesign of Abrams/Bradley TPSs to execute on core commercial NGATS instrumentation versus continuing to execute on single-purpose instrumentation specifically developed for testing Abrams/Bradley line replaceable units (LRU).					
<b>FY 2019 Base Plans:</b> Continue redesign of Abrams/Bradley TPSs to execute on core commercial NGATS instrumentation versus continuing to execute on single-purpose instrumentation specifically developed for testing Abrams/Bradley line replaceable units (LRU).					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease of \$0.800 million from FY2018 to FY2019 because of higher priority funding requirements.					
<b>Title:</b> Electro-Optic (EO) TPS Development					
	0.750	1.800	1.000	-	1.000
	0.450	0.250	0.500	-	0.500

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / Automatic Test Equipment Development	<b>Project (Number/Name)</b> L59 / Diagnost/Expert Sys

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p><b>Description:</b> Develop Increment 2 and 3 EO TPSs for use with NGATS EO asset to utilize (Army standard) core NGATS instrumentation vice legacy automatic test systems such as DSESTS and Base Shop Test Facility (BSTF)(V)5</p> <p><b>FY 2018 Plans:</b> Continue development of re-hosted EO TPSs to include 2 each CROWS and 2 each Stryker Remote Weapons Station.</p> <p><b>FY 2019 Base Plans:</b> Continue development of re-hosted EO TPSs to include 2 each Common Remotely Operated Weapons Station (CROWS) and 2 each Stryker Remote Weapons Station.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase of \$0.250 million from FY2018 to FY2019 to accommodate weapon system support schedules.</p>					
<p><b>Title:</b> NGATS Logistics Support Products</p> <p><b>Description:</b> Develop NGATS initial logistics support products (including provisioning, technical manuals and calibration)</p> <p><b>FY 2018 Plans:</b> Continue development of NGATS EO and RF logistics products for use with the full-rate production NGATS.</p> <p><b>FY 2019 Base Plans:</b> Complete development of NGATS EO and RF logistics products for use with the full-rate production NGATS.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase of \$0.050 million from FY2018 to FY2019 to accommodate efforts needed to complete products according to schedule.</p>	0.500	0.200	0.250	-	0.250
<p><b>Title:</b> Maintenance Support Device (MSD) Technology Enhancements</p> <p><b>Description:</b> Incorporate current relevant technology into the next-generation MSD and support capability enhancement of the wireless at-platform test set (WATS). Develop capabilities to minimize or eliminate Army dependency on proprietary software to support tactical vehicles and maintain compatibility with emerging platform hardware bus technology and software interface requirements.</p> <p><b>FY 2018 Plans:</b></p>	0.234	0.633	0.633	-	0.633

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L59 / <i>Diagnost/Expert Sys</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>Design a modern vehicle data bus development tool, leveraging the new WATS design. The development tool will minimize the costs of connecting directly to vehicles. This tool allows for quicker and more complete functional testing, along with serving as a much more comprehensive tool for new equipment training. Gather Army test requirements related to MIL-STD-1553 that maintain compatibility with emerging platform hardware bus technology.</p> <p><b>FY 2019 Base Plans:</b> Investigate and validate the emerging hardware and software suitability for use in the next generation of MSD and WATS. Test, develop technical data package, and incorporate innovative technology for use to support the Army's at-platform test and diagnostic requirements of new weapon systems and engineering changes to existing weapon system/platform interface.</p>					
<p><b>Title:</b> NGATS Simulation Environment</p> <p><b>Description:</b> Develop a simulation environment that will allow development and testing of TPSs on a desktop environment</p> <p><b>FY 2019 Base Plans:</b> Initiate development of an NGATS simulation environment to allow TPS developers and contractors to develop and test TPSs on a desktop environment. Environment will allow for a cost-effective way to develop, maintain and troubleshoot TPSs off station. Develop desktop training environment for TPS developers and maintainers.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Development initiation delayed from FY2018 to FY2019 because of funding availability.</p>	-	-	0.418	-	0.418
<p><b>Title:</b> TPS Development Environment</p> <p><b>Description:</b> Develop a standardized TPS development environment for NGATS</p> <p><b>FY 2018 Plans:</b> Continue development on the C-Oriented Test Executive (COTE) TPS development software for NGATS. Continue development of test executive that is standard and compliant with DoD initiatives, framework working group and the Automatic Test Equipment Management Board (AMB). Standardized test executive will promote long-term maintainability of TPSs.</p> <p><b>FY 2019 Base Plans:</b></p>	0.300	0.300	0.500	-	0.500

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / Automatic Test Equipment Development	<b>Project (Number/Name)</b> L59 / Diagnost/Expert Sys
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue development on the COTE TPS development software for NGATS. Continue development of test executive that is standard and compliant with DoD initiatives, framework working group and the AMB. Standardized test executive will promote long-term maintainability of TPSs.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase of \$0.200 million from FY2018 to FY2019 to accommodate required efforts.					
<b>Title:</b> Anti-Tamper/Cyber Security  <b>Description:</b> Develop an Anti-Tamper/Cyber Security software capability for NGATS  <b>FY 2018 Plans:</b> Initiate development of Anti-Tamper/Cyber Security (AT/CS) software capability for NGATS. Continue to upgrade existing hardware and software with constantly changing security and information assurance requirements. Upgrade to Win10 operating system.  <b>FY 2019 Base Plans:</b> Continue development of Anti-Tamper/Cyber Security (AT/CS) software capability for NGATS. Continue to upgrade existing hardware and software with constantly changing security and information assurance requirements. Upgrade to Win10 operating system to include Trusted Platform Module (TPM) 2.0.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease of \$0.113 million from FY2018 to FY2019 to account for availability of funding.	-	0.191	0.078	-	0.078
<b>Accomplishments/Planned Programs Subtotals</b>	5.831	5.883	7.579	-	7.579

<b>C. Other Program Funding Summary (\$ in Millions)</b>										
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete Total Cost</u>
• MB4000: <i>Integrated Family of Test Equipment</i>	35.737	37.644	76.295	9.495	85.790	44.180	49.961	61.827	59.321	Continuing Continuing
<b>Remarks</b>										

**D. Acquisition Strategy**  
This developmental Project consists of organic and contractual actions. When the necessary expertise and capability are available within the Department of Defense, services required for the individual development projects are ordered from the government source; otherwise, commercial contracts are used. Equipment required

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b>	<b>R-1 Program Element (Number/Name)</b>	<b>Project (Number/Name)</b>
2040 / 5	PE 0604746A / <i>Automatic Test Equipment Development</i>	L59 / <i>Diagnost/Expert Sys</i>

for developmental projects is obtained by contract from the commercial supplier. Developmental efforts for the Next Generation Automatic Test System (NGATS) are being completed under a number of contracts awarded to the prime contractor for the Integrated Family of Test Equipment off-platform testers and other contractors with automatic test equipment (ATE) and test program set development capabilities. NGATS is following an evolutionary acquisition strategy using incremental development to satisfy Army depot and field testing requirements for new and existing systems. It will replace existing legacy Army ATE (i.e., Base Shop Test Facility (BSTF)(V)3, BSTF(V)5, and Direct Support Electrical System Test Set) as well as Army depot system-specific ATE.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)							
2040 / 5				PE 0604746A / Automatic Test Equipment Development					L59 / Diagnost/Expert Sys							
<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Project Management	Various	Various : Various	0.150	0.200	Jan 2017	0.246		0.253	Dec 2018	-		0.253	Continuing	Continuing	Continuing	
<b>Subtotal</b>			0.150	0.200		0.246		0.253		-		0.253	Continuing	Continuing	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Software Development/ Verification/Validation	Various	Various, : Various	36.853	1.435	Apr 2017	2.110		3.015	Feb 2019	-		3.015	Continuing	Continuing	Continuing	
Hardware/Support Items Development	Various	Various, : Various	66.419	2.696	Feb 2017	2.547		3.561	Jan 2019	-		3.561	Continuing	Continuing	Continuing	
<b>Subtotal</b>			103.272	4.131		4.657		6.576		-		6.576	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Technical Support	Various	Various, : Various	50.035	0.450	Feb 2017	0.540		0.550	Dec 2018	-		0.550	Continuing	Continuing	Continuing	
Other Direct	Various	Various, : Various	4.190	0.200	Feb 2017	0.240		0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing	
<b>Subtotal</b>			54.225	0.650		0.780		0.750		-		0.750	Continuing	Continuing	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Developmental/ Operational Testing	Various	Various, : Various	2.046	0.850	Nov 2017	0.200		-		-		-	0.000	3.096	-	
<b>Subtotal</b>			2.046	0.850		0.200		-		-		-	0.000	3.096	N/A	
<b>Remarks</b>																
Test program set (TPS) and contractor developmental test and evaluation are included in the product development cost.																

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Army							<b>Date:</b> February 2018				
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604746A / Automatic Test Equipment Development				<b>Project (Number/Name)</b> L59 / Diagnost/Expert Sys				
	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>		
<b>Project Cost Totals</b>	159.693	5.831	5.883	7.579	-	7.579	Continuing	Continuing	N/A		

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / Automatic Test Equipment Development	<b>Project (Number/Name)</b> L59 / Diagnost/Expert Sys

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Full Materiel Release									2 FMR																			
First Unit Equipped									3 FUE																			
Full Rate Production Decision Review									4 FRP-DR																			
NGATS Full-Rate Production (Increment 1)																												
NGATS System Development and Demonstration (SDD) (Increment 1)																												
NGATS Testing (Increment 2)																												
FOT&E Completed (DT)									1																			
NGATS Development (RF Subsystem)																												
NGATS EO Integration																												
NGATS RF Integration																												
NGATS Testing (EO & RF Subsystems)																												
NGATS Product Improvements - Netcentric																												
New Systems Test Capability																												



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date: February 2018</b>		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604746A / Automatic Test Equipment Development		<b>Project (Number/Name)</b> L59 / Diagnost/Expert Sys	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
MSD Technology Enhancements																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / Automatic Test Equipment Development	<b>Project (Number/Name)</b> L59 / Diagnost/Expert Sys

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Full Materiel Release	1	2019	1	2019
First Unit Equipped	1	2019	1	2019
Full Rate Production Decision Review	1	2019	1	2019
NGATS Testing (Increment 1 Follow-On DT/OT)	1	2016	3	2016
NGATS Full-Rate Production (Increment 1)	2	2019	4	2023
NGATS System Development and Demonstration (SDD) (Increment 2)	1	2016	4	2019
NGATS Testing (Increment 2)	1	2016	4	2019
FOT&E Completed (DT)	1	2018	1	2018
NGATS Development (RF Subsystem)	1	2016	4	2019
NGATS EO Integration	3	2016	4	2019
NGATS RF Integration	3	2017	4	2019
NGATS Testing (EO & RF Subsystems)	1	2016	4	2019
NGATS Product Improvements - Netcentric	1	2016	4	2023
New Systems Test Capability	1	2016	4	2023
MSD Technology Enhancements	1	2016	4	2023

**Note**

Test program set (TPS) compatibility testing runs continually throughout the product development process.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>				<b>Project (Number/Name)</b> L65 / <i>Test Equipment Development</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L65: <i>Test Equipment Development</i>	-	2.672	2.461	5.718	-	5.718	4.546	3.934	4.055	4.135	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This Project supports development and demonstration of state-of-the-art calibration standards and techniques, and it upgrades/improves existing Army calibration systems. The Project provides feasibility studies, market research, inventory analyses, bid sample testing, and prototyping to support calibration systems and general-purpose test, measurement, and diagnostic equipment (TMDE) acquisitions. Primary effort of this Project is development of calibration software; calibration capability for electro-optical, chemical, biological agent, radiation sourcing and detection systems, signal measurement and generation from direct current to microwave ranges, and physical and mechanical measurements such as torque, pressure and temperature; and improvements in test and measurement equipment performance envelopes. This Project provides for product improvements and development/evaluation of advanced technologies to increase reliability of calibration systems and general-purpose TMDE. The product improvements eliminate gaps in existing organic capabilities and ensure operational readiness, accuracy, effectiveness, and safety of Army weapons and combat support systems. These improvements employ reconfigurable open-electronics architecture and computer-based instrumentation where feasible and focus on reduced test equipment footprint to improve deployability and mobility in areas of operation.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Calibration Sets (CALSETS) Software Environment and Calibration Procedures	0.774	0.093	1.104	-	1.104
<b>Description:</b> Develop and test an Army automated calibration environment and develop calibration procedures. Test and evaluate automated calibration equipment software efforts in support of the Army risk management framework (RMF).					
<b>FY 2018 Plans:</b> Continue development and evaluation of automated calibration procedures and enhanced calibration environment to version 2.0. Continue development and test of ISO 17025 accreditation reporting capability of the calibration software environment and calibration procedures. Continue test and evaluation of RMF compliance					
<b>FY 2019 Base Plans:</b> Conclude development of calibration procedures and enhanced calibration environment. Continue test and evaluation of RMF compliance.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L65 / <i>Test Equipment Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Reduced funding in FY2018 requires shift to critical Army requirements for weapon systems maintenance in physical and electrical standards. FY2019 allows catch-up level of effort for 800 automated calibration procedures used by the Army Calibration Environment (ACE). Army RMF compliance workload increases significantly with the conclusion of development effort and move to field testing on Army networks.					
<p><b>Title:</b> Physical Instruments</p> <p><b>Description:</b> Research, develop, and test physical parameter calibration instrumentation to support areas such as force, torque, radiological, chemical/biological agent detection systems, night vision testers, small arms gages, pneumatic pressure systems, and temperature related to target detection in the infrared spectrum..</p> <p><b>FY 2018 Plans:</b> Continue development and test of prototype small arms gage calibration standards. Continue development and test of calibration systems for biological agent detectors and protective equipment. Complete development and test of hydrocarbon flow calibration and test standards. Perform market research, evaluate commercial equipment, and complete specifications for acquisition.</p> <p><b>FY 2019 Base Plans:</b> Complete development and testing of prototype small arms gage calibration standards. Complete development and testing of calibration systems for biological agent detectors and protective equipment. Initiate tests of pneumatic standards to support avionics systems. Perform market research, evaluate commercial equipment, and complete specifications for acquisition.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding in FY2019 provides for additional development and testing for pneumatic pressure standards to support critical requirements for avionics systems that measure differential pressure to indicate onboard altitude, airspeed, rate of climb and rate of descent computations.</p>	0.807	1.059	1.544	-	1.544
<p><b>Title:</b> Electrical Instruments</p> <p><b>Description:</b> Research, develop, and test electrical parameter calibration instrumentation to support areas such as deployable recertification set, intrinsic electrical standards, electrical transport standards and electro-optic standards.</p> <p><b>FY 2018 Plans:</b></p>	0.662	0.924	2.685	-	2.685

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L65 / <i>Test Equipment Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>Complete development and test of electrical transport standards. Continue development and test of electro-optic sources for aviation systems maintenance. Develop calibration standards and techniques for automated high accuracy calibration of attenuation, power, resistance, and phase noise.</p> <p><b>FY 2019 Base Plans:</b> Complete development and test of electro-optic sources. Continue development and test of calibration standards and techniques for automated high accuracy calibration of attenuation, power, resistance, and phase noise.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Multiple individual development efforts, some of relatively short duration, are funded through this Project; and, funding is allocated based on the priority of the individual efforts. This results in increases or decreases within the various categories from year to year. FY2019 funding enables development of working prototype systems aimed at closing gaps left by obsolete and unsupported Army equipment in the measurement areas of attenuation, power, resistance and phase noise.</p>					
<p><b>Title:</b> Test Equipment Modernization (TEMOD)</p> <p><b>Description:</b> Perform market research, bid sample testing, and evaluation of commercial general-purpose electronic test equipment (GPETE) and develop performance specifications for TEMOD acquisitions.</p> <p><b>FY 2018 Plans:</b> Perform market research and evaluation of commercial GPETE and validate performance specifications for improved spectrum analysis test equipment. Conduct bid sample testing to support acquisition program.</p> <p><b>FY 2019 Base Plans:</b> Perform market research and evaluation of commercial GPETE and validate performance specifications for improved test equipment. The market research will be expanded to cover emerging synthetic instrumentation to potentially replace multiple pieces of GPETE within one platform. Conduct bid sample testing to support acquisition program.</p>	0.429	0.385	0.385	-	0.385
<b>Accomplishments/Planned Programs Subtotals</b>	2.672	2.461	5.718	-	5.718

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L65 / <i>Test Equipment Development</i>

**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Cost To	
			Base	OCO	Total					Complete	Total Cost
• N10000: <i>Calibration Sets Equipment</i>	4.963	5.564	4.270	-	4.270	3.030	2.514	9.882	2.650	Continuing	Continuing
• N11000: <i>Test Equipment Modernization (TEMOD)</i>	7.482	7.771	9.806	-	9.806	8.915	7.868	10.100	8.459	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

Projects focus on commercial and nondevelopmental item technologies. Department of Defense services provide programmatic, engineering expertise and capability for individual development projects; otherwise, commercial service contracts are used to obtain required capabilities. Equipment required for development projects is obtained from commercial suppliers. Candidate commercial equipment and nondevelopmental items are identified and evaluated through market research and government test and evaluation.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604746A / Automatic Test Equipment Development				Project (Number/Name) L65 / Test Equipment Development								
<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
In-house Engineering	SS/ Various	Various : Various	5.929	0.447	Jan 2017	0.541		0.554	Dec 2018	-		0.554	Continuing	Continuing	-	
<b>Subtotal</b>			5.929	0.447		0.541		0.554		-		0.554	Continuing	Continuing	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
CALSETS Software Environment and Calibration	Various	Various : Various	6.687	0.365	Apr 2017	0.293		0.290	Jan 2019	-		0.290	Continuing	Continuing	-	
Physical Instruments	Various	Various : Various	7.476	0.363	Feb 2017	0.266		0.855	Feb 2019	-		0.855	Continuing	Continuing	-	
Electrical Instruments	Various	Various : Various	10.085	0.276	Apr 2017	0.185		1.546	Feb 2019	-		1.546	Continuing	Continuing	-	
Test Equipment Modernization	Various	Various : Various	0.738	0.257	Feb 2017	0.231		0.231	Jan 2019	-		0.231	Continuing	Continuing	-	
<b>Subtotal</b>			24.986	1.261		0.975		2.922		-		2.922	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Contract Engineering	C/FFP	Various : Various	2.487	0.051	Jul 2017	0.296		0.304	Feb 2019	-		0.304	Continuing	Continuing	Continuing	
<b>Subtotal</b>			2.487	0.051		0.296		0.304		-		0.304	Continuing	Continuing	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
CALSETS Software Environment and Calibration	Various	Various : Various	1.311	0.243	Apr 2017	0.195		0.194	Apr 2019	-		0.194	Continuing	Continuing	-	

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army													Date: February 2018		
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)						
2040 / 5				PE 0604746A / Automatic Test Equipment Development					L65 / Test Equipment Development						
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Physical Instruments	Various	Various : Various	2.229	0.278	Apr 2017	0.177		0.570	Mar 2019	-		0.570	Continuing	Continuing	-
Electrical Instruments	Various	Various : Various	2.156	0.220	Apr 2017	0.123		1.020	Mar 2019	-		1.020	Continuing	Continuing	-
Test Equipment Modernization	Various	Various : Various	0.723	0.172	Feb 2017	0.154		0.154	Feb 2019	-		0.154	Continuing	Continuing	-
<b>Subtotal</b>			6.419	0.913		0.649		1.938		-		1.938	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			39.821	2.672		2.461		5.718		-		5.718	Continuing	Continuing	N/A

Remarks



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L65 / <i>Test Equipment Development</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Physical Instruments	[Redacted]																											
CALSETS Software Environment and Calibration	[Redacted]																											
Electrical Instruments	[Redacted]																											
Test Equipment Modernization	[Redacted]																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L65 / <i>Test Equipment Development</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Physical Instruments	1	2016	4	2023
CALSETS Software Environment and Calibration	1	2016	4	2023
Electrical Instruments	1	2016	4	2023
Test Equipment Modernization	1	2016	4	2023

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / Distributive Interactive Simulations (DIS) - Eng Dev
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	10.150	11.270	9.145	-	9.145	13.869	14.076	13.806	10.330	0.000	82.646
C74: Devel Simulation Tech	-	1.212	1.423	1.494	-	1.494	2.215	2.260	2.340	2.381	0.000	13.325
C77: Army Geospatial Data Master Plan	-	0.415	0.597	0.786	-	0.786	0.767	0.730	0.577	0.585	0.000	4.457
C78: One Semi-Automated Forces	-	8.523	9.250	6.865	-	6.865	10.887	11.086	10.889	7.364	0.000	64.864

**A. Mission Description and Budget Item Justification**

The program element "Distributive Interactive Simulations - Engineering Development" applies to the Army's Advanced Simulation Program, which enables operational readiness and the development of concepts and systems for the Future Force through the application of new simulation technology and techniques. The development and application of simulation technology will provide the means to link electronically a range of various simulation tools in a manner that is transparent to the user. The amalgam of simulations and tools is linked together to enable execution of an event; to verify the scenarios, tactics/techniques and procedures; to train testers on new hardware/software; and to conduct trial test runs before costly live field tests. The tools developed are available for reuse by developers and users of simulations throughout the Army.

Project C74 funds the HQDA-chartered mission of the Simulation-to-Mission Command Interoperability (SIMCI) Overarching Integrated Product Team (OIPT) in support of Army Training and Readiness. The SIMCI OIPT mission is to provide policy recommendations to Army senior leadership to improve organizations by allowing Soldiers to fight in the same manner in which they train. This is accomplished by interoperability between Mission Command (MC) systems and the Modeling and Simulation (M&S) systems the Army uses to stimulate MC systems for training Soldiers and their Leaders. SIMCI also invests in targeted solutions to critical problem areas that exist between MC and Simulations. The SIMCI OIPT, led by Program Executive Office (PEO) Simulation, Training, and Instrumentation (STRI) and PEO Command Control Communications-Tactical (C3T), uses focused collaborative processes among its 30+ Army organizations to identify key/critical interoperability shortfalls and the required materiel solutions.

Project C77, Army Geospatial Data Master Plan, focuses on activities that start with data acquisition from multiple sources and culminate in (1) accurate, robust and timely geospatial data and data management and (2) integration and conversion tools that support multiple battle command, training and mission-rehearsal applications. Project C77 continues development efforts associated with the Ground-Warfighter Geospatial Data Model (GGDM) and Geospatial Data Standards.

One Semi-Automated Forces (OneSAF) Project C78 develops and delivers a software application that represents activities of units and forces in simulation to support Army Training and Readiness. The application is used by Army agencies to support the concept evaluation, experimentation, materiel acquisition and training throughout the communities. The focus of this project is systems/software engineering and design for development and evolution of the architecture and software tools for a universal system of Army computer-generated forces -- OneSAF. OneSAF is a high fidelity brigade-and-below SAF that represents a full range of operations, systems and control processes in support of stand-alone and embedded training and Research, Development and Acquisition (RDA) simulation applications. OneSAF is fully

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>
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interoperable with the Army's emerging virtual, live, and division-and-above constructive simulations and provides next-generation simulation products. OneSAF replaces a variety of legacy simulations used within the Army to support analytic and training simulation activities.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	10.487	11.270	11.403	-	11.403
Current President's Budget	10.150	11.270	9.145	-	9.145
Total Adjustments	-0.337	0.000	-2.258	-	-2.258
• Congressional General Reductions	-0.005	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.332	-0.423			
• Adjustments to Budget Years	-	0.423	-2.258	-	-2.258

**Change Summary Explanation**

\$1.877M moved to OMA Civ Pay line per OSD direction. \$381K was a decrease in requirements for inflation.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>				<b>Project (Number/Name)</b> C74 / <i>Devel Simulation Tech</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
<i>C74: Devel Simulation Tech</i>	-	1.212	1.423	1.494	-	1.494	2.215	2.260	2.340	2.381	0.000	13.325
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Project C74 funds the HQDA-chartered mission of the Simulation-to-Mission Command Interoperability (SIMCI) Overarching Integrated Product Team (OIPT) in support of Army Training and Readiness. The SIMCI OIPT mission is to provide policy recommendations to Army senior leadership to improve organizations by allowing Soldiers to fight in the same manner in which they train. This is accomplished by interoperability between Mission Command (MC) systems and the Modeling and Simulation (M&S) systems the Army uses to stimulate MC systems for training Soldiers and their Leaders. SIMCI also invests in targeted solutions to critical problem areas that exist between MC and Simulations. The SIMCI OIPT, led by Program Executive Office (PEO) Simulation, Training, and Instrumentation (STRI) and PEO Command Control Communications-Tactical (C3T), uses focused collaborative processes among its 30+ Army organizations to identify key/critical interoperability shortfalls and the required materiel solutions.

The SIMCI OIPT provides the following: (1) Advisor to Army Leadership--improve MC and M&S interoperability programs, policies, directives, resourcing, and procedures; (2) Technical Investment--sponsor/support initiatives that seek common solutions to critical interoperability issues surrounding MC and M&S systems; (3) Outreach--conduct & participate in interoperability outreach activities. SIMCI investments consist primarily of cost-sharing initiatives, leveraging initial system solutions of acquisition programs to enhance the interoperability of multiple systems in the Joint Operational Environment. SIMCI investments accelerate implementation within MC and M&S systems, of common data models and information exchanges that are used by other Services and coalition nations, thus enhancing the inherent ability of Army systems to interoperate seamlessly in a Joint, Interagency, Intergovernmental, and Multinational (JIIM) environment.

FY 2019 funding continues progress with embedding simulation into Mission Command Systems via the Ozone Widget Framework, continues management of the SIMCI OIPT's Army-wide collaborative, interoperability enhancement activities, including architecture alignment, data model alignment, common standards, components, and products. It is focused first on reducing costs and improving capabilities in the areas of automating Operational Plans, Orders, and Reports in support of Army, Joint, and Coalition operations. Objectives are: identify and articulate to HQDA senior leadership specific standards that require Army-wide implementation; co-develop data standards, architecture standards, implementation specifications and Joint/Coalition products; continue transition of SIMCI knowledge and proof-of-principle products to Army and Joint acquisition programs.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Program Management for the SIMCI Overarching Integrated Product Team (OIPT) Projects.	1.212	1.423	1.494
<b>Description:</b> Program Management of the SIMCI OIPT's Army-wide collaborative, interoperability enhancement activities, including architecture alignment, data model alignment, common standards, components, and products. The OIPT consists of a Product Director, engineers, and finance personnel.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C74 / <i>Devel Simulation Tech</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p><b><i>FY 2018 Plans:</i></b> Will continue management and support of the SIMCI OIPT'S Army-wide collaborative, interoperability enhancement activities, including architecture alignment, data model alignment, common standards, components, and products. Will continue focus on gap-analysis of the current model and simulation programs and capabilities in the areas of Live, Virtual, and Constructive (LVC) simulations. This will support the Vice Chief of Staff of the Army's request to find redundancy within the Modeling and Simulation (M&amp;S) community and reduce it. Objectives are to compare the current M&amp;S capabilities with what will be required in the upcoming LVC-Information Assurance (LVC-IA) and Integrated Training Environment (ITE) environments, which will eventually become the Simulated Training Environment (STE) in 2025. This will be Army-wide, as well as, Joint combined interagency products. Focus on ITE with the creation of the blueprint for STE, which is slated to be implemented in 2025.</p> <p><b><i>FY 2019 Plans:</i></b> Will continue management and support of the SIMCI OIPT'S Army-wide collaborative, interoperability enhancement activities, including architecture alignment, data model alignment, common standards, components, and products. Will continue focus on gap-analysis of the current model and simulation programs and capabilities in the areas of Live, Virtual, and Constructive (LVC) simulations. This will support the Vice Chief of Staff of the Army's request to find redundancy within the Modeling and Simulation (M&amp;S) community and reduce it. Objectives are to compare the current M&amp;S capabilities with what will be required in the upcoming LVC-Information Assurance (LVC-IA) and Integrated Training Environment (ITE) environments, which will eventually become the Simulated Training Environment (STE) in 2025. This will be Army-wide, as well as, Joint combined interagency products. Focus on ITE with the creation of the blueprint for STE, which is slated to be implemented in 2025.</p> <p><b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> FY18 funding is different than FY19 funding due to inflation.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	1.212	1.423	1.494

<p><b>C. Other Program Funding Summary (\$ in Millions)</b> N/A</p> <p><b>Remarks</b> Currently SIMCI has no contract vehicle specific to their program. SIMCI uses other contract vehicles (internal/external) and awards money to work on specific technical projects. This provides the opportunity to leverage technical expertise from different agencies. SIMCI chooses projects that enhance current capabilities, closes the gaps of existing capabilities, and makes the determination for future projects that affect both the Mission Command and Live, Virtual, Constructive simulations environment. SIMCI only chooses those projects that meet specific requirements and criteria as stated above. It is one of SIMCI's missions to locate, utilize, or upgrade those projects or specific products that do just that.</p>
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Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	Project (Number/Name) C74 / <i>Devel Simulation Tech</i>

**D. Acquisition Strategy**

SIMCI Overarching Integrated Product Team (OIPT) resources are allocated to multiple organizations in both the Mission Command (MC) and Modeling and Simulation (M&S) Communities. The funds are contracted to execute approved functions and to projects that advance the efforts of SIMCI and components-based architecture alignment. Products developed transition to the lead or sponsor's program which then maintains the product for the cost savings of itself and other programs in both Communities. The primary focus for these projects are the following: Embedded simulations with current Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems, gap-analysis for current simulations, and the proper implementation of Next-Generation modeling and simulation capabilities in regards to the Synthetic Training Environment (STE).

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C74 / <i>Devel Simulation Tech</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	Various	PEO STRI : Orlando, FL	9.973	0.150	Oct 2016	0.150		0.150		-		0.150	Continuing	Continuing	Continuing
SBIR/STTR	TBD	PEO STRI : Orlando, FL	0.086	-		-		-		-		-	0.000	0.086	-
<b>Subtotal</b>			10.059	0.150		0.150		0.150		-		0.150	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Transition of simulation initialization capability	Various	TBD : TBD	3.134	-		-		-		-		-	Continuing	Continuing	Continuing
Geospatial Initiative	Various	TBD : TBD	1.388	-		-		-		-		-	Continuing	Continuing	Continuing
Data Model applications and reference implementations	Various	TBD : TBD	2.363	-		-		-		-		-	Continuing	Continuing	Continuing
Implementation of Initialization Products	Various	TBD : TBD	2.255	-		-		-		-		-	Continuing	Continuing	Continuing
Initialization Study Implementation	Various	TBD : TBD	1.038	-		-		-		-		-	Continuing	Continuing	Continuing
Mission Comand systems data mediation/web services	Various	TBD : TBD	2.910	-		-		-		-		-	Continuing	Continuing	Continuing
Expanding MTOE System Architecture (SA) Data	Various	TBD : TBD	1.821	-		-		-		-		-	Continuing	Continuing	Continuing
C2 Adapter Web Services and Tools	Various	TBD : TBD	2.660	-		-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			17.569	-		-		-		-		-	Continuing	Continuing	N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C74 / <i>Devel Simulation Tech</i>
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<b>Support (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>		<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>			
SIMCI Program/OIPT Support	Various	Various : Various	3.866	1.037	Dec 2016	1.248		1.319		-		1.319	Continuing	Continuing	Continuing	
Army Initialization Program and Technical Work Groups (TWG)	Various	Various : Various	0.656	0.025	Dec 2016	0.025		0.025		-		0.025	Continuing	Continuing	Continuing	
<b>Subtotal</b>			4.522	1.062		1.273		1.344		-		1.344	Continuing	Continuing	N/A	

<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>			
<b>Project Cost Totals</b>			32.150	1.212	1.423	1.494	-	1.494	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C74 / <i>Devel Simulation Tech</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Implementation of Initialization Products	█				█																							
Transition of simulation initialization capability	█				█																							
Initialization Study Implementation	█				█																							
Data Model applications and reference implementations	█				█																							
C2 Adapter Web Services and Tools	█				█																							
Quarterly SIMCI OIPT Meeting	█				█																							
Annual Project Call	█				█																							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C74 / <i>Devel Simulation Tech</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Geospatial Initiative	1	2011	4	2014
Implementation of Initialization Products	1	2010	4	2022
Transition of simulation initialization capability	1	2010	4	2022
Initialization Study Implementation	1	2010	4	2017
Data Model applications and reference implementations	1	2010	4	2022
C2 Adapter Web Services and Tools	1	2010	4	2022
Quarterly SIMCI OIPT Meeting	1	2010	4	2022
Annual Project Call	1	2010	4	2022

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>				<b>Project (Number/Name)</b> C77 / <i>Army Geospatial Data Master Plan</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
<i>C77: Army Geospatial Data Master Plan</i>	-	0.415	0.597	0.786	-	0.786	0.767	0.730	0.577	0.585	0.000	4.457
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Project C77 addresses the implementation and acceleration of objectives focused on geospatial standards that were identified in the Army Geospatial Data Integrated Master Plan (AGDIMP), approved by the Chief of Staff, Army in April 2005 and newer guidance and directives including the Army's Geospatial Information Office (GIO) GIO Charter, Army Regulation for Geospatial Information and Services updated in 2014 (AR 115-11), and Army COE (Common Operating Environment Implementation Plan's Geospatial Annex). The AGDIMP and the GIO charter, Geospatial Annex to COE IP, and AR 115-11 require the establishment of an enterprise architecture framed around geospatial standards that address geospatial/GEOINT data, services, and applications to enable the Army Geospatial Enterprise (AGE). This Army Geospatial Enterprise serves the Army's Programs/Systems, Organizations (most importantly our soldiers) to provide the geospatial foundation of accurate, robust, and timely geospatial data, robust tools and services that support mission command, intelligence, training, mission-rehearsal and other mission-applications. Project C77 addresses a geospatial/GeoINT standard-base framework that supports the ground-warfighter. This geospatial standard framework must also fit within the broader National System for Geospatial-Intelligence (NSG) and Allies Systems for GeoINT (ASG) architecture and standards. The establishment of a ground-warfighter, standards-based framework support the management, dissemination, and update of geospatial data and services from National systems and organization to tactical systems and ground-warfighter in an enterprise fashion that will minimal translation into unique and often proprietary data formats and internal application databases.

FY 2019 funding continues development efforts associated with the Ground-Warfighter Geospatial Data Model (GGDM) and integration of Geospatial Data Standards into the U.S. Army Geospatial Enterprise (AGE) and the Army M&S Enterprise.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Ground-Warfighter Geospatial Data Model (GGDM)	0.134	0.175	0.246
<p><b>Description:</b> The GGDM incorporates common data elements that conform to standards mandated by the Department of Defense Information Technology Standards Registry (DISR) for the National System for Geospatial Intelligence (NSG). Incorporating common geospatial data standards into the GGDM makes the Programs of Record (POR) consistent with new DISR-mandated geospatial intelligence standards for the NSG. The implementation of GGDM across the army increases system-interoperability at the geospatial data level.</p> <p><b>FY 2018 Plans:</b> Will continue development of GGDM to maintain alignment with National System for Geospatial-Intelligence (NSG) Application Schema (NAS) and will develop routing profiles based on GGDM. Will develop translational tools and incorporate new metadata</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C77 / <i>Army Geospatial Data Master Plan</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
standards to support NSG Metadata Foundation (NMF) and International Standards Organization (ISO) metadata standards for data discovery and interoperability.  <b>FY 2019 Plans:</b> Initiate development of the next version of GGDM based upon new information and revisions to the National System for Geospatial-Intelligence (NSG) Application Schema (NAS) as well as new requires from the US Army, USMC, and ABCANZ Allies. Provide GGDM training classes to Army and USMC personnel. Ensure major Army PORs are implementing the GGDM (I.E. DCGS-A and SECORE).  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increased complexity to develop the next version of GGDM. Increased outreach to implement GGDM in the M&S Enterprise			
<b>Title:</b> Geospatial Data Standards  <b>Description:</b> Army Geospatial Standards including data standards and standards for services to manage, process and disseminate and utilize geospatial data. Alignment of industry and Open geospatial standards from organizations such as the Open Geospatial Consortium (OGC) and others into the Army Geospatial Enterprise (AGE).  <b>FY 2018 Plans:</b> Will work on emerging standards and technology implementations to support to three-dimensional modeling and tiling capabilities and to update elevation data formats and services, focusing on support for mobile and handheld applications. Will continue to maintain Geospatial Standards compliance matrix, Std-V1, in alignment with quarterly updated NSG standards and DoD Information Technology Standards and Profile Registry (DISR) cycle updates of GeoINT standards and coordinate results with Army CIO/G6 and ASA(ALT) Programs. Will continue to provide SME support on geospatial data and technology standards to Army PORs.  <b>FY 2019 Plans:</b> Will initiate work in collaboration with industry and other agencies to develop new geospatial data and services standards, DOD Profiles of these standards, and technology implementations of these standards. Focus on standards to support 2D raster tiled maps, 3D globe standards, and initial assessment about vector tile maps. Additionally, cont. to develop modifications/updates elevation data formats and services. Maintain Geospatial Standards compliance matrix, Std-V1, in alignment with quarterly updated NSG standards and DoD Information Technology Standards and Profile Registry (DISR) cycle updates of GeoINT standards and coordinate results with Army CIO/G6 and ASA(ALT) Programs. Will continue to provide SME support on geospatial data and technology standards to Army PORs.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>	0.281	0.422	0.540

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C77 / <i>Army Geospatial Data Master Plan</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Cost increase due to additional collaboration efforts to support new geospatial data and services standards. Specifically, the inclusion of M&S based standards into the Army Geospatial Enterprise.			
<b>Accomplishments/Planned Programs Subtotals</b>	0.415	0.597	0.786

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Resources are allocated to several critical geospatial projects in support of the Army Geospatial Data Integrated Master Plan (AGDIMP) and the Army Geospatial Enterprise (AGE).

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C77 / <i>Army Geospatial Data Master Plan</i>
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<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Army Geospatial Model and Data Standards	Various	TBD : TBD	5.270	0.415	Nov 2016	0.597		0.786	Nov 2018	-		0.786	0.000	7.068	Continuing
<b>Subtotal</b>			5.270	0.415		0.597		0.786		-		0.786	0.000	7.068	N/A
			Prior Years	<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>			5.270	0.415		0.597		0.786		-		0.786	0.000	7.068	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date: February 2018</b>		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>		<b>Project (Number/Name)</b> C77 / <i>Army Geospatial Data Master Plan</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Ground Warfighter Geospatial Data Model	[Redacted]																											
Geospatial Data Standards	[Redacted]																											



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C77 / <i>Army Geospatial Data Master Plan</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Ground Warfighter Geospatial Data Model	1	2010	4	2023
Geospatial Data Standards	1	2010	4	2023

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>				<b>Project (Number/Name)</b> C78 / <i>One Semi-Automated Forces</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
<i>C78: One Semi-Automated Forces</i>	-	8.523	9.250	6.865	-	6.865	10.887	11.086	10.889	7.364	0.000	64.864
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

One Semi-Automated Forces (OneSAF) develops and delivers a software application that represents activities of units and forces in simulation to support Army Training and Readiness. The application is used by Army agencies to support the concept evaluation, experimentation, materiel acquisition and training throughout the communities. The focus of this project is systems/software engineering and design for development and evolution of the architecture and software tools for a universal system of Army computer-generated forces -- OneSAF. OneSAF is a high fidelity brigade-and-below SAF that represents a full range of operations, systems and control processes in support of stand-alone and embedded training and Research, Development and Acquisition (RDA) simulation applications. OneSAF is fully interoperable with the Army's emerging virtual, live, and division-and-above constructive simulations and provides next-generation simulation products. OneSAF replaces a variety of legacy simulations used within the Army to support analytic and training simulation activities.

FY 2019 funding allows for continued development of the software product line by addressing OneSAF Pre-Planned Product Improvements (P3Is) as prioritized and approved by the Training and Doctrine Command (TRADOC). This funding also provides for the management of the infrastructure, equipment, laboratories, and processes needed to develop, test, and release the required product baseline.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activities for the One Semi-Automated Forces program.	5.673	6.300	5.439
<b>Description:</b> Continue EMD phase contract activities for the OneSAF program.			
<b>FY 2018 Plans:</b> Will continue the development of software capabilities based on OneSAF P3Is as prioritized and approved by TRADOC. Will continue the software development of functionality that enhances architectural services, components, synthetic environment and infrastructure of the OneSAF Product Line and will provide for software integration, test and release of required software refreshes and Version 8.8.			
<b>FY 2019 Plans:</b> Will continue the development of software capabilities based on OneSAF P3Is as prioritized and approved by TRADOC. Will continue the software development of functionality that enhances architectural services, components, synthetic environment and infrastructure of the OneSAF Product Line and will provide for software integration, test and release of required software refreshes and Version 9.0			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>			

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C78 / <i>One Semi-Automated Forces</i>
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**B. Accomplishments/Planned Programs (\$ in Millions)**

FY19 value decreased due to funding for civilian pay moving to OMA.

**Title:** Government System Test and Evaluation for the One Semi-Automated Forces (OneSAF) program.

**Description:** Government System Test and Evaluation for the OneSAF program.

**FY 2018 Plans:**

Will provide for the conducting of software, test, integration and release for Version 8.8. Will provide support to the user community in conducting experiments, analyses, and validation events for integration into the Home Station Training Federation, Network Integration Events (NIE), Battle Lab Collaborative Simulation Environment (BLCSE), Multi Resolution Federation- Brigade (MRF-B) Enhanced, and other LVC applications.

**FY 2019 Plans:**

Will provide for the conducting of software, test, integration and release for Version 9.0. Will provide support to the user community in conducting experiments, analyses, and validation events for integration into the Home Station Training Federation, Network Integration Events (NIE), Battle Lab Collaborative Simulation Environment (BLCSE), Multi Resolution Federation- Brigade (MRF-B) Enhanced, and other LVC applications.

**Title:** Government Program Management for the One Semi-Automated Forces (OneSAF) program.

**Description:** Government Program Management for the One Semi-Automated Forces (OneSAF) program.

**FY 2018 Plans:**

Will provide program management, engineering and technical oversight, contract support, and travel for support of site surveys and Subject Matter Experts for the development of OneSAF.

**FY 2019 Plans:**

Will provide a portion of program management, engineering and technical oversight, contract support, and travel for support of site surveys and Subject Matter Experts for the development of OneSAF.

**FY 2018 to FY 2019 Increase/Decrease Statement:**

FY 2019 value decreased due to funding for civilian pay moving to OMA.

**Accomplishments/Planned Programs Subtotals**

	8.523	9.250	6.865
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OMA: OMA, 121014000	4.922	5.090	6.409	-	6.409	6.460	6.592	6.740	6.859	Continuing	Continuing

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C78 / <i>One Semi-Automated Forces</i>

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

**D. Acquisition Strategy**

Continue the yearly release of the OneSAF Software (SW) versions containing performance enhancements resulting from the development and integration of both approved Product Improvements and integration of Co-Developer handovers. PM OneSAF continues to manage two Delivery Orders for the Development, Integration, Interoperability, and Support (I2S) of capabilities products, data, and documentation that fully serves the current and evolving needs of the user community.

The enhancements will be executed within the development line as modifications to the released baseline via Engineering Change Proposals (ECPs); Change Requests (CRs); Pre-Planned Product Improvements (P3I); and correction of deficiencies identified as Problem Test Reports (PTRs) and Deficiency Reports (DRs) by the user community.

In FY2019, the program office is pursuing a single award contract for the continuing development and maintenance of the software baseline.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C78 / <i>One Semi-Automated Forces</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	Various	PEO STRI, Orlando, FL : Various	24.856	1.850	Oct 2016	1.850		0.326	Oct 2018	-		0.326	Continuing	Continuing	Continuing
<b>Subtotal</b>			24.856	1.850		1.850		0.326		-		0.326	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Architecture Dev & System Integration	C/CPFF	Science Applications International Corp : Orlando, FL	51.466	-		-		-		-		-	0.000	51.466	51.466
Model and Tools Development	C/CPFF	Science Applications International Corp : Orlando, FL	27.625	-		-		-		-		-	0.000	27.625	27.625
Environmental Runtime Component	C/CPFF	Science Applications : Orlando, FL	7.981	-		-		-		-		-	0.000	7.981	7.981
OneSAF Component Development	C/CPFF	Various : Various	9.648	-		-		-		-		-	0.000	9.648	9.648
Integrated Environment Dev	C/CPFF	Advanced Systems Technology, Inc : Orlando FL	11.702	-		-		-		-		-	0.000	11.702	11.702
OneSAF Bridge Contract	C/CPFF	Science Applications International Corp : Orlando, FL	3.797	-		-		-		-		-	0.000	3.797	3.797
Integration, Interoperability, and Support (I2S) & Logical Follow On (LFO)	C/CPFF	Cole Engineering Services, Inc. : Orlando, FL	6.290	-		1.000		-		-		-	Continuing	Continuing	Continuing
Software Development & Production Logical Follow On (LFO)	C/CPFF	Leidos : Orlando, FL	18.985	-		1.000		-		-		-	Continuing	Continuing	Continuing
Software Development	C/CPFF	TBD : Orlando, FL	-	3.601		3.840		4.989		-		4.989	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604760A / Distributive Interactive Simulations (DIS) - Eng Dev				C78 / One Semi-Automated Forces								
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
<b>Subtotal</b>			137.494	3.601		5.840		4.989		-		4.989	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
System Analysis	Various	Various : Various	6.597	-		-		-		-		-	Continuing	Continuing	Continuing	
Domain Analysis	Various	Various : Various	5.910	0.225	Dec 2016	0.150		0.150		-		0.150	Continuing	Continuing	Continuing	
Integrated Development Environment	Various	Various : Various	8.239	1.697	Nov 2016	-		-		-		-	Continuing	Continuing	Continuing	
Architecture Engr & Tech Spt	SS/FP	MITRE FFRDC : Aberdeen Proving Ground, MD	5.299	0.150	Nov 2016	0.310		0.300		-		0.300	Continuing	Continuing	Continuing	
<b>Subtotal</b>			26.045	2.072		0.460		0.450		-		0.450	Continuing	Continuing	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
OneSAF integration, evaluation and test	Various	Various : Various	11.979	0.850	Dec 2016	0.900		0.900		-		0.900	Continuing	Continuing	Continuing	
OneSAF Verification, Validation & Accreditation	Various	Various : Various	7.097	0.150	Dec 2016	0.200		0.200		-		0.200	Continuing	Continuing	Continuing	
<b>Subtotal</b>			19.076	1.000		1.100		1.100		-		1.100	Continuing	Continuing	N/A	
<b>Project Cost Totals</b>			207.471	8.523		9.250		6.865		-		6.865	Continuing	Continuing	N/A	
<b>Remarks</b>																

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C78 / <i>One Semi-Automated Forces</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
P3I Requirements Development	P3I																											
OneSAF Version Release 8.7 (Concurrency Updates)	1				v8.7																							
OneSAF Version Release 8.8 (Concurrency Updates)					2				v8.8																			
OneSAF Version Release 9.0 (Concurrency Updates)									3				v9.0															
OneSAF Version Release X.1 (Concurrency Updates)													4				vX.1											
OneSAF Version Release X.2 (Concurrency Updates)																	5				vX.2							
OneSAF Version Release X.3 (Concurrency Updates)																					6				vX.3			
OneSAF Support	Life Cycle Software Support																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C78 / <i>One Semi-Automated Forces</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
P3I Requirements Development	1	2006	4	2022
OneSAF Version Release 8.7 (Concurrency Updates)	4	2017	4	2017
OneSAF Version Release 8.8 (Concurrency Updates)	4	2018	4	2018
OneSAF Version Release 9.0 (Concurrency Updates)	4	2019	4	2019
OneSAF Version Release X.1 (Concurrency Updates)	4	2020	4	2020
OneSAF Version Release X.2 (Concurrency Updates)	4	2021	4	2021
OneSAF Version Release X.3 (Concurrency Updates)	4	2022	4	2022
OneSAF Support	1	2006	4	2022



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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / Brilliant Anti-Armor Submunition(BAT)
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	10.000	9.894	-	9.894	9.886	109.884	160.416	358.713	0.000	658.793
688: ATACMS BLK II	-	0.000	5.000	4.947	-	4.947	4.943	4.942	4.941	4.940	0.000	29.713
P01: Multi-Mode Seeker Development and Test	-	0.000	5.000	4.947	-	4.947	4.943	104.942	155.475	353.773	0.000	629.080

**A. Mission Description and Budget Item Justification**

Army Tactical Missile System (ATACMS) is the United States (U.S.) Army's primary all-weather, surface-to-surface long-range artillery precision guided missile used by Combatant Commanders to shape the battlefield with long-range fires against hard & soft targets in open, complex, and urban environments.

FY19 base dollars in the amount of \$9.894 million support ATACMS BLK II (Project #: 688) and the Multi-Mode Seeker (MMS) program (Project #: P01) which focus on development, integration & test of warheads and sensors to engage moving maritime & armored land-based targets. Strategic Capabilities Office (SCO) demonstrations through FY21 will inform technology maturity and transition plans to U.S. Army programs.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	0.000	10.000	0.000	-	0.000
Current President's Budget	0.000	10.000	9.894	-	9.894
Total Adjustments	0.000	0.000	9.894	-	9.894
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	9.894	-	9.894

**Change Summary Explanation**

FY 2019 funding change due to realignment of funds from ATACMS PIP (PE 0203802A, Project 788) to Brilliant Anti-Armor Submunition (BAT) (PE 0604768A).

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition(BAT)</i>	<b>Project (Number/Name)</b> 688 / <i>ATACMS BLK II</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
688: <i>ATACMS BLK II</i>	-	0.000	5.000	4.947	-	4.947	4.943	4.942	4.941	4.940	0.000	29.713
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

ATACMS BLK II will integrate Strategic Capabilities Office (SCO) Breaker program demonstrated capabilities into ATACMS. This effort focuses on providing ATACMS with integrated sensor & warhead technologies to engage moving land-based armored targets.

FY19 Base funds in the amount of \$4.947 million supports system analysis & evaluation, requirements & specification development, and program transition activities.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019
<b>Title:</b> Transition of SCO demonstrated capabilities to defeat armored targets	-	5.000	4.947
<b>Description:</b> Conduct warhead component requirements development, system integration analysis, and transition planning targeted at rapid qualification and fielding of the armor engagement capability.			
<b>FY 2018 Plans:</b> Began system analysis & evaluation, requirements & specification development, contract requirements package development, and program transition activities.			
<b>FY 2019 Plans:</b> Continue system analysis & evaluation, requirements & specification development, and program transition activities.			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY18-19 funding decrease due to reduction in effort needed to support transition of SCO demonstrated capabilities to defeat armored targets.			
<b>Accomplishments/Planned Programs Subtotals</b>	-	5.000	4.947

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

N/A

**D. Acquisition Strategy**

Accelerate the transition of Strategic Capabilities Office (SCO) Breaker program demonstrated capabilities into ATACMS.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition(BAT)</i>	<b>Project (Number/Name)</b> 688 / <i>ATACMS BLK II</i>

**E. Performance Metrics**

N/A

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition(BAT)</i>	<b>Project (Number/Name)</b> 688 / <i>ATACMS BLK II</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Gov SEPM	MIPR	Various : RSA	-	-		1.000		0.947	Nov 2019	-		0.947	0.000	1.947	-
<b>Subtotal</b>			-	-		1.000		0.947		-		0.947	0.000	1.947	N/A

**Remarks**  
RSA - Redstone Arsenal, Alabama

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Warhead Development	C/CPFF	LMMFC : Dallas, TX	-	-		3.000		3.000	Jan 2019	-		3.000	0.000	6.000	-
System Analysis, Requirement & Spec Dev	MIPR	AMRDEC : RSA	-	-		1.000		1.000	Nov 2019	-		1.000	0.000	2.000	-
<b>Subtotal</b>			-	-		4.000		4.000		-		4.000	0.000	8.000	N/A

**Remarks**  
AMRDEC-U.S. Army Research, Development and Engineering Command; RSA-Redstone Arsenal, Alabama; LMMFC - Lockheed Martin Missiles and Fire Control

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	-	5.000	4.947	-	4.947	0.000	9.947	N/A

**Remarks**

**UNCLASSIFIED**

<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition(BAT)</i>	<b>Project (Number/Name)</b> 688 / <i>ATACMS BLK II</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
System Analysis, Requirement & Spec Development																												
Warhead Development																												

**UNCLASSIFIED**

<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition(BAT)</i>	<b>Project (Number/Name)</b> 688 / <i>ATACMS BLK II</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
System Analysis, Requirement & Spec Development	1	2018	4	2019
Warhead Development	1	2019	4	2023

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition(BAT)</i>				<b>Project (Number/Name)</b> P01 / <i>Multi-Mode Seeker Development and Test</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
P01: <i>Multi-Mode Seeker Development and Test</i>	-	0.000	5.000	4.947	-	4.947	4.943	104.942	155.475	353.773	0.000	629.080
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Multi-Mode Seeker will integrate Strategic Capabilities Office (SCO) STRIKE-X program demonstrated capabilities into ATACMS. This effort focuses on providing integration of a seeker to search, detect, acquire, and engage moving maritime/land-based targets.

FY19 Base funds in the amount of \$4.947 million supports system analysis & evaluation, requirements & specification development, Sensor development, System Integration, and program transition activities.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Transition of SCO demonstrated capabilities to defeat maritime targets	-	5.000	4.947
<b>Description:</b> Conduct seeker component requirements development, system integration analysis, and transition planning targeted at rapid qualification and fielding of the maritime engagement capability.			
<b>FY 2018 Plans:</b> Began system analysis & evaluation, requirements & specification development, contract requirements package development, and program transition activities.			
<b>FY 2019 Plans:</b> Continue system analysis & evaluation, requirements & specification development, Sensor Development, System Integration, and program transition activities.			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY18-19 funding decrease due to reduction in effort needed to transition SCO demonstrated capabilities to defeat maritime targets.			
<b>Accomplishments/Planned Programs Subtotals</b>	-	5.000	4.947

**C. Other Program Funding Summary (\$ in Millions)**

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604768A / <i>Brilliant Anti-Armor Submunition(BAT)</i>	Project (Number/Name) P01 / <i>Multi-Mode Seeker Development and Test</i>

**C. Other Program Funding Summary (\$ in Millions)**

**Remarks**

N/A

**D. Acquisition Strategy**

Accelerate the transition of Strategic Capabilities Office (SCO) STRIKE-X program demonstrated capabilities into ATACMS.

**E. Performance Metrics**

N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition(BAT)</i>	<b>Project (Number/Name)</b> P01 / <i>Multi-Mode Seeker Development and Test</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Gov SEPM	MIPR	Various : RSA	-	-		1.000		0.947	Nov 2019	-		0.947	0.000	1.947	-
<b>Subtotal</b>			-	-		1.000		0.947		-		0.947	0.000	1.947	N/A

**Remarks**  
RSA-Redstone Arsenal, Alabama

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Seeker Development	C/CPFF	Various : Various	-	-		1.000		1.500	Jan 2019	-		1.500	0.000	2.500	-
System Analysis, Requirement & Spec Dev	MIPR	AMRDEC : RSA	-	-		1.500		1.500		-		1.500	0.000	3.000	-
<b>Subtotal</b>			-	-		2.500		3.000		-		3.000	0.000	5.500	N/A

**Remarks**  
AMRDEC-U.S. Army Research, Development and Engineering Command; RSA-Redstone Arsenal, Alabama

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test Support Hardware	MIPR	Redstone Test Center : RSA	-	-		1.500		1.000	Nov 2019	-		1.000	0.000	2.500	-
<b>Subtotal</b>			-	-		1.500		1.000		-		1.000	0.000	2.500	N/A

**Remarks**  
RSA-Redstone Arsenal, Alabama

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>								<b>Date: February 2018</b>			
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition(BAT)</i>				<b>Project (Number/Name)</b> P01 / <i>Multi-Mode Seeker Development and Test</i>				
	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>		<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	
<b>Project Cost Totals</b>	-	-	5.000		4.947	-	4.947	0.000	9.947	N/A	

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition(BAT)</i>	<b>Project (Number/Name)</b> P01 / <i>Multi-Mode Seeker Development and Test</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
System Analysis, Requirement & Spec Development																												
Sensor Study & Analysis																												
Sensor Development																												
System Integration																												
System Engineering Development Tests																												
System Flight Test Demonstrations (DM-1 thru DM-4)																												
Sensor Subsystem Qualification																												
System Qualification Flight Tests (SQT-1 thru -6)																												
System Updates, Delta-Qual, and Fielding Support																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition(BAT)</i>	<b>Project (Number/Name)</b> P01 / <i>Multi-Mode Seeker Development and Test</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
System Analysis, Requirement & Spec Development	1	2018	4	2018
Sensor Study & Analysis	2	2018	4	2018
Sensor Development	4	2018	3	2020
System Integration	3	2018	1	2021
System Engineering Development Tests	2	2020	3	2020
System Flight Test Demonstrations (DM-1 thru DM-4)	3	2020	1	2021
Sensor Subsystem Qualification	3	2020	1	2021
System Qualification Flight Tests (SQT-1 thru -6)	1	2021	3	2021
System Updates, Delta-Qual, and Fielding Support	1	2021	4	2023

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	14.538	18.566	21.964	-	21.964	15.554	15.322	12.757	11.805	0.000	110.506
571: <i>Close Cbt Tact Trainer</i>	-	0.972	0.937	0.665	-	0.665	0.651	0.988	0.988	0.988	0.000	6.189
577: <i>Gaming Technology In Support Of Army Training</i>	-	1.903	0.536	2.268	-	2.268	2.273	1.615	1.725	0.913	0.000	11.233
582: <i>Synthetic Envir Core</i>	-	9.000	11.513	9.729	-	9.729	9.830	9.863	10.044	9.904	0.000	69.883
585: <i>Aviation Combined Arms Tactical Trainer</i>	-	2.663	5.580	9.302	-	9.302	2.800	2.856	0.000	0.000	0.000	23.201

**A. Mission Description and Budget Item Justification**

The Combined Arms Tactical Trainers (CATT) represent a family of combined arms simulation systems designed to support the Army's simulation-based, Combined Arms Training Strategy. The CATT program portfolio directly supports the Army's Training Strategy and progressive training model by providing realistic training events and comprehensive After Action Reviews (AAR). CATT enables units, from crew to the battalion task force level, to conduct a wide variety of combat tasks on a realistic, interactive, synthetic battlefield. CATT's combination of manned simulators and staff officer workstations enables units to train as a combined arms team in a cost effective manner. The primary CATT system is the Close Combat Tactical Trainer (CCTT) which provides the underlying baseline architecture and AAR for CATT expansions, Pre-Planned Product Improvements (P3I) and system enhancements. The Reconfigurable Vehicle Simulator (RVS) supports combat convoy operations and Improvised Explosive Devices (IED) tasks. Synthetic Environment (SE) Core provides for the expansion of the synthetic environment baseline to include enhanced interoperability and the products and infrastructure to support current and future combat operations and mission rehearsal required for Unified Land Operations. The first synthetic environments expanded were in the Aviation Combined Arms Tactical Trainer (AVCATT) and the CCTT for both the Active and Reserve components. Gaming Technology provides an application to train and rehearse convoy-operations, platoon level, mounted infantry tactics, dismounted operations, rules-of-engagement training, cross-cultural communications training, IED defeat training, route clearance, ground-air coordination, Unmanned Aerial Vehicle (UAV) integration, and other small unit and individual training and mission rehearsal requirements. Soldiers can train in a common environment on geotypical or geospecific virtual terrain. It is also possible to link Gaming technology to actual communication, command, control, computer, and intelligence (C4I) systems and other CATT simulation systems to increase the utility and realism of the training. By practicing skills in CATT, units are able to effectively prepare for costly live fire and maneuver exercises, as well as training tasks deemed too hazardous to conduct in a live training environment. Fielded in both fixed site and mobile versions, CATT enables both Active and Reserve component units to prepare for real world contingency missions. By being able to use a wide array of training terrain databases and modify the behavior of the computer generated opposing forces, CATT offers an unlimited array of training options to support the Army's many regional combat missions. The combination of tough field and live fire training, and realistic simulation training in CATT, is the formula to prepare Soldiers and their Leaders for the uncertainties they face in combat operations.

FY 2019 base funding of \$0.665 million for CCTT enables gaming technology and visualization for maneuver training, and the P3I for the CCTT in order to reduce life cycle costs.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>
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FY 2019 base funding of \$2.268 million for Games for Training will provide improved Government data rights and integration of an extended capability for the GFT software, Virtual Battlespace 3 (VBS3). These capabilities are to include, but not limited to, adding jamming and communications, close air support, and medical competencies. Additionally, funds will be used to conduct development and integration activities of the GFT system to ensure interoperability with Live, Virtual and Constructive training simulations and Mission Command Systems, and compliance with Risk Management Framework (RMF) requirements.

FY2019 base funding of \$9.729 million for SE Core will continue the development of the Standard Terrain Generation Capability (STDGC) to ensure the process remains Army Geospatial Center (AGC) certified and that the correlated terrain databases maintain the "Gold Standard" quality rating and remain concurrent with supported training systems. FY19 funds will continue developing and integrating the tools and process for constructive terrain database generation. Additionally, funds will be used to enhance subterranean and building interiors capabilities for incorporation into the STDGC baseline to provide interoperability across training simulators and simulations. SE Core will continue to enhance Virtual One Semi-Automated Forces (Virtual OneSAF) in the SE Core Architecture and develop, upgrade, integrate and refine the common visual models with FY19 funds.

FY 2019 base funding of \$9.302 million for AVCATT will design and develop software to inter-operate with other training devices and simulators in a Common Operating Environment (COE). This is required to enable training with the Universal Mission Simulator, CCTT, Games For Training, and LVC-IA. Additionally, the base funding will be used to design and develop the replacement of the Image Generator system as part of hardware modernization.

<b>B. Program Change Summary (\$ in Millions)</b>	<b><u>FY 2017</u></b>	<b><u>FY 2018</u></b>	<b><u>FY 2019 Base</u></b>	<b><u>FY 2019 OCO</u></b>	<b><u>FY 2019 Total</u></b>
Previous President's Budget	15.068	18.566	19.601	-	19.601
Current President's Budget	14.538	18.566	21.964	-	21.964
Total Adjustments	-0.530	0.000	2.363	-	2.363
• Congressional General Reductions	-0.006	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.524	-0.513			
• Adjustments to Budget Years	-	0.513	2.363	-	2.363

**Change Summary Explanation**

Increase in FY19 funding was primarily due to AVCATT's alignment with projected award of the AVCATT modernization / tech refresh contract and beginning of a three year RDT&E modernization cycle.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>				<b>Project (Number/Name)</b> 571 / <i>Close Cbt Tact Trainer</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
571: <i>Close Cbt Tact Trainer</i>	-	0.972	0.937	0.665	-	0.665	0.651	0.988	0.988	0.988	0.000	6.189
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Close Combat Tactical Trainer (CCTT) immersively and comprehensively trains Armor, Cavalry, Infantry, Mechanized Infantry, and Armored Reconnaissance units from squad through Battalion/Squadron level, to include their staffs. The primary training audience operates from full-crew simulators, reconfigurable command posts, and live battalion command posts to accomplish their combined arms training tasks. CCTT is a ground based, collective training device comprised of the CCTT and the Reconfigurable Vehicle Tactical Trainer (RVTT). CCTT is comprised of full fidelity, manned simulators for the M1 Abrams main battle tank, M2 Bradley Fighting Vehicles (BFV) variants, and Cavalry Fighting Vehicles (CFV). RVTT is a CCTT Reconfigurable Vehicle Simulator (RVS) comprised of full fidelity, manned simulators for the High Mobility Multipurpose Wheeled Vehicle (HMMWV) and Heavy Expanded Mobility Tactical Truck (HEMTT).

FY 2019 core funding of \$.665 million for CCTT enables: the continued development and integration of gaming technology, development of virtualization technology to support maneuver training, and the Planning, Performance, Process & Innovation (P31) to reduce life cycle costs.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Government Program Management for the Close Combat Tactical Trainer (CCTT) program.	0.138	0.166	0.169
<b>Description:</b> Government Program Management for the CCTT program.			
<b>FY 2018 Plans:</b> Will support government program management, engineering, technical, contracting support, and will continue operational evaluation support.			
<b>FY 2019 Plans:</b> Will support engineering, technical, contracting support, and will continue operational evaluation support.			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> PMO costs increase for inflation			
<b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for CCTT, and Interoperability between CCTT.	0.834	0.771	0.496
<b>Description:</b> Continue EMD phase contract activities for CCTT.			
<b>FY 2018 Plans:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 571 / <i>Close Cbt Tact Trainer</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Will enable the continued development and integration of gaming technology; and development of virtualization technology into CCTT in support of maneuver training for Armor Brigade Combat Teams.			
<b>FY 2019 Plans:</b> Will enable the continued development and integration of gaming technology; and development of virtualization technology into CCTT in support of maneuver training for Armor Brigade Combat Teams.			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY19 was funded at lower levels than FY18. The scope of development efforts will be reduced at a level commensurate with funding provided.			
<b>Accomplishments/Planned Programs Subtotals</b>	0.972	0.937	0.665

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• NA0170: <i>Close Combat Tactical Trainer</i>	47.962	45.718	33.080	-	33.080	46.156	34.420	23.543	16.059	0.000	246.938
• OMA, Appropriation 121018000, TCAT: <i>OMA, Appropriation 121018000 and 435104 TCAT</i>	2.950	3.246	7.913	-	7.913	8.239	7.241	6.736	5.401	Continuing	Continuing

**Remarks**  
The RDT&E efforts are essential to provide enhancements for the hardware and software of the program to meet warfighter mission priorities and validated requirements. These enhancements, after proper testing, will be procured and fielded with the programs procurement funds.

Civilian pay, per HQDA directive is now in OMA APE 435104. For CCTT, the civilian pay amount is approximately \$4.2M annually.

**D. Acquisition Strategy**  
All CCTT development will utilize small business competitively awarded contract vehicles or agreements with the Army Research Laboratory (ARL) and other Army programs for support of research and development.

**E. Performance Metrics**  
N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 571 / <i>Close Cbt Tact Trainer</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Government Program Management, Engineering, Technical, Contracting Support	Various	PEO STRI : Orlando, FL	17.707	0.163	Mar 2017	0.167	Oct 2018	0.169	Mar 2019	-		0.169	Continuing	Continuing	Continuing
<b>Subtotal</b>			17.707	0.163		0.167		0.169		-		0.169	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EMD Phase - Virtualization	C/T&M	AVT Simulation : Orlando, FL	1.872	0.809	Mar 2018	0.770	Mar 2018	0.496	Mar 2019	-		0.496	0.000	3.947	-
<b>Subtotal</b>			1.872	0.809		0.770		0.496		-		0.496	0.000	3.947	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
		Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date				
<b>Project Cost Totals</b>		19.579	0.972		0.937		0.665		-	0.665	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 571 / <i>Close Cbt Tact Trainer</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
P3I in Support of Gaming Technology and Virtualization for Man																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 571 / <i>Close Cbt Tact Trainer</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
P3I in Support of Gaming Technology and Virtualization for Maneuver Training	2	2015	2	2023

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>				<b>Project (Number/Name)</b> 577 / <i>Gaming Technology In Support Of Army Training</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
577: <i>Gaming Technology In Support Of Army Training</i>	-	1.903	0.536	2.268	-	2.268	2.273	1.615	1.725	0.913	0.000	11.233
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Games for Training (GFT) Program prepares Soldiers and leaders for combined arms maneuver operations for Force 2025 and beyond in support of the Joint Force and allies with tailorable and scalable training and mission rehearsal capabilities. Gaming Technology provides an application to train and rehearse convoy-operations, platoon level, mounted infantry tactics, dismounted operations, rules-of-engagement training, cross-cultural communications training, IED defeat training, route clearance, groundair coordination, Unmanned Aerial Vehicle (UAV) integration, and other small unit and individual training and mission rehearsal requirements. The GFT program satisfies the Active, the National Guard, and the Army Reserves' educational requirements in the Operational, Institutional, and Self-Development Training Domains with a low-overhead, flexible, persistent training capability on geo-specific and geo-typical terrain that is relevant with all military platforms and weapon systems. GFT comprehensively trains Company and below formations to operate in today's dynamic combat environment. GFT trains higher multi-echelon units and staffs without troops to meet Combatant Commanders' requirements.

FY 2019 base funding of \$2.268 million for Games for Training will provide improved Government data rights and integration of an extended capability for the GFT software, Virtual Battlespace 3 (VBS3). These capabilities are to include, but not limited to, adding jamming and communications, close air support, and medical competencies. Additionally, funds will be used to conduct development and integration activities of the GFT system to ensure interoperability with Live, Virtual and Constructive training simulations and Mission Command Systems, and compliance with Risk Management Framework (RMF) requirements.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Games for Training (GFT) program.	1.617	-	2.268
<b>Description:</b> Continue EMD phase contract activities for the GFT program.			
<b>FY 2019 Plans:</b> Funding will provide increased Government data rights and integration of enhanced capability for Virtual Battlespace 3 (VBS3) in achieving training requirements. These capabilities are to include, but not limited to, adding jamming and communications, close air support, and medical competencies. Additionally, funds will be used to conduct development and integration activities of the GFT system to ensure interoperability with Live, Virtual and Constructive training simulations and Mission Command Systems, and compliance with Risk Management Framework (RMF) requirements.			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 577 / <i>Gaming Technology In Support Of Army Training</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Increase in funding from FY18 to FY19 is result of the integration of capabilities and concurrency modifications for the GFT system to ensure integration compliance with Live, Virtual and Constructive simulations and Mission Command Systems.			
<b>Title:</b> Government Program Management for the GFT program.	0.286	0.536	-
<b>Description:</b> Government Program Management for the GFT program.			
<b>FY 2018 Plans:</b> Government program management, engineering, technical, contract and test activities to support market research for future commercial and Government gaming solutions.			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease in funding for FY18 to FY19 is a result of concluding market research efforts for the GFT flagship replacement. Additionally, decrease is due to government civilian labor cost being moved to 435104 OMA, in accordance with Army Policy.			
<b>Accomplishments/Planned Programs Subtotals</b>	1.903	0.536	2.268

<b>C. Other Program Funding Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• NA0176: <i>OPA 3, Appropriation NA0176 Gaming Technology in Support of Army Training</i>	11.543	5.406	25.471	-	25.471	18.564	17.006	14.527	7.396	Continuing	Continuing
• OMA, Appropriation 121018000: <i>OMA, Appropriation 121018000, TCAT</i>	0.241	0.250	0.279	-	0.279	0.435	0.448	0.461	0.475	Continuing	Continuing
• OMA, Appropriation, 435104000: <i>OMA, Appropriation, 435104000, TCAT</i>	-	-	0.682	-	0.682	0.695	0.710	0.724	0.740	Continuing	Continuing

**Remarks**  
OPA funding provides concurrency of the Virtual Battlespace 3 (VBS3) software that provides the Army enterprise use rights. Additionally, OPA funding conducts the procurement and fielding of the Stryker Virtual Collective Trainers (SVCT), new gaming hardware suites, and gaming system refreshes. The GFT program will also provide other commercial and Government off the-shelf game software applications used to train Active, Reserve, and Army National Guard soldiers in a PC based, shared environment. OMA funding supports system monitoring of the Games for Training hardware and software configuration, in addition to funding Government program management, engineering and technical oversight for the GFT program.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 577 / <i>Gaming Technology In Support Of Army Training</i>

**D. Acquisition Strategy**

The acquisition strategy supports Army-wide gaming software for a commercial game based training system with government data rights, Virtual Battlespace 3 (VBS3), and associated Games for Training system hardware. The hardware consist of a common desktop or laptop computer, headset, and peripherals. In support of concurrency initiatives to the COTS solution, the GFT program conducts development and integration activities for new models and visual concurrency for the VBS3 software baseline.

In FY17, the government awarded a firm-fixed price contract for concurrency of the VBS3 software, to include commercial software updates, and technical support for the VBS3 suite of products. Additionally, the government plans to procure VBS3 training support as well as commercial VBS3 software data rights to provide areas of training competency such as engineering tasks, call for fire, and the generation of supporting 3D models. The contract was awarded June 2017 with one base year and four (4) one year option periods.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604780A / Combined Arms Tactical Trainer (CATT) Core				577 / Gaming Technology In Support Of Army Training							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Program Management	Various	PEO STRI : Orlando, FL	1.853	0.286	Oct 2016	0.536	Nov 2017	-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			1.853	0.286		0.536		-		-		-	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Games for Training	Various	PEO STRI : Orlando, FL	9.286	1.617	Jan 2017	-		2.268	Dec 2018	-		2.268	Continuing	Continuing	Continuing
<b>Subtotal</b>			9.286	1.617		-		2.268		-		2.268	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			11.139	1.903		0.536		2.268		-		2.268	Continuing	Continuing	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 577 / <i>Gaming Technology In Support Of Army Training</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
GFT Program Management																												
GFT Integration with LVC																												
GFT Verification Testing																												
GFT Software Development and Integration																												
GFT Market Research																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 577 / <i>Gaming Technology In Support Of Army Training</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
GFT Program Management	1	2010	4	2018
GFT Integration with LVC	1	2010	4	2023
GFT Verification Testing	4	2013	4	2023
GFT Software Development and Integration	1	2016	4	2023
GFT Market Research	1	2017	4	2018

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 582 / <i>Synthetic Envir Core</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
582: <i>Synthetic Envir Core</i>	-	9.000	11.513	9.729	-	9.729	9.830	9.863	10.044	9.904	0.000	69.883
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project supports the Synthetic Environment Core (SE Core) Program. The Synthetic Environment Core (SE Core) Program is a foundational element and the only provider of correlated terrain for the Army's Live, Virtual, Constructive Integrated Training Environment (LVC ITE) that links Army training systems and simulators into an integrated and interoperable environment. SE Core's mission is to ensure that Army systems and simulators support U.S. Army Readiness by providing visual models (buildings and vehicles), terrain (over which the simulator moves), and entity behaviors (models performing realistic and appropriate actions such as movement and weapon effects) that are relevant and realistic to Force 2025 and beyond. As the exclusive provider of correlated terrain, SE Core ensures that all Army simulators/operators receive terrain that allows for a "Fair Fight" capability; that is, no one will have an inherent advantage over another because training did not occur on a "level playing field". Fair Fight allows air and ground forces to hold coordinated and integrated training events that accurately replicate combat operations for a train-as-we-fight capability.

A major component of the program is the SE Core-developed Standard Terrain Database Generation Capability (STDGC), the process used to build the terrain and models that the simulators and simulations employ. The Army Geospatial Center (AGC) gave SE Core its highest rating, the "Gold Standard", based on the quality of the STDGC process and the geospatial data generated by it. The program has been a certified, AGC co-producer of geospatial data since 2014. In addition to the correlated terrain databases and common visual models, SE Core components include Virtual One Semi-Automated Forces (Virtual OneSAF) (the computer generated force behaviors for virtual systems); the virtual systems architecture; and mission command development.

FY2019 base funding of \$9.729 million for SE Core will continue the development of the STDGC terrain generation capability to ensure the process remains AGC certified and that the correlated terrain databases maintain the "Gold Standard" quality rating and remain concurrent with supported training systems. FY19 funds will continue developing and integrating the tools and process for constructive terrain database generation. Additionally, funds will be used to enhance subterranean and building interiors capabilities for incorporation into the STDGC baseline to provide interoperability across training simulators and simulations. SE Core will continue to enhance Virtual OneSAF in the SE Core Architecture and develop, upgrade, integrate and refine the common visual models with FY19 funds.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019
<b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Synthetic Environment Core (SE Core) program.	7.412	9.841	9.214
<b>Description:</b> Continue EMD phase contract activities for the SE Core program.			
<b>FY 2018 Plans:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 582 / <i>Synthetic Envir Core</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>Satisfy requirements necessary to initiate Increment 3. Efforts will continue to automate the terrain generation capability to meet the demand for synthetic terrain for constructive and gaming training. Will also continue to increase interoperability across simulators and simulations by improving subterranean capabilities and building interiors. Will begin development of new tools and processes needed to support the Dense Urban Terrain environment requirement.</p> <p><b>FY 2019 Plans:</b> Continue to fulfill requirements of Increment 3. Efforts to automate the terrain generation capability to meet the demand for synthetic terrain for constructive and gaming training will continue. Will continue to increase interoperability across simulators and simulations by improving subterranean capabilities and building interiors. Will research requirements and begin systems engineering required to add additional LVC-IA system formats into the terrain generation process.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease between FY18 to FY19 is a result from accelerating development of new tools and processes to support the complex Dense Urban Terrain environment requirements in FY18.</p>				
<p><b>Title:</b> Government Program Management for the Synthetic Environment Core (SE Core) program.</p> <p><b>Description:</b> Government Program Management for the SE Core program.</p> <p><b>FY 2018 Plans:</b> Will provide program management, engineering and technical oversight, contract support, and travel for support of site surveys and Subject Matter Experts for the development of SE Core under the newly awarded contract.</p> <p><b>FY 2019 Plans:</b> Will provide funding for program management travel supporting site surveys, in addition to, funding the Subject Matter Experts providing technical oversight in the development of SE Core terrain generation capability.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease from FY18 to FY19 is due to government civilian labor cost being moved to 435104 OMA, in accordance with Army Policy.</p>		1.588	1.672	0.515
<b>Accomplishments/Planned Programs Subtotals</b>		9.000	11.513	9.729

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 582 / <i>Synthetic Envir Core</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• OMA, Appropriation, 121018000: <i>OMA, Appropriation</i> 121018000, <i>TBWG</i>	16.829	16.915	14.927	-	14.927	15.470	15.883	17.483	17.336	Continuing	Continuing
• OMA, Appropriation, 435104000: <i>OMA, Appropriation</i> , 435104000, <i>TBWG</i>	-	-	1.268	-	1.268	1.292	1.673	1.708	1.698	Continuing	Continuing
• OMA, Appropriation, 435A98000: <i>OMA, Appropriation</i> , 435A98000, <i>TBWG</i>	-	0.157	0.000	-	0.000	-	-	-	-	0.000	0.157

**Remarks**

OMA funds are used to generate and maintain the synthetic terrain, models, and virtual OneSAF for the Army's Integrated Training Environment (ITE) concept. Additionally, OMA funds provides Government Program Management Oversight of aforementioned activities.

**D. Acquisition Strategy**

The SE Core program is post Milestone B and will remain in the Engineering and Manufacturing Development phase for the remainder of its lifecycle. SE Core is a "software only" program that continuously develops terrain, virtual models and other software products for integration into existing training systems. It does not field products to the end user, therefore the program will not require a Milestone C decision or go into the Production phase. The SE Core program is developing the software tools and processes to develop the Army's common virtual environment to link simulation devices [to include: Close Combat Tactical Trainer (CCTT), Aviation Close Combat tactical Trainer (AVCATT), Games for Training (GFT), Live, Virtual, Constructive Integrating Architecture (LVC-IA), Homestation Instrumentation Training System (HITS), Joint Land Component Constructive Training Capability (JLCCTC), Fires Simulation (FIRESIM), One Semi-Automated Forces (OneSAF)] into an interoperable environment and maintaining the synthetic terrain, models, and virtual OneSAF for the Army's Integrated Training Environment (ITE) concept.

The government awarded Increment 2 as a single award, cost plus fixed fee (CPFF), indefinite delivery indefinite quantity (IDIQ) contract to Leidos in August 2011 with a period of performance start date of December 2011. Leidos was formerly known as Science Applications International Corporation (SAIC). This contract has a one-year base with four one-year options. The government exercised the first option in December 2012, the second option in December 2013, the third option in December 2014 and the fourth option in December 2015. The government awarded a final delivery order in December 2016 that extended the period of performance of the Increment 2 contract into December 2017.

In keeping with the original SE Core acquisition strategy of continuous development, the government intends to award the Increment 3 contract as a single award, CPFF, IDIQ contract in FY18. Increment 3, which will add the Dense Urban Terrain requirements, additional systems and formats, will align with the contract period of performance. The contract will have a one year base and four one-year options with a target end date of 2022.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 582 / <i>Synthetic Envir Core</i>

<b><u>E. Performance Metrics</u></b> N/A
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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 582 / <i>Synthetic Envir Core</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	Various	Various : Various	3.622	-		-		-		-		-	0.000	3.622	3.622
Government Program Management Support	Various	PEO STRI : Orlando, FL	23.803	1.588	Nov 2016	1.672	Oct 2017	0.515	Oct 2018	-		0.515	Continuing	Continuing	Continuing
<b>Subtotal</b>			27.425	1.588		1.672		0.515		-		0.515	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Technology Development - Architecture and Integration	C/CPFF	SAIC : Orlando, FL	6.946	-		-		-		-		-	0.000	6.946	6.946
Technology Development -Architecture and Integration	C/CPFF	SAIC : Orlando, FL	50.785	-		-		-		-		-	0.000	50.785	50.785
Technology Development -Database Virtual Environment Development	C/CPFF	CAE, USA : Orlando, FL	56.179	-		-		-		-		-	0.000	56.179	56.179
Technology Development-Common Virtual Environment & Management	C/CPFF	Leidos : Orlando, FL	69.275	7.412	Dec 2016	-		-		-		-	0.000	76.687	-
Technology Development-Common Virtual Environment & Management INC III	C/TBD	ACC-Orlando : Orlando, FL	-	-		9.841		-		-		-	0.000	9.841	-
Technology Development-Common Virtual Environment & Management INC III	Option/ TBD	ACC - Orlando : Orlando, FL	-	-		-		9.214	Nov 2018	-		9.214	0.000	9.214	-
<b>Subtotal</b>			183.185	7.412		9.841		9.214		-		9.214	0.000	209.652	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 582 / <i>Synthetic Envir Core</i>
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<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

**Remarks**  
FY18 planned award date for Technology Development- Common Virtual Environment & Management INC III is slated for November 2017.

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Technology Development - Test Support	Various	Test Community : Various	0.125	-		-		-		-		-	0.000	0.125	0.125
<b>Subtotal</b>			0.125	-		-		-		-		-	0.000	0.125	N/A

**Remarks**  
Not Applicable

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	210.735	9.000	11.513	9.729	-	9.729	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 582 / <i>Synthetic Envir Core</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Increment 2 (Development and Integration)																												
Increment 3 (Development and Integration)																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 582 / <i>Synthetic Envir Core</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Increment 2 (Development and Integration)	4	2013	1	2018
Increment 3 (Development and Integration)	1	2018	4	2023

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>			<b>Project (Number/Name)</b> 585 / <i>Aviation Combined Arms Tactical Trainer</i>				
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
585: <i>Aviation Combined Arms Tactical Trainer</i>	-	2.663	5.580	9.302	-	9.302	2.800	2.856	0.000	0.000	0.000	23.201
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Aviation Combined Arms Tactical Trainer (AVCATT) is Army Aviation's only Collective Training Program of Record for Active, Reserve, and Army National Guard Aviation Units. AVCATT enables unit collective and combined arms air-ground training for AH-64, UH-60, CH-47, and UH-72 aircrews within the Live, Virtual and Constructive (LVC) Integrated Training Environment (ITE). The AVCATT also supports the training of Non-Rated crew members in crew coordination, flight, aerial gunnery, hoist, and slingload related tasks via the Non-Rated Crew Member Manned Module (NCM3); which can be linked to AVCATT's UH-60, CH-47, and UH-72 cockpit configurations to support a unit's specific Mission Training Requirements.

FY2019 base funding of \$9.302M for AVCATT will design and develop software to inter-operate with other training devices and simulators in a Common Operating Environment (COE). This is required to enable training with the Universal Mission Simulator, Close Combat Tactical Trainers (CCTT), Games For Training, and LVC-IA. Additionally, the base funding will be used to design and develop the replacement of the Image Generator system as part of hardware modernization.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Government Program Management for the Aviation Combined Arms Tactical Trainer (AVCATT) program.	0.435	0.104	0.106
<b>Description:</b> Government Program Management for the AVCATT program.			
<b>FY 2018 Plans:</b> Will support government program management, engineering, technical, contracting support, and continues operational evaluation support.			
<b>FY 2019 Plans:</b> Program Management costs were increased to reflect inflation.			
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY17 RDTE program management costs were higher due to RDTE-specific requirements being imposed for one year. Changes to reflect inflation in FY19 compared to FY18 costs.			
<b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Aviation Combined Arms Tactical Trainer (AVCATT) program.	2.228	5.476	9.196
<b>Description:</b> Continue EMD phase contract activities for the AVCATT program.			

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 585 / <i>Aviation Combined Arms Tactical Trainer</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019
<p><b><i>FY 2018 Plans:</i></b> Will complete development and testing for new interfaces and protocols for the system to inter-operate with other training devices and simulators in a Common Operating Environment (COE). Will begin design and development of upgraded image generators in preparation for FY20 planned hardware modernization.</p> <p><b><i>FY 2019 Plans:</i></b> Continue EMD phase contract activities for the AVCATT program. Replacement of both the AVCATT and NCM3 Image Generators with next generation, game based, cloud delivered rendering technology and the modification of existing AVCATT and NCM3 software baselines and data products (17 terrain databases and hundreds of 3D visual models) to accommodate the new image generator technology are planned.</p> <p><b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> FY19 RDTE funding increases in FY19 to align with projected award of the AVCATT Modernization / Tech Refresh contract and beginning of a three year RDT&amp;E modernization cycle. Replacement of both the AVCATT and NCM3 Image Generators with next generation, game based, cloud delivered rendering technology and the modification of existing AVCATT and NCM3 software baselines and data products (17 terrain databases and hundreds of 3D visual models) to accommodate the new image generator technology are planned. Enhancements to the NCM3 radio communications system are also planned.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	2.663	5.580	9.302

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• NA0173: <i>OPA3, Appropriation</i>	40.000	30.568	24.599	-	24.599	34.665	32.774	36.758	37.455	Continuing	Continuing
<i>NA0173 Aviation Combined Arms Tactical Trainer</i>											
• <i>Operations and Maintenance, Army: OMA, Appropriation 435104 TCAT</i>	-	-	1.025	-	1.025	1.044	1.064	1.087	1.110	0.000	5.330

**Remarks**  
Civilian pay, per HQDA directive is now in OMA APE 435104. No other OMA exists for the AVCATT program of record at this time.

**D. Acquisition Strategy**  
The government awarded a single award, cost plus fixed fee (CPFF), indefinite delivery indefinite quantity (IDIQ) contract to Applied Visual Technologies, a minority owned, small disadvantaged business, in December 2012. The period of performance of the base contract is through December 2017. Additional tasks are exercised

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 585 / <i>Aviation Combined Arms Tactical Trainer</i>
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through delivery orders which each have multiple options for development. The most recently awarded RDTE effort was on the fourth delivery order, awarded in September 2014, which included options for gunnery enhancements, integrated data modem development, training environment virtualization, aviation mission planning software development, maintenance tool kit development, manned unmanned teaming, and AH-64E concurrency development.

The government awarded a single award, CPFF, IDIQ services contract to Cole Engineering Services, Inc, a small business, in September 2015. The period of performance of the base contract is through September 2020. The third task order, awarded in June 2016, included hardware modernization development and Windows 10 research and testing.

AVCATT utilizes small business competitively awarded contract vehicles when able. Currently small businesses are conducting development for dynamic terrain enhancements, NCM3 development, and training effectiveness analysis.

The AVCATT program is post Milestone C. Although the system is in the production phase, continuous research, development, testing, and engineering is required in order to maintain concurrency with the real world aircraft and systems that the AVCATT simulates in the virtual training environment. The AVCATT program has fielded the full base order of issue of 23 suites but continues to release incremental hardware and software upgrades at approximate semiannual intervals. RDTE efforts will conclude in FY21, as system begins its transition into sustainment.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 585 / <i>Aviation Combined Arms Tactical Trainer</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AVCATT Program Management Support	Various	PEO STRI : Orlando, FL	3.109	0.435	Oct 2016	0.104	Oct 2017	0.106	Oct 2018	-		0.106	0.000	3.754	-
<b>Subtotal</b>			3.109	0.435			0.104			-		0.106	0.000	3.754	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AVCATT Interoperability	C/CPFF	Cole Engineering Services, INC : Orlando, FL	-	-		2.938		1.042	Jul 2019	-		1.042	0.000	3.980	-
AVCATT Image Generators	C/CPFF	Cole Engineering Services, INC : Orlando, FL	-	-		2.538		8.154	May 2019	-		8.154	0.000	10.692	-
AVCATT Virtualization - Manned Module	C/CPFF	Cole Engineering Services, INC : Orlando, FL	-	2.228	Jan 2017	-		-		-		-	0.000	2.228	-
<b>Subtotal</b>			-	2.228		5.476		9.196		-		9.196	0.000	16.900	N/A

**Remarks**  
Change in FY17 cost categories reflect shift of program priorities. Specifically, interoperability and image generator development are more critical to training than maintenance tool kits or planning software.

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	3.109	2.663	5.580	9.302	-	9.302	0.000	20.654	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 585 / <i>Aviation Combined Arms Tactical Trainer</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
AVCATT Virtualization - Manned Module																												
AVCATT Interoperability																												
AVCATT Image Generator																												
AVCATT Flight Model Upgrade																												
AVCATT/NCM3 Interoperability																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604780A / <i>Combined Arms Tactical Trainer (CATT) Core</i>	<b>Project (Number/Name)</b> 585 / <i>Aviation Combined Arms Tactical Trainer</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
AVCATT Virtualization - Manned Module	2	2017	4	2017
AVCATT Interoperability	2	2018	4	2019
AVCATT Image Generator	2	2018	3	2020
AVCATT Flight Model Upgrade	1	2020	4	2020
AVCATT/NCM3 Interoperability	1	2021	4	2021

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	101.927	145.360	49.288	-	49.288	59.097	59.815	60.491	61.459	0.000	537.437
DY3: <i>NIE Test &amp; Evaluation</i>	-	41.885	58.395	22.683	-	22.683	23.530	23.677	23.541	23.508	0.000	217.219
DY5: <i>Production/Field Coordination for Capability Sets</i>	-	4.660	4.261	4.242	-	4.242	4.301	4.391	4.369	4.462	0.000	30.686
DY7: <i>Army Systems Engineering, Architecture &amp; Analysis</i>	-	18.802	15.508	15.610	-	15.610	24.377	24.760	25.449	25.939	0.000	150.445
DZ6: <i>Army Integration Management &amp; Coordination</i>	-	8.915	6.775	6.753	-	6.753	6.889	6.987	7.132	7.550	0.000	51.001
FG7: <i>Emerging Technology Initiatives</i>	-	27.665	60.421	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	88.086

**Note**  
 Project FG7 Emerging Technology Initiatives was created in support of the Army Rapid Capabilities Office (RCO). This project was realigned to PE 0605054A Emerging Technologies Initiatives in FY 2019 for greater transparency of the Army RCO efforts.

**A. Mission Description and Budget Item Justification**

This program element is comprised of five projects: Network Integration Evaluation (NIE) Test and Evaluation; Production/Field Coordination for Capability Sets; Army Systems Engineering, Architecture & Analysis; Army Integration Management & Coordination; and Emerging Technology Initiatives. The specific evaluation requirements will support Mission Command Network 2020, Force 2025 objectives, and emerging technology insertion.

Project DY3: Network Integration Evaluation (NIE) Test & Evaluation, synchronizes, integrates, and manages system and System of Systems (SoS) network capability evaluations in laboratory and operational environments in order to inform Army force modernization decisions that impact network improvements, interoperability compliance, operational readiness, and exploitable technology opportunities.

Project DY5: Production/Fielding Coordination for Capability Sets, provides for the development of a synchronized Brigade/Division level plan for the Production equipment delivery and Fielding (hand-off logistics and new equipment training) of Capability Set (CS) components (both hardware/software in A and/or B Kits) upon completion of Network Integration Evaluation (NIE), Army Interoperability Certification (AIC) and Army CS fielding decision.

Project DY7: Army System Engineering, Architecture & Analysis, provides the Army's leadership and materiel developers with the necessary modernization planning, System of Systems (SoS) engineering, technical analysis, architectural products, critical path analysis, and risk analysis and mitigation planning to influence the Army's materiel portfolio. This project also explicitly funds Cyber Security engineering, architecture and development tasks necessary to create effective, affordable and secure



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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>
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network capabilities that address critical gaps, meet Mission Command Network (MCN) 2020 objectives and/or Force 2025 and Beyond (F2025B) initiatives. Integration of Army defensive/offensive cyber and Position, Navigation, and Timing (PNT) capabilities into the overall CS design, Multinational/Mission Partner Environments architecture development at both the tactical and enterprise levels, network modernization risks/gaps for Corps level units and below, and Army spectrum strategy.

Project DZ6: Army Integration Management & Coordination, provides for all "shared" functions (Human resources, Budget development and executions, Acquisition, Operations, Program Coordination, Facilities management) and headquarters functions that supports the technical aspects of the Network integration, Platform integration, Brigade Integration and the Production Integration and coordination and synchronized fielding teams.

Project FG7: Emerging Technology Initiatives, will fund prototyping and demonstration of selected technology enabled capabilities to defeat emerging threats against ground, aviation, command, control, communications & reconnaissance systems and equipment, precision weapons, and Soldier equipment. Funding facilitates maturation and demonstration of emerging technologies and systems in relevant varied environments and tactical/operational scenarios. The focus is to mature technologies with a goal of initial production, limited fielding, and transition to a Program of Record in an Army or DoD Program Management Office.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	146.655	145.360	128.742	-	128.742
Current President's Budget	101.927	145.360	49.288	-	49.288
Total Adjustments	-44.728	0.000	-79.454	-	-79.454
• Congressional General Reductions	-0.035	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.681	-			
• Adjustments to Budget Years	-	-	-39.463	-	-39.463
• Transfer funding from PE0604798A (FG7) to PE060505A (FI3)	-	-	-39.991	-	-39.991
• RAA not appropriated	-42.012	-	-	-	-

**Change Summary Explanation**

FY 2017 funds in the amount of (-\$2.681) million were transferred to support SBIR/STTR from project DY3.

FY 2017 program changes reflect \$42.012 million not appropriated in the request for additional appropriations for FY 2017 to support the Army's Rapid Capabilities Office (RCO) efforts.

FY 2019 program change reflects the \$39.991 million of funding under project PE0604798A FG7 moving to PE0605054A project FI3.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army Date: February 2018

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>

FY 2019 program changes also reflects \$39.463 million of funding removed [\$21.924 million from DY3 for Cross Functional Teams (CFTs); \$14.558 million from DY3 for FY17 Under Execution; and \$2.981 million in Economic Adjustments (Army) from all projects (\$2.317 million from DY3; \$0.107 million from DY5; \$0.388 million from DY7; \$0.169 million from DZ6)]

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>					<b>Project (Number/Name)</b> DY3 / <i>NIE Test &amp; Evaluation</i>		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
DY3: <i>NIE Test &amp; Evaluation</i>	-	41.885	58.395	22.683	-	22.683	23.530	23.677	23.541	23.508	0.000	217.219
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Project DY3: Network Integration Evaluation (NIE) Test & Evaluation, synchronizes, integrates, and manages system and System of Systems (SoS) capability assessments in laboratory and operational environments in order to inform Army force modernization decisions that impact system improvements, interoperability compliance, operational readiness, and exploitable technology opportunities.

In FY2018 there are two planned events: a NIE and a Joint Warfighting Assessment (JWA) [formerly known as an Army Warfighting Assessment (AWA)]. The NIE will focus on testing of Programs of Record (PoR) in support of synchronized Capability Set (CS) fielding of network and mission command systems. The JWA will focus on Force 2025 concepts; interoperability & Army Warfighting Challenges (AWFCs); and emerging capabilities. Beginning in FY2019, in accordance with readiness demands and the Army's new modernization approach, the mission will shift to only support Warfighter Assessment events with focus on Joint Multination Interoperability and concept development. This change will affect associated integration and management processes by reducing the formal rigor associated with PoR testing and shifting to an experimentation model, with prototype-level designs and increased unit ownership of preparation tasks.

These funds support the following major efforts associated with an assessment:

- Planning: coordination with multiple stakeholders on the participation and resourcing of personnel, services, equipment and prototypes, and other deliverables needed for lab based risk reduction (LBRR), capability and platform integration, training, field support and logistics, event battle rhythm/schedule, and developing network data products.
- Preparation: Conduct LBRR, complete integrated vehicle designs, build prototype vehicles for safety release, conduct platform installation and checkout, validate the network, and obtain Information Assurance certifications.
- Execution: technical and logistics support during soldier-led assessments, trouble ticket management and closeout, and field support management.
- Close-out: inventorying platforms, de-installing equipment, returning platforms to their original configurations.

These funds may also be used for procuring equipment and materials (to include prototypes, when required), event infrastructure, field services, personnel (government and contractor), and travel.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Integrated Evaluations	39.000	55.934	21.548
<b>Description:</b> These funds enable assessments of capabilities in laboratory and operational environments across the Army battlespace to assess the systems, SoS, and inform system development and fielding decisions. These funds support event planning, preparation, execution, and close-out.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY3 / <i>NIE Test &amp; Evaluation</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p><b>FY 2018 Plans:</b></p> <p>Overview:                      These funds provide for Planning, Preparation, Execution, and Close-out for two planned evaluation events (JWA 18.1 and NIE 18.2); and initial planning and procurement of long lead items for the next event (JWA 19.1).                      For both events, Planning, Platform Preparation, Execution and Close-out are expected to occur at the unit?s home station. Required program management, engineering, and vehicle integration resources will deploy to the unit?s home station to integrate network systems onto brigade platforms and validate network performance. The evaluation execution will then take place. At the conclusion of the NIE/JWA, the unit and integration team will demod platforms and return them to baseline configuration. Support listed below is common to both events unless otherwise noted and consists of the following activities.</p> <p>Planning:                      These funds provide for coordination with Training and Doctrine Command (TRADOC), Headquarters, Department of the Army G-3/5/7, and Assistant Secretary of the Army for (Acquisition, Logistics, &amp; Technology) ASA (ALT) PEOs to align capabilities/ technologies to Focused End States (FES) for each event. Support development and implementation of Horseblanket architecture and engineering analysis of design requirements and platform Size, Weight, and Power (SWaP) constraints that may impact inclusion of proposed systems in the event architecture. Conduct detailed planning sessions (?Bullpens?) to finalize system parameters and characteristics needed for platform/system engineering designs, determine and verify network accreditation status, identify supporting hardware and software requirements, finalize product delivery schedules, and synchronize the Integrated Master Schedule (IMS) with all lower tier integration schedules.</p> <p>These funds support planning for the network Validation Exercise (VALEX) to support the operational exercise. This effort includes developing a VALEX site plan, assigning unit locations within the VALEX location; identifying and resolving security issues associated with running classified and/or coalition network operations; validating all Information Assurance Accreditations for networked C4ISR systems, and developing of technical mission threads used to validate the network.</p> <p>These funds also support development of Network Architecture, Transport View, and Interconnecting Diagrams that are critical for defining the network system configurations, routing schemes, and architectures for networked systems/devices, as well as a spectrum plan to allocate and de-conflict operating frequencies.</p> <p>Event Preparation:                      These funds support efforts leading up to the execution of the Evaluation exercise to include LBRR, design refinement, Bill of Material (BOM) development, Configuration Management (CM), integration material procurement and manufacturing, Golden Vehicle (GV) build, safety release, Fleet build, VALEX, management of field support representatives (FSR) and products to be evaluated.</p> <p>The LBRR risk reduction efforts for the NIE and AWA are conducted in controlled laboratory environment to identify and resolve integration, configuration and interoperability issues prior to the operational events. LBRR efforts use PoR hardware/software,</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
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**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019
<p>validated communications threads, and the data products to ensure the network effectively represents the event networks. Test products delivered by the LBRR document the results of network functional testing, routing, and thread testing. These funds also provide LBRR SMEs on-site VALEX support to conduct analysis efforts designed to improve future Army networks and end states, and oversee blue/red teaming.</p> <p>These funds further refine the engineering design packages (drawings, diagrams, and other guides/documentation); development of Bills of Material (BOMs) needed to support integration of an estimated 3000 Command, Control, Communications, and Computer Intelligence, Surveillance, and Reconnaissance (C4ISR) systems and their A/B Kits on to approximately 250 tactical platforms; Configuration Management (CM) for the event network architecture, all platforms, systems, system of system engineering designs, A-Kits, B-Kits, and the IMS; management of the Authority to Connect (ATC) process; risk analysis for the Operational Test Network (OTN); Procurement of approximately 20,000 items (e.g., fasteners, cables, components, Prototypes (as required), and other items) needed to support NIE/AWA; and fabrication of approximately 1,000 specialized cables, metal plates, racks, and brackets to enable platform installation/integration.</p> <p>These funds also enable design, integration, and safety release testing of Prototype or Golden Vehicles (GV) [NIEs average 50 GVs and AWAs require approximately 25 GVs] and Fleet build of approximately 250 tactical platforms. For each event, the scope of the integration effort includes management of approximately 500 Field Service Representatives (FSRs) that support all installation teams, coordination and movement of the Fleet vehicles, inventory management of systems, instrumentation, and integration material.</p> <p>Following completion of platform integration efforts, these funds support a structured network VALEX consisting of four subordinate efforts: Load Exercise (LOADEX), ESTABLISH, INTEGRATE, and VALIDATE.</p> <p>? LOADEX; Installation of network system hard drives, operating system software, software applications, and firmware on up to 3000 systems. Set Internet Protocol (IP) addresses and configure all network systems; load and initialize radio mission plans, system configuration files and system parameters on up to 400 platforms; and perform test/fix/test processes at the system and component levels.</p> <p>? ESTABLISH; Verification of networked hardware and software performance at the platform level. Troubleshoot issues associated with network system configurations and verify that each integrated platform can perform its mission while operating on the network.</p> <p>? INTEGRATE; Verification of networked hardware/software performance and networked communications at each echelon. Troubleshoot any issues found and ensure tactical unit information exchange will enable units to support their intended missions. Ensure instrumentation is operational, collecting data, and storing the data as required. Provide over-the-shoulder training for Soldiers.</p> <p>? VALIDATE; Execution of up to 40 mission threads to verify the correct routing of messages and information transfer among critical nodes in the network. For Systems Under Test, ensure instrumentation is properly configured for capturing and logging data, enabling Army Test and Evaluation Command (ATEC) and Training and Doctrine Command (TRADOC) assessments and evaluations.</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
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**B. Accomplishments/Planned Programs (\$ in Millions)**

Coordination with System Owners, vendors, and Joint Modernization Command (JMC) for New Equipment Training (NET) training package development/delivery and manage training for approximately 1,000 soldiers. Platform integration and VALEX efforts may encompass coordination with CS design teams. Funding will ensure equipment and network interface designs support the CS architecture; verify CS training support requirements; establish methods for informing CS design teams on issues and/or trends; address Integrated Logistics System (ILS) requirements; and capture lessons learned from After Action Reviews (AARs), Technical Reports, and Feedback on CS issues.

Evaluation Event Execution:  
Funding supports all field operations of approximately 500 FSRs and 50 CPD personnel that provide support to the unit during the events and coordination with ATEC and TRADOC. It also includes monitoring of network operations in the field, trouble ticket management, continued LBRR support to troubleshoot technical issues, data capture and analysis, red/blue team cyber support, deployment of mobile facilities, and replacement parts/components required to effectively complete detailed evaluations.

Closeout:  
These funds support all activities associated with the de-installation and recovery of network systems, components, A-kits, cabling installed on platforms, and restoration of platforms to baseline configurations. Removal, inspection, repair/replacement, shipping, and storing of all materiel and infrastructure used to enable the unit to execute the event. Analyze data and publish reports on how well systems performed and recommendations for future fielding. Conduct AARs for process improvements.

Future Planning:  
These funds support efforts to provide technical input on candidate systems at the Technical Interchange Meetings, Concepts and Capabilities Review Board, and Strategic Planning Reviews for future events. Funding also supports Network SoS performance analyses of future CS reference architectures, performance validation, predictive analysis (to include operational impact assessment of the proposed architectural COAs), sustainment improvement analysis; and assessments of Position, Navigation and Timing (PNT), Cyber, Electronic Warfare solutions performance.

**FY 2019 Plans:**  
Overview:  
These funds provide for Close out of NIE 18.2; Planning, Preparation, Execution, and Close-out for JWA 19; and initial planning for JWA 20. Planning and Preparation are expected to occur at Ft Bliss, TX, while, Execution and Close-out are expected to occur at various locations such as the unit's home station or a Combined Arms Training Center.

Planning:  
These funds support the development and implementation of horse blanket architecture, conducting design activities for integration of capability onto unit vehicles, exercise planning and coordination, to include:  
Developing a Validation Exercise (VALEX) plan that configures and checks out the system of systems prior to the exercise; assigning unit locations within the VALEX location; identifying and resolving security issues associated with running classified and/

FY 2017	FY 2018	FY 2019

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>or coalition network operations; validating all Information Assurance Accreditations for networked C4ISR systems, and developing of technical mission threads used to validate the capabilities. These funds also support defining the network system configurations and routing schemes for each event.</p> <p>Preparation: These funds support efforts leading up to the execution of the assessment exercise, to include LBRR, vehicle integration design and build, safety release, and conducting of VALEX. The LBRR risk reduction efforts are conducted in controlled laboratory environments to identify and resolve integration, configuration and interoperability issues prior to assessments. Reports delivered by the LBRR document the results of network functional testing, routing, and thread testing. These funds provide for integration efforts such as design of installation kits on tactical platforms; fabrication of specialized cables, metal plates, racks, and brackets to enable platform installation/integration; and safety release testing. The scope of the integration effort also includes planning for Field Service Representatives (FSRs) and other technical support personnel, coordination and movement of the Fleet vehicles, and inventory management of systems. Following completion of platform integration efforts, these funds support a structured network VALEX consisting of four subordinate efforts: Load Exercise (LOADEX), ESTABLISH, INTEGRATE, and VALIDATE. -LOADEX; Support unit installation of new network capabilities into existing network, to include setting Internet Protocol (IP) addresses and configure network systems changes; modify radio mission plans, system configuration files and system parameters; and perform test/fix/test processes at the system and component levels. -ESTABLISH; Verification of new hardware and software performance at the platform level. Troubleshoot issues associated with network system configurations and verify that each integrated platform can perform its mission while operating on the network. -INTEGRATE; Verification of networked related hardware/software performance and networked communications at each echelon. Troubleshoot issues found with new capabilities and ensure tactical unit information exchange will enable units to support their intended missions. -VALIDATE; Support unit conduct of mission threads to verify the correct routing of messages and information transfer among critical nodes in the network.</p> <p>Execution: Funding supports all management and synchronization of field operations and support personnel during the events, and coordination with the supported command. It also includes monitoring of network operations in the field, trouble ticket management, continued LBRR support to troubleshoot technical issues, deployment of mobile facilities, and replacement parts/ components required to effectively support concepts and capabilities under assessment.</p> <p>Closeout:</p>				

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>These funds support all activities associated with the de-installation and recovery of systems, components, A-kits, cabling installed on platforms, and restoration of platforms to baseline configurations. Removal, inspection, repair/replacement, shipping, and storing of all materiel and infrastructure used to enable the unit to execute the event. Conduct AARs for process improvements.</p> <p>Future Planning: These funds support efforts to provide technical input on candidate systems at the Concepts and Capabilities Review Board and Strategic Planning Reviews for future events.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Based upon elimination of NIEs, in accordance with readiness demands and the Army's new modernization approach, the mission will shift to only support Warfighter Assessment events.</p>				
<p><b>Title:</b> Infrastructure and other support</p> <p><b>Description:</b> Provides for setup, utilities, furniture, equipment and maintenance (of all equipment and facilities) used by SoSE&amp;I (CPD) in support of Network Integration Evaluations (NIE) and Joint Warfighting Assessments (JWA).</p> <p><b>FY 2018 Plans:</b> Provides for setup, utilities, furniture, equipment and maintenance (of all equipment and facilities) used by SoSE&amp;I (CPD) in support of Network Integration Evaluations (NIE) and Joint Warfighting Assessments (JWA). It includes lease and support maintenance contracts for Government Service Administration (GSA) vehicles, IT equipment/support and facilities to support NIEs and JWAs.</p> <p><b>FY 2019 Plans:</b> Provides for setup, utilities, furniture, equipment and maintenance (of all equipment and facilities) used by SoSE&amp;I Capability Package Directorate (CPD) in support of assessments. It includes lease and support maintenance contracts for IT equipment/support and facilities.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Based upon infrastructure needs and varying locations.</p>		2.885	2.461	1.135
<b>Accomplishments/Planned Programs Subtotals</b>		41.885	58.395	22.683



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
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**C. Other Program Funding Summary (\$ in Millions)**

<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>			<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To</b>	
			<b>Base</b>	<b>OCO</b>	<b>Total</b>					<b>Complete</b>	<b>Total Cost</b>
• DY5: <i>Production/Fielding Coordination for Capability Sets</i>	4.660	4.261	4.242	-	4.242	4.301	4.391	4.369	4.462	Continuing	Continuing
• DY7: <i>Army Systems Engineering, Architecture and Analysis</i>	18.802	15.508	15.610	-	15.610	24.377	24.760	25.449	25.939	Continuing	Continuing
• DZ6: <i>Army Integration &amp; Coordination Management</i>	8.915	6.775	6.753	-	6.753	6.889	6.987	7.132	7.550	Continuing	Continuing
• FG7: <i>Emerging Technology Initiatives</i>	27.665	60.421	0.000	-	0.000	-	-	-	-	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

This project includes competitive contracts for test support services. Additional competitive contracts are awarded by Defense Information Systems Agency (DISA) for satellite support.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY3 / <i>NIE Test &amp; Evaluation</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Core Government Labor	Allot	SoSE&I : Various	-	-		4.056	Nov 2017	4.278	Nov 2018	-		4.278	Continuing	Continuing	-
Matrix Government Labor	MIPR	SoSE&I : Various	-	-		3.331	Nov 2017	1.665	Nov 2018	-		1.665	Continuing	Continuing	-
MITRE Labor	FFRDC	MITRE : Various	-	-		1.820	Nov 2017	0.910	Nov 2018	-		0.910	Continuing	Continuing	-
Contractor SETA Labor	C/CPFF	TBD : Various	-	-		5.620	Nov 2017	2.967	Nov 2018	-		2.967	Continuing	Continuing	-
Temporary Duty (TDY)	Allot	SoSE&I : Various	-	-		1.000	Nov 2017	0.853	Nov 2018	-		0.853	Continuing	Continuing	-
<b>Subtotal</b>			-	-		15.827		10.673		-		10.673	Continuing	Continuing	N/A

**Remarks**  
 - Program Activities performed at Aberdeen Proving Grounds (MD), FT Bliss (TX), White Sands Missile Range (NM) and the selected NIE/JWA unit's home station.  
 - Other NIE/JWA subject matter expertise support provided using existing Army contracts managed by PEO C3T, ATEC, and CERDEC.

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Integrated Evaluations	Various	Various : TBD	-	39.000	Nov 2016	-		-		-		-	0.000	39.000	-
<b>Subtotal</b>			-	39.000		-		-		-		-	0.000	39.000	N/A

**Remarks**  
 - Program Activities performed, Aberdeen Proving Grounds (MD), FT Bliss (TX), White Sands Missile Range (NM) and the selected NIE/JWA unit's home station.  
 - Vehicle Integration performed under contract W56HZV-15-D-ER03 by BRTRC and other NIE/JWA support provided using existing Army contracts managed by PEO C3T, ATEC, and CERDEC.  
 - Includes support services from DISA (for satellite time) and other governments agencies

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Vehicle Integration	C/CPFF	BRTRC : Various	-	-		12.000	Nov 2017	5.000	Mar 2019	-		5.000	Continuing	Continuing	Continuing
Network Integration and Baseline Systems	MIPR	PEO C3T : Various	-	-		10.000	Nov 2017	3.400	Mar 2019	-		3.400	Continuing	Continuing	Continuing

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY3 / <i>NIE Test &amp; Evaluation</i>
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Infrastructure and other support	TBD	TBD : Various	-	2.885	Nov 2016	5.000	Nov 2017	1.135	Mar 2019	-		1.135	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	2.885		27.000		9.535		-		9.535	Continuing	Continuing	N/A

**Remarks**

- Program Activities performed at Aberdeen Proving Grounds (MD), FT Bliss (TX), White Sands Missile Range (NM) and the selected NIE/JWA unit's home station.
- Vehicle Integration performed under contract W56HZV-15-D-ER03 by BRTRC.
- Network Integration and Baseline Systems subject matter expertise support provided using existing Army contracts managed by PEO C3T and its subordinate Program Managers (PMs).

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ATEC Test and Evaluation Support	MIPR	ATEC : Various	18.117	-		3.500	Nov 2017	0.700	Mar 2019	-		0.700	Continuing	Continuing	Continuing
Lab Based Risk Reduction (LBRR)	MIPR	CERDEC : APG, MD	-	-		5.300	Nov 2017	1.500	Mar 2019	-		1.500	Continuing	Continuing	Continuing
Satellite Region Hub Node (RHN) Technical Support	MIPR	Cyber Battle Lab : Ft. Gordon, GA	-	-		2.339	Nov 2017	-		-		-	Continuing	Continuing	Continuing
Satellite Transponder Bandwidth	MIPR	DISA : Various	-	-		2.500	Nov 2017	-		-		-	Continuing	Continuing	Continuing
Cyber Vulnerability/Risk Assessments	MIPR	Army Research Laboratory : Various	-	-		0.700	Nov 2017	0.275	Mar 2019	-		0.275	Continuing	Continuing	Continuing
Systems Under Evaluation (SUEs)	C/Various	TBD : Various	-	-		1.229	Nov 2017	-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			18.117	-		15.568		2.475		-		2.475	Continuing	Continuing	N/A

**Remarks**

- Program Test support through ATEC, Lab Based Risk Reduction through CERDEC, and Cyber Vulnerability/Risk Assessments through Army Research Laboratory (ARL).
- Satellite RHN Technical Support provided by the Cyber Battle Lab at Fort Gordon, GA and Satellite Transponder Bandwidth contracted through DISA.
- Program Activities performed at Aberdeen Proving Grounds (MD), FT Bliss (TX), White Sands Missile Range (NM) and the selected NIE/JWA unit's home station.

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>								<b>Date:</b> February 2018					
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>				<b>Project (Number/Name)</b> DY3 / <i>NIE Test &amp; Evaluation</i>					
	<b>Prior Years</b>	<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	18.117	41.885		58.395		22.683		-		22.683	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
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Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>AWA 17.1 Planning - Execution</b>																												
AWA 17.1 Lab Integration/Testing																												
AWA 17.1 Garrison CommEx																												
AWA 17.1 Field CommEx																												
AWA 17.1 Event																												
AWA 17.1 Event Analysis & Summary																												
<b>NIE 17.2 Planning - Execution</b>																												
NIE 17.2 DP 2																												
NIE 17.2 Lab Integration/Testing																												
NIE 17.2 Candidate Solution Integration																												
NIE 17.2 ValEx																												
NIE 17.2 Garrison CommEx																												
NIE 17.2 Pilot																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY3 / <i>NIE Test &amp; Evaluation</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
NIE 17.2 Event				■																								
NIE 17.2 Event Analysis & Summary				■																								
<b>JWA 18.1 Planning - Execution</b>																												
JWA 18.1 DP 2B		▲ 3																										
JWA 18.1 Candidate Solution Integration							■																					
JWA 18.1 ValEx								■																				
JWA 18.1 Garrison CommEx								■																				
JWA 18.1 Field CommEx								■																				
JWA 18.1 Event								■																				
JWA 18.1 Event Analysis & Summary								■																				
<b>NIE 18.2 Planning - Execution</b>																												
NIE 18.2 DP 2		▲ 4																										
NIE 18.2 Lab Integration/Testing								■																				

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY3 / <i>NIE Test &amp; Evaluation</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023									
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4						
NIE 18.2 Candidate Solution Integration																																		
NIE 18.2 ValEx																																		
NIE 18.2 Garrison CommEx																																		
NIE 18.2 Pilot																																		
NIE 18.2 Event																																		
NIE 18.2 Event Analysis & Summary																																		
<b>JWA 19.1 Planning - Execution</b>																																		
JWA 19.1 DP 2A	1																																	
JWA 19.1 DP 2B							6																											
JWA 19.1 Lab Integration/Testing																																		
JWA 19.1 Candidate Solution Integration																																		
JWA 19.1 ValEx																																		
JWA 19.1 Garrison CommEx																																		

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY3 / <i>NIE Test &amp; Evaluation</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
JWA 19.1 Field CommEx									■																			
JWA 19.1 Event									■																			
JWA 19.1 Event Analysis & Summary									■																			
<b>JWA 20.1 Planning - Execution</b>																												
JWA 20.1 DP 1					▲ 5																							
JWA 20.1 DP 2a					▲ 7																							
JWA 20.1 DP 2b									▲ 9																			
JWA 20.1 Lab Integration/Testing													■															
JWA 20.1 Candidate Solution Integration													■															
JWA 20.1 ValEx													■															
JWA 20.1 Garrison CommEx													■															
JWA 20.1 Field CommEx													■															
JWA 20.1 Event													■															



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY3 / <i>NIE Test &amp; Evaluation</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
JWA 20.1 Event Analysis & Summary													■																			
<b>JWA 21.1 Planning - Execution</b>													▲ 8																			
JWA 21.1 DP 1																	▲ 10															
JWA 21.1 DP 2a																					▲ 11											
JWA 21.1 DP 2b																																
<b>JWA 22.1 Planning - Execution</b>																																
<b>JWA 23.1 Planning - Execution</b>																																

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY3 / <i>NIE Test &amp; Evaluation</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
AWA 17.1 Planning - Execution	3	2015	2	2017
AWA 17.1 Lab Integration/Testing	3	2016	1	2017
AWA 17.1 Candidate Solution Integration	4	2016	4	2016
AWA 17.1 ValEx	4	2016	4	2016
AWA 17.1 Garrison CommEx	4	2016	1	2017
AWA 17.1 Field CommEx	1	2017	1	2017
AWA 17.1 Event	1	2017	1	2017
AWA 17.1 Event Analysis & Summary	1	2017	2	2017
NIE 17.2 Planning - Execution	3	2016	1	2018
NIE 17.2 DP 2	2	2017	2	2017
NIE 17.2 Lab Integration/Testing	2	2017	4	2017
NIE 17.2 Candidate Solution Integration	2	2017	3	2017
NIE 17.2 ValEx	3	2017	3	2017
NIE 17.2 Garrison CommEx	3	2017	3	2017
NIE 17.2 Pilot	4	2017	4	2017
NIE 17.2 Event	4	2017	4	2017
NIE 17.2 Event Analysis & Summary	4	2017	1	2018
JWA 18.1 Planning - Execution	3	2016	3	2018
JWA 18.1 DP 2B	2	2017	2	2017
JWA 18.1 Candidate Solution Integration	2	2018	2	2018
JWA 18.1 ValEx	2	2018	3	2018
JWA 18.1 Garrison CommEx	3	2018	3	2018

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**Exhibit R-4A, RDT&E Schedule Details: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY3 / <i>NIE Test &amp; Evaluation</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
JWA 18.1 Field CommEx	3	2018	3	2018
JWA 18.1 Event	3	2018	3	2018
JWA 18.1 Event Analysis & Summary	3	2018	3	2018
NIE 18.2 Planning - Execution	2	2017	2	2019
NIE 18.2 DP 2	2	2017	2	2017
NIE 18.2 Lab Integration/Testing	3	2018	1	2019
NIE 18.2 Candidate Solution Integration	4	2018	4	2018
NIE 18.2 ValEx	4	2018	4	2018
NIE 18.2 Garrison CommEx	4	2018	4	2018
NIE 18.2 Pilot	1	2019	1	2019
NIE 18.2 Event	1	2019	1	2019
NIE 18.2 Event Analysis & Summary	1	2019	2	2019
JWA 19.1 Planning - Execution	3	2016	4	2019
JWA 19.1 DP 2A	1	2017	1	2017
JWA 19.1 DP 2B	2	2018	2	2018
JWA 19.1 Lab Integration/Testing	1	2019	3	2019
JWA 19.1 Candidate Solution Integration	2	2019	2	2019
JWA 19.1 ValEx	2	2019	3	2019
JWA 19.1 Garrison CommEx	3	2019	3	2019
JWA 19.1 Field CommEx	3	2019	3	2019
JWA 19.1 Event	3	2019	3	2019
JWA 19.1 Event Analysis & Summary	3	2019	4	2019
JWA 20.1 Planning - Execution	1	2018	4	2020
JWA 20.1 DP 1	1	2018	1	2018
JWA 20.1 DP 2a	2	2018	2	2018

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**Exhibit R-4A, RDT&E Schedule Details: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY3 / <i>NIE Test &amp; Evaluation</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
JWA 20.1 DP 2b	2	2019	2	2019
JWA 20.1 Lab Integration/Testing	1	2020	3	2020
JWA 20.1 Candidate Solution Integration	2	2020	2	2020
JWA 20.1 ValEx	2	2020	3	2020
JWA 20.1 Garrison CommEx	3	2020	3	2020
JWA 20.1 Field CommEx	3	2020	3	2020
JWA 20.1 Event	3	2020	3	2020
JWA 20.1 Event Analysis & Summary	3	2020	4	2020
JWA 21.1 Planning - Execution	1	2019	4	2021
JWA 21.1 DP 1	1	2019	1	2019
JWA 21.1 DP 2a	2	2019	2	2019
JWA 21.1 DP 2b	2	2020	2	2020
JWA 22.1 Planning - Execution	1	2020	4	2022
JWA 23.1 Planning - Execution	1	2021	4	2023

**Note**

-With the loss of a dedicated unit (2/1 Armored Division) after AWA 17.1, NIE/JWA event planning and a unit requirements determination has to be made earlier than in previous FYs to allow Forces Command (FORSCOM) time to select the unit participating in the test events.

-NIEs eliminated after NIE 18.2

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>					<b>Project (Number/Name)</b> DY5 / <i>Production/Field Coordination for Capability Sets</i>		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
DY5: <i>Production/Field Coordination for Capability Sets</i>	-	4.660	4.261	4.242	-	4.242	4.301	4.391	4.369	4.462	0.000	30.686
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project provides for the development of a synchronized Brigade/Division level plan for the Production equipment delivery and Fielding (hand-off logistics and new equipment training) of Capability Set (CS) components (both hardware/software in A and/or B Kits) upon completion of Network Integration Evaluation (NIE), Army Interoperability Certification (AIC) and Army CS fielding decision.

This project includes the following efforts: Oversight and direct coordination between participating Program Executive Offices (PEOs), Program Managers (PMs), Research, Development and Engineering Commands (RDECOMs) and the Army's Brigade Combat Teams (BCT) throughout the CS Vehicle Integration and Synchronized Fielding process to ensure that a CS package is received, integrated, trained, and handed-off to the unit in a synchronized and efficient manner. Identification and assessment of available capabilities for inclusion into a CS. Alignment of the CS requirements with the appropriate Programs of Record (PoR) and the recipient unit to define the unit's Network Basis of Issue (NBOI)/ Architecture by type of BCT. Coordination with PEOs, PMs, Army G-staff to ensure CS products are Materiel Released/Type Classified, fully resourced and synchronized by a single Integrated Master Schedule for design integration, testing, production, kitting, platform integration, training and fielding. Direct support during each of the unit's "New Equipment Training" and "New Equipment Fielding", along with the preparation for the BCT's rotation through one of the Army's Combat Training Centers, (Joint Readiness Training Center (JRTC) or National Training Center (NTC)). Ensuring that all training assets are reset and moved to the follow-on BCT. Manage all After Action activities.

This project does not fund the actual production, integration, nor fielding costs associated with the CS.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Production/Fielding Coordination for Capability Sets (CS)	4.660	4.261	4.242
<p><b>Description:</b> This project provides for the development of a synchronized Brigade/Division level plan for the Production equipment delivery and Fielding (hand-off logistics and new equipment training) of Capability Set (CS) components (both hardware/software in A and/or B Kits) upon completion of Network Integration Evaluation (NIE), Army Interoperability Certification (AIC) and Army CS fielding decision.</p> <p>This project includes the following efforts: Oversight and direct coordination between participating Program Executive Offices (PEOs), Program Managers (PMs), Research, Development and Engineering Commands (RDECOMs) and the Army's Brigade Combat Teams (BCT) throughout the CS Vehicle Integration and Synchronized Fielding process to ensure that a CS package is received, integrated, trained, and handed-off to the unit in a synchronized and efficient manner. Identification and assessment of available capabilities for inclusion into a CS. Alignment of the CS requirements with the appropriate Programs of Record (PoR) and the recipient unit to define the unit's Network Basis of Issue (NBOI)/ Architecture by type of BCT. Coordination with PEOs,</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY5 / <i>Production/Field Coordination for Capability Sets</i>

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019
<p>PMs, Army G-staff to ensure CS products are Materiel Released/Type Classified, fully resourced and synchronized by a single Integrated Master Schedule for design integration, testing, production, kitting, platform integration, training and fielding. Direct support during each of the unit's "New Equipment Training" and "New Equipment Fielding", along with the preparation for the BCT's rotation through one of the Army's Combat Training Centers, (Joint Readiness Training Center (JRTC) or National Training Center (NTC)). Ensuring that all training assets are reset and moved to the follow-on BCT. Manage all After Action activities.</p> <p>This project does not fund the actual production, integration, nor fielding costs associated with the CS.</p> <p><b>FY 2018 Plans:</b>                      These funds provide for the following:                      - Production/Fielding Coordination for CS:                      Development, coordination, and execution management of the CS Fielding plan needed to produce, integrate, and field NIE tested Brigade improvements to the BCTs. Synchronize the integration and coordinate CS Fielding including CS17 closeout, CS18 execution, and detail plan for CS19 along with high level planning for CS20/21. This effort funds government and contractor personnel and travel to unit location and fielding sites for planning and coordination of resources, integrated schedule, training and fielding across CS Programs of Record (PoR). It does not fund the production, physical integration, or fielding of the CS.</p> - Production/Fielding Coordination for CS17 Products and Services: Complete training and fielding of CS 17 units which begins in the 4th Quarter of FY17. This includes to IBCTs (one Active and one USARNG) and one Division HQ. Final close out of Materiel Fielding documentation and After Action Reports (AARs) for one Total Army Analysis (TAA) Infantry Brigade Combat Team (IBCT) with Lower Tactical Internet (LTI), three (3) TAA IBCTs and one (1) Division (DIV) Headquarters (HQ).                     - Production/Fielding Coordination for CS18 Products and Services: Synchronize the integration of the CS package into the Brigade Combat Team (BCT) consisting of multiple network systems, on various configurations of Mine Resistant Ambush Protected (MRAP) and High Mobility Multipurpose Wheeled Vehicle (HMMWV) platforms, at multiple locations. Complete synchronization, integration, and coordination of CS Fielding for the following CS18 Units (five (5) total): field upgrade to LTI to two (2) Total Army Analysis (TAA) 2020 IBCTs, one (1) TAA 2020 IBCT (OCONUS), one (1) TAA Army National Guard (ARNG) IBCT, and one (1) ARNG Division Headquarters (HQs). Coordinate the integrated designs by platform, role, echelon, and BCT for CS18 including LTI. Finalize CS18 fielding requirements. Develop and manage the Integrated Master Schedule (IMS) for CS18. Coordinate A-Kit design, development and production and B-Kit's Integration Kit (IK) design, between system and platforms Program Executive Offices (PEOs) and Program Managers (PMs) for CS18. Coordinate the delivery of prototype and production builds for CS18. Support Configuration Management (CM) of platform configuration implementations, designs, A-Kits, and B-Kits. Support fielding integration of Program of Record (PoR) assets in			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY5 / <i>Production/Field Coordination for Capability Sets</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>accordance with the defined BCT Reference architecture. Coordinate planning and execution of unit meetings, site inventories, A/B kit deliveries, chalk vehicle block schedules, assessment of Fully Mission Capable condition and integration of vehicle schedules (both component and complete vehicle installations). Coordinate and publish a synchronized New Equipment Training / New Equipment Fielding (NET/NEF) Integrated Master Schedule (IMS) for CS18 gaining units.</p> <p>- Production/Fielding Coordination for CS19 Products and Services: Conduct synchronization and coordination of CS Fielding for the following CS19 Units (four (4) Total): one (1) ARNG IBCT, one (1) ARNG Division HQ, two (2) TAA IBCT with LTI (including one OCONUS). Execute a synchronized New Equipment Training /New Equipment Fielding (NET/NEF) Integrated Master Schedule (IMS) for fielding of CS19 to all gaining units. Begin CS19 NET/NEF requirements definition finalization and development of the NET/NEF integrated master schedule. This includes scheduling Program of Record unique NET, System of Systems NET (Capability Set holistic classes), and property accountability handoffs as an integrated process to enhance efficiency of the brigade modernization events.</p> <p>- Engineering and Integration Effort to develop and maintain CS and Sync Fielding specific Integrated Master Schedule (IMS): Develop and maintain an IMS for the Army's Capability Set ? Synchronized Fielding (CSSF) efforts. Close out the IMS for FY17, maintain the IMS for FY18 and FY19 and develop initial IMSs for FYs 20, 21 and 22. Collect and analyze sub-schedule performance against the baseline IMS to identify schedule risks for the Army's CSSF efforts. Validate that established integration points are achievable and, if not, identify the schedule risk. Analyze schedule performance against schedule baseline, identify variances and their causes, and identify risks and/or impacts to critical path. Perform ?what if? schedule analysis of alternative program courses of action to determine impact on schedule critical path. Update and post schedules on SharePoint for visibility and increased collaboration across ASA (ALT). Participate in After Action Reviews, Lessons Learned, Synchronized Fielding Technical Exchange Meetings (TEMs). Provide scheduling reports and briefings to meet the needs of the CSSF community. It also includes Capability Sync Fielding IMS and briefings and IMS analysis reports. Coordinate, develop, and publish a synchronized New Equipment Training/New Equipment Fielding (NET/NEF) Integrated Master Schedule (IMS) for fielding of CS to all gaining units.</p> <p><b>FY 2019 Plans:</b> These funds provide for the following: - Production/Fielding Coordination for CS: Development, coordination, and execution management of the CS Fielding plan needed to produce, integrate, and field NIE tested Brigade improvements to the BCTs. Synchronize the integration and coordinate CS Fielding including CS18 closeout, CS19 execution, and detail plan for CS20 along with high level planning for CS20/21. This effort funds government and contractor personnel and travel to unit location and fielding sites for planning and coordination of resources, integrated schedule, training and fielding across CS Programs of Record (PoR). It does not fund the production, physical integration, or fielding of the CS.</p>				

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY5 / <i>Production/Field Coordination for Capability Sets</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>- Production/Fielding Coordination for CS18 Products and Services: Complete training and fielding of CS 18 units. Final close out of Materiel Fielding documentation and After Action Reports (AARs) for this includes synchronization, integration, and coordination of CS Fielding for the following CS18 Units (two (2) total): field upgrade to LTI for one (1) Total Army Analysis (TAA) IBCTs and one (1) TAA IBCT plus an LTI. Coordinate and execute the PM Mission Network (WIN-T Inc 2) TCN Lite fielding and the cascading/disposition of the TCN Heavy variants and two (2) BCT NCR SNE reduction efforts.</p> <p>- Production/Fielding Coordination for CS19 Products and Services: Synchronize the integration of the CS package into the Brigade Combat Team (BCT) consisting of multiple network systems, on various configurations of Joint Light Tactical Vehicle (JLTV), Mine Resistant Ambush Protected (MRAP) and High Mobility Multipurpose Wheeled Vehicle (HMMWV) platforms, at multiple locations. Complete synchronization, integration, and coordination of CS Fielding for the following CS19 Units (two (2) total): one (1) IBCT (OCONUS) and one (1) TAA IBCT with LTI (OCONUS). Synchronize the schedule for the execution of five Brigade Combat Team NCR SNE Reduction efforts and five Brigade Combat Team TCN Lite fieldings and corresponding TCN Heavy cascade/disposition. Coordinate the integrated designs by platform, role, echelon, and BCT for CS19 including LTI. Finalize CS19 fielding requirements. Develop and manage the Integrated Master Schedule (IMS) for CS19. Coordinate A-Kit design, development and production and B-Kit's Integration Kit (IK) design, between system and platform Program Executive Offices (PEOs) and Program Managers (PMs) for CS19. Coordinate the delivery of prototype and production builds for CS19. Support Configuration Management (CM) of platform configuration implementations, designs, A-Kits, and B-Kits. Support fielding integration of Program of Record (PoR) assets in accordance with the defined BCT network architecture. Coordinate planning and execution of unit meetings, site inventories, A/B kit deliveries, chalk vehicle block schedules, assessment of Fully Mission Capable condition and integration of vehicle schedules (both component and complete vehicle installations). Coordinate and publish a synchronized New Equipment Training /New Equipment Fielding (NET/NEF) Integrated Master Schedule (IMS) for CS19 gaining units.</p> <p>- Production/Fielding Coordination for CS20 Products and Services: Conduct planning, synchronization and coordination of CS Fielding for the following CS20 Units (two (2) total): two (2) TAA IBCT with LTI. Coordinate for the execution of FY20 TCN Lite fielding and the cascading/disposition of the TCN Heavy variants. Execute a synchronized New Equipment Training /New Equipment Fielding (NET/NEF) Integrated Master Schedule (IMS) for fielding of CS20 to all gaining units. Begin CS20 NET/NEF requirements definition finalization and development of the NET/NEF integrated master schedule. This includes scheduling Program of Record unique NET, System of Systems NET (Capability Set holistic classes), and property accountability handoffs as an integrated process to enhance efficiency of the brigade modernization events.</p>			



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY5 / <i>Production/Field Coordination for Capability Sets</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>- Engineering and Integration coordination/planning efforts to develop and maintain CS unit-specific Network Basis of Issue (NBOI) architecture and Integrated Master Schedule (IMS):                      Developed and maintained unit-specific NBOI and IMS for the Army's Capability Set ? Synchronized Fielding (CSSF) efforts. Prepared ?as-built? NBOI and final IMS for units fielded during FY18, maintained unit-specific NBOI and IMS for units designated to undergo CS integration in FY19-20, and developed initial (draft-level) NBOI and IMS for planned units in FY21 thru FY23. Organized, prepared, and conducted incremental technical reviews to examine and assess key/crucial planning activities and associated data product development supporting CS integration at specific fielded locations. Collected and analyzed sub-schedule performance against the baseline IMS to identify schedule risks for the Army's CSSF efforts. Validated that established incremental integration points were achievable and, if not, identified the risk to schedule. Analyzed schedule and cost performance against schedule established baselines, identified variances and their causes, and identified risks and/or impacts to critical path. Performed ?what if? schedule and cost analyses of alternative program courses of action to determine impact on schedule critical path and mission requirements. Updated and posted schedules on SharePoint for visibility and increased collaboration across the entire CS community to include ASA (ALT). Led or participated in other key technical reviews to include: After Action Reviews, Lessons Learned, Synchronized Fielding Technical Exchange Meetings (TEMs) and mini-TEMs. Provided reports and briefings to key CS stakeholders to support mutual programmatic goals and objectives and to help resolve issues and concerns affecting the CS community at-large. Identified key program risks as well as specific risk mitigation plans. Coordinated, prepared, and published a synchronized New Equipment Training / New Equipment Fielding (NET/NEF) Integrated Master Schedule (IMS) for CS fielding to all gaining units.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>                      Increases to personnel costs (COLA &amp; salary increases).</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	4.660	4.261	4.242

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• DY3: <i>NIE Test &amp; Evaluation</i>	41.885	58.395	22.683	-	22.683	23.530	23.677	23.541	23.508	Continuing	Continuing
• DY7: <i>Army Systems Engineering, Architecture and Analysis</i>	18.802	15.508	15.610	-	15.610	24.377	24.760	25.449	25.939	Continuing	Continuing
• DZ6: <i>Army Integration &amp; Coordination Management</i>	8.915	6.775	6.753	-	6.753	6.889	6.987	7.132	7.550	Continuing	Continuing
• FG7: <i>Emerging Technology Initiatives</i>	27.665	60.421	0.000	-	0.000	-	-	-	-	Continuing	Continuing

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY5 / <i>Production/Field Coordination for Capability Sets</i>

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

**D. Acquisition Strategy**

This project does not have any requirement for direct procurement of hardware or software.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY5 / <i>Production/Field Coordination for Capability Sets</i>
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<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Production/Fielding Coordination for Capability Sets	TBD	Various Note: 1 : TBD	9.653	4.660	Nov 2016	4.261	Nov 2017	4.242	Nov 2018	-		4.242	Continuing	Continuing	Continuing
<b>Subtotal</b>			9.653	4.660		4.261		4.242		-		4.242	Continuing	Continuing	N/A

**Remarks**  
 Note: 1  
 - Program Activities performed at TACOM (Warren MI) and CS units location receiving fielding.  
 - Program Integration support through various PMs, PEOs, RDECOM.

<b>Support (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Facilities and IT Support	TBD	Various Note:1 : TBD	0.694	-		-		-		-		-	0.000	0.694	-
<b>Subtotal</b>			0.694	-		-		-		-		-	0.000	0.694	N/A

**Remarks**  
 Note: 1  
 - Program Activities performed at TACOM (Warren MI) and CS units location receiving fielding.

<b>Prior Years</b>	<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	10.347	4.660		4.261		4.242		-	4.242	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY5 / <i>Production/Field Coordination for Capability Sets</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>CS17 Capability Set</b>																												
CS17 Build & Integration																												
<b>CS18 Capability Set</b>																												
CS18 Architecture Design																												
CS18 Build & Integration																												
CS18 NEW Equipment Training (NET)																												
CS18 NEW Equipment Fielding (NEF)																												
CS19 Capability Set																												
CS19 Architecture Design																												
CS19 Build & Integration																												
CS19 NEW Equipment Training (NET)																												
CS19 NEW Equipment Fielding (NEF)																												
<b>CS20 Capability Set</b>																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY5 / <i>Production/Field Coordination for Capability Sets</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
CS20 Architecture Design																												
CS20 Build & Integration																												
CS20 NEW Equipment Training (NET)																												
CS20 NEW Equipment Fielding (NEF)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY5 / <i>Production/Field Coordination for Capability Sets</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CS17 Capability Set	2	2015	2	2018
CS17 Architecture Design	2	2015	3	2016
CS17 Build & Integration	3	2015	4	2017
CS18 Capability Set	3	2017	1	2019
CS18 Architecture Design	3	2017	1	2018
CS18 Build & Integration	2	2018	4	2018
CS18 NEW Equipment Training (NET)	2	2018	1	2019
CS18 NEW Equipment Fielding (NEF)	2	2018	1	2019
CS19 Capability Set	1	2018	2	2019
CS19 Architecture Design	1	2017	2	2018
CS19 Build & Integration	3	2017	4	2019
CS19 NEW Equipment Training (NET)	1	2019	1	2020
CS19 NEW Equipment Fielding (NEF)	1	2019	2	2020
CS20 Capability Set	1	2018	2	2021
CS20 Architecture Design	1	2018	2	2019
CS20 Build & Integration	3	2018	4	2020
CS20 NEW Equipment Training (NET)	1	2020	2	2021
CS20 NEW Equipment Fielding (NEF)	1	2020	2	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>				<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
DY7: <i>Army Systems Engineering, Architecture &amp; Analysis</i>	-	18.802	15.508	15.610	-	15.610	24.377	24.760	25.449	25.939	0.000	150.445
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project provides the Army's leadership and materiel developers with the necessary modernization planning, System of Systems (SoS) engineering, technical analysis, architectural products, critical path analysis, and risk analysis and mitigation planning to influence the Army's materiel portfolio. This project defines and executes its mission in the context of a SoS Engineering Management Plan (SoSEMP), that provides comprehensive engineering, analysis and architecture processes across early CS requirements and roadmap development; engineering and analysis tasks; lab and field risk reduction efforts; capability assessments, and unit-specific architectural planning support to boots-on-the-ground synchronized fielding execution. This project also funds Cyber Security engineering, architecture and development tasks necessary to create effective, affordable and secure network capabilities that address critical gaps, meet Mission Command Network (MCN) 2020 objectives and/or Force 2025 and Beyond (F2025B) initiatives. This project also funds engineering synchronization oversight and governance for the Army SoS Common Operating Environment (COE). This effort includes analysis of integrated capabilities, requirements decomposition and alignment, and resource and acquisition synchronization. This project includes support to other Department of Defense (DOD) and international agencies for joint programs and collaboration efforts.

Key tasks are Reference Architecture products; Architecture Planning Analysis, Integration and Coordination; Engineering Analysis and Design; Portfolio Analysis; Integrated Master Schedule (IMS); Integration Risk Identification, Mitigation, Plans and Reports; Strategic Process and Planning; Future Capability Sets Planning Integration and Engineering; CS Products and Services.

The effort includes costs for labor (Government and contractor), service contracts, travel, training, supplies, facilities, and Information Technology (IT) support. This effort funds support for both SoSE&I and the Army Rapid Capabilities Office (RCO).

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Army System of Systems Engineering and Analysis	13.029	10.509	10.841
<b>Description:</b> Provide coordinated SoS engineering, architectures, and analysis products for integrating new technologies with existing capabilities to stakeholders (e.g. materiel developers, TRADOC Capability Manager (TCM), Army Capabilities Integration Center (ARCIC), etc.) to deliver integrated solutions to Army formations.			
<b>FY 2018 Plans:</b> Army Formation Reference Architecture products:			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>Develop and maintain all Army Combat Formations (Corps &amp; below) SoS architecture and integration products. These products are used to design Objective, Base, and Modified Table of Organization &amp; Equipment (TOE) for demonstration/test environments (e.g. NIE, Operational Test, and Army Interoperability Certification).</p> <p>Four core recurring products are:</p> <ul style="list-style-type: none"> <li>- Integrated Basis of Issue Plan (IBOIP): detailed database and spreadsheets describing the objective, basic, and modified TOE, TRADOC required BOI system placements, etc.</li> <li>- SoS View Diagram: Visual reference document diagramming all Soldier and platform roles, and their network connectivity and waveform assignments to each other as dictated by the IBOIP.</li> <li>- Vehicle Interconnectivity Diagram (VID): Visual reference document diagramming software (operating systems, applications, etc), hardware (radios, computers, antennae?s, routers/switches, etc.), internal/external networks (protocols, ports, gateways, etc.), and waveforms (frequency bands) are connected for individual platforms.</li> <li>- SoS Thread: Visual reference diagram documenting technical use cases of the SoS architecture and the data/message flows throughout Brigade and below based on Army universal task lists, Army Interoperability Certification, and Joint Common System Function List.</li> </ul> <p>Architecture Planning Analysis, Integration and Coordination: These funds provide for the development of products which are necessary for modernization planning, technical and risk analysis, mitigation planning, and SoS engineering. It includes Cyber and Position Navigation &amp; Timing (PNT) as well as Division &amp; Corps echelons as it pertains to architecture development to meet MCN 2020 and F2025B initiatives.</p> <p>Engineering Analysis &amp; Design: These funds provide support to the Army's Network Modernization Strategy (NMS) and Capability Needs Assessment (CNA) at the tactical and enterprise levels. Network Modernization engineering will include support for PNT integration into the overall CS design, Multinational/Mission Partner Environments architecture development, Army defensive/offensive cyber capabilities integrated at both the tactical and enterprise levels, network modernization risks/gaps for Corps level units and below, and Army spectrum strategy.</p> <p>Analyze Programs of Record (PoRs) and emerging technologies to maximize Warfighter effectiveness under cost, within schedule and meeting technology readiness constraints. Perform cross-PEO integration and performance issues analysis. Develop strategic plans for providing key technologies in support of Army gaps. Conduct analyses of technical and performance requirements to support technology insertion for Warfighter capability (ie. Intel-related operations, spectral assignment risk mitigation, and PNT architecture placement).</p>				



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>IMS: These funds provide a reliable IMS that synchronizes engineering, architecture, PoRs, network evaluation, and CS fielding schedules to ensure their alignment to the Program Objective Memorandum (POM) and the Army Force Generation (ARFORGEN) cycles. Efforts include implementation of IMS tools for POR input, analyses of Platform schedules, and MCN 2020 network components schedules to identify issues and opportunities. These funds also provide for analysis of Program Executive Office (PEO) portfolios and their IMS which identifies opportunities to incorporate capabilities earlier into CS configurations.</p> <p>Integration Risk Identification, Mitigation, Plans and Reports: These funds provide strategic planning in support of network modernization objectives and CNA efforts. It provides analysis of objectives, potential risks and mitigation plans to capability delivery.</p> <p>Strategic Process and Planning: These funds provide for strategic planning to achieve MCN 2020 FES, F2025B, and emerging solutions, to include: Strategic Planning Review events, Road map to MCN 2020 validation, Agile Process Standard Operating Procedure adaptation for rapid acquisition, Network Synchronization Working Group outcomes analysis, Proponent Integrated Product Teams (IPT), and database improvements to track/report progress.</p> <p>- Integration Engineering Planning and Execution of Capability Sets (IEP&amp;E-CS): These funds provide for the advanced collaboration and coordination with platform and network system Product Managers (PdMs) to ensure CS Fielding platform integration design decisions are based on CS Reference Architecture products for CS18-23 to be evaluated in Network Integration Evaluation (NIE) events. Develop the Unit-specific architecture (e.g., Network Basis of Issue (NBOI), Unit Transport Design (TD), etc.) for CS Fieldings. Engineering coordination with platform and equipment integrators to ensure component level equipment is designed to meet platform level integrated design requirements established in the Unit NBOI and validate the integrated architecture design is functional. Develop the unit integration design for each CS. Update and transition architecture products to stakeholders by utilizing Unit specific NBOIs based on property book/maintenance analysis and physical inventory comparisons of Forces Command (FORSCOM) assets. Assess, synchronize, and status the production and installation of CS products and processes for platform integration and installation at the integration facilities to meet delivery schedules. Document and continuously improve engineering activities and process flows for efficiencies. Work with stakeholders to resolve problems such as conflicting requirements, funding and priorities. Seek innovative solutions to efficiently accomplish multiple efforts within allocated resources. Develop CS engineering products to include processes, schedule, established technical baselines through Technical Exchange Meetings (TEMs) and synchronization across stakeholder organizations.</p> <p>- IEP&amp;E-CS: CS18</p>				

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>
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**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019
<p>Synchronize and monitor platform and network system Size, Weight and Power (SWaP) assessment of Unit specific Architectures in collaboration and coordination with platform and network system PMs. Coordinate NRE funding requirements and delivery/ production schedules with the Synchronized Fielding (SF) ? Fielding team to ensure production schedules are met to field selected systems. Develop, update, and finalize the unit specific NBOI, assist in site inventory and analysis, develop CS vehicle/ equipment configurations, develop the CS Non-Recurring Engineering (NRE) integration configurations for design (based on NIE Original Equipment Manufacturer involvement). Provide integration status of equipment designs by platform, role, echelon and by BCT for the following CS18 Units (five (5) total): field upgrade to LTI to two (2) Total Army Analysis (TAA) 2020 IBCTs, one (1) TAA 2020 IBCT (OCONUS), one (1) TAA ARNG IBCT and one (1) ARNG Division Headquarters (HQs).</p> <p>- IEP&amp;E-CS; CS19 Products and Services: Evaluate, synchronize, and monitor platform and network system program acquisition schedules, integration costs, and system requirements across organizations for the development of production ready A&amp;B-kit Interface Control Documents (ICDs) and Level II Technical Data Packages (TDPs) supporting CS19 Unit specific baseline evaluations in collaboration and coordination with platform and network system PMs. Synchronize CS program schedules through coordination and communication with System of Systems Engineering and Integration (SoSE&amp;I) Engineering and Integration (E&amp;I) and other organizations within and outside of SoSE&amp;I. Coordinate with associated PoRs for the integration, forecasting, procurement, testing and delivery of platform integrated Network equipment for CS baseline evaluations. Vet NBOIs with vehicle and equipment PMs, TCMs, PEOs, G3/5/7 and other stakeholders. Develop, coordinate, document and assess the updated and final LTI integration activities on 700+ platforms and evaluate the integration flow of multiple production lines of numerous platform types. Develop, update, and finalize the Unit specific NBOIs (one for each Unit touched) and are then vetted with platform and equipment PMs, TRADOC Capability Managers (TCMs), Program Executive Offices (PEOs), G3/5/7, FORSCOM and other stakeholders. Perform Property Book Unit Supply Enhanced (PBUSE) and Standard Army Maintenance System (SAMS) unit analyses to determine the serial and bumper numbers that are used to align platform roles by echelon (based on the Modified Table of Organization and Equipment (MTOE) and Objective Table of Organization and Equipment (OTOE)). Assist in Unit Inventories to confirm vehicle and legacy equipment configurations, confirm vehicle roles and identify/coordinate in lieu of vehicles for shortages. Develop NRE designs for platform and equipment (legacy and CS) configurations that will be required for Safety Release/Confirmation (SR/SC) testing. Coordinate with platform PMs the NRE configurations that are combined to develop a CS Golden platform design candidate list to minimize SR/SC costs. Monitor and assess the development and maturation of the A-kit design and ensure the installation manuals and technical data packages produce a repeatable and consistent integration process to support new equipment fieldings.</p> <p>- IEP&amp;E-CS; CS20-23 Products and Services: Evaluate and synchronize platform and network system SWaP assessment of Network Architectures in collaboration and coordination with platform and network system PMs in support of the CS20-23 Reference Architectures. Evaluate, synchronize,</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>and track platform and network system integration risks and mitigation plans for execution to the NBOI identified in collaboration and coordination with platform and network system PMs.</p> <p>Evaluate, synchronize and track disconnects in platform and network system program acquisition schedules, integration costs, and system requirements across organizations for the development of production ready A&amp;B-kit ICDs and Level II TDPs supporting CS20-23 baseline evaluations. Resolve and elevate operational, technical and programmatic issues for Initial and Reference Architecture Products in collaboration and coordination with SoSE&amp;I-E&amp;I, platform PMs, network system PMs and TCMs. Synchronize CS program schedules through coordination and communication with other organizations within and outside of SoSE&amp;I. Coordinate with associated PoRs for the management, integration, forecasting, procurement, testing and delivery of platform integrated Network equipment for CS baseline evaluations. Support PMs and PEOs in resolution of tasks associated with Network integration. Evaluate, synchronize, and track PM implementation of Vehicular Integration for Command, Control, Communication, Computers, Intelligence, Surveillance, Reconnaissance (C4ISR) / Electronic Warfare (EW) Interoperability (VICTORY) standards in Initial and CS20-23 Reference Architecture products. Begin the planning for CS20-23 Unit specific NBOI requirements and develop and coordinate the IMS with all stakeholders.</p> <p><b>FY 2019 Plans:</b></p> <p>Army Formation Reference Architecture products:</p> <p>Develop and maintain all Army Combat Formations (Corps &amp; below) SoS architecture and integration products. These products are used to design Objective, Base, and Modified Table of Organization &amp; Equipment (TOE) for demonstration/test environments (e.g. NIE, Operational Test, and Army Interoperability Certification).</p> <p>Four core recurring products are:</p> <ul style="list-style-type: none"> <li>- Network Basis of Issue (NBOI): detailed database and spreadsheets describing the objective, basic, and modified TOE, TRADOC required BOI system placements, network and subnet assignment data, etc.</li> <li>- SoS View Diagram: Visual reference document diagramming all Soldier and platform roles, and their network connectivity and waveform assignments to each other as dictated by the NBOI.</li> <li>- Vehicle Interconnectivity Diagram (VID): Visual reference document diagramming software (operating systems, applications, etc), hardware (radios, computers, antennae's, routers/switches, etc.), internal/external networks (protocols, ports, gateways, etc.), and waveforms (frequency bands) are connected for individual platforms.</li> <li>- SoS Thread: Visual reference diagram documenting technical use cases of the SoS architecture and the data/message flows throughout Brigade and below based on Army universal task lists, Army Interoperability Certification, and Joint Common System Function List.</li> </ul> <p>Architecture Planning Analysis, Integration and Coordination:</p> <p>These funds provide for the development of products which are necessary for modernization planning, technical and risk analysis, mitigation planning, and SoS engineering. It includes Cyber and Position Navigation &amp; Timing (PNT) as well as Division &amp; Corps echelons as it pertains to architecture development to meet MCN 2020 and F2025B initiatives.</p>				

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p><b>Engineering Design &amp; Analysis:</b>                      These funds provide support to engineering and analysis on current critical network shortfalls to address how the Army achieve expeditionary, uninterrupted mission command; through a network comprised of intuitive, secured, standards-based capabilities adapted to commander's requirements; and integrated into a common operating environment, with network capabilities that are assured, interoperable, tailorable, collaborative, identity-based, and accessible at the point of need in operations that include unified action partners.                      Network Modernization engineering will include the 10 modernization priorities to address critical capability shortfalls : 1) Air and Missile Defense; 2) Long-Range Fires; 3) Munitions Shortfalls; 4) Mobility, Lethality, and Protection of Brigade Combat Teams; 5) Active Protection Systems (air and ground); 6) Assured Position, Navigation, and Timing (PNT); 7) Electronic Warfare; 8) Offensive and Defensive Cyber Capabilities; 9) Assured Communications ; and 10) Vertical Lift.</p> <p>Analyze Programs of Record (PoRs) and emerging technologies to maximize Warfighter effectiveness under cost, within schedule and meeting technology readiness constraints. Perform cross-PEO System of system engineering, integration and performance analysis. Develop strategic plans for providing key technologies in support of Army critical gaps or shortfalls. Conduct analyses of technical and performance requirements to support technology insertion for Warfighter capability (ie. Intel-related operations, spectral assignment risk mitigation, and PNT architecture placement).</p> <p><b>IMS:</b>                      These funds provide a reliable IMS that synchronizes engineering, architecture, PoRs, network evaluation, and CS fielding schedules to ensure their alignment to the Program Objective Memorandum (POM) and the Army Force Generation (ARFORGEN) cycles. Efforts include implementation of IMS tools for POR input, analyses of Platform schedules, and MCN 2020 network components schedules to identify issues and opportunities. These funds also provide for analysis of Program Executive Office (PEO) portfolios and their IMS which identifies opportunities to incorporate capabilities earlier into CS configurations.</p> <p><b>Integration Risk Identification, Mitigation, Plans and Reports:</b>                      These funds provide strategic planning in support of network modernization objectives and CNA efforts. It provides analysis of objectives, potential risks and mitigation plans to capability delivery.</p> <p><b>Strategic Process and Planning:</b>                      These funds provide for strategic planning to achieve MCN 2020 FES, F2025B, and emerging solutions, to include: Strategic Planning Review events, Road map to MCN 2020 validation, Agile Process Standard Operating Procedure adaptation for rapid acquisition, Network Synchronization Working Group outcomes analysis, Proponent Integrated Product Teams (IPT), and database improvements to track/report progress.</p>				

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>- Integration Engineering Planning and Execution of Capability Sets (IEP&amp;E-CS):                  These funds provide for the advanced collaboration and coordination with platform and network system Product Managers (PdMs) to ensure CS Fielding platform integration design decisions are based on CS Reference Architecture products for CS18-25 to be evaluated in Network Integration Evaluation (NIE) events. Develop the Unit-specific architecture (e.g., Network Basis of Issue (NBOI), Unit Transport Design (TD), etc.) for CS Fieldings. Engineering coordination with platform and equipment integrators to ensure component level equipment is designed to meet platform level integrated design requirements established in the Unit NBOI and validate the integrated architecture design is functional.                  Develop the unit integration design for each CS. Update and transition architecture products to stakeholders by utilizing Unit specific NBOIs based on property book/maintenance analysis and physical inventory comparisons of Forces Command (FORSCOM) assets. Assess, synchronize, and status the production and installation of CS products and processes for platform integration and installation at the integration facilities to meet delivery schedules. Document and continuously improve engineering activities and process flows for efficiencies. Work with stakeholders to resolve problems such as conflicting requirements, funding and priorities. Seek innovative solutions to efficiently accomplish multiple efforts within allocated resources. Develop CS engineering products to include processes, schedule, established technical baselines through Technical Exchange Meetings (TEMs) and synchronization across stakeholder organizations.                  Additional system or systems architecture support is provided to Army organizations to support fielding of modernized network equipment in parallel to CS fielding activities. These activities include architecture development supporting Special Operations Forces (SOF) dismounted radio network, Army watercraft modernization initiatives, and Army wide radio crypto-modernization related divestiture/reallocation/fielding efforts.</p> <p>- IEP&amp;E-CS: CS18                  Synchronize and monitor platform and network system Size, Weight and Power (SWaP) assessment of Unit specific Architectures in collaboration and coordination with platform and network system PMs. Coordinate NRE funding requirements and delivery/ production schedules with the Synchronized Fielding (SF) ? Fielding team to ensure production schedules are met to field selected systems. Develop, update, and finalize the unit specific NBOI, assist in site inventory and analysis, develop CS vehicle/ equipment configurations, develop the CS Non-Recurring Engineering (NRE) integration configurations for design (based on NIE Original Equipment Manufacturer involvement). Provide integration status of equipment designs by platform, role, echelon and by BCT for the following CS18 Units (six (6) total): 2xIBCT retouch (brings CS17 BCT up to full CS18 capability) 1xANG IBCT without lower tactical internet, 1xANG IBCT Division HQ, and 1xIBCT without lower tactical internet.</p> <p>- IEP&amp;E-CS; CS19 Products and Services:                  Evaluate, synchronize, and monitor platform and network system program acquisition schedules, integration costs, and system requirements across organizations for the development of production ready A&amp;B-kit Interface Control Documents (ICDs) and Level II Technical Data Packages (TDPs) supporting CS19 Unit specific baseline evaluations in collaboration and coordination</p>				

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>with platform and network system PMs. Synchronize CS program schedules through coordination and communication with System of Systems Engineering and Integration (SoSE&amp;I) Engineering and Integration (E&amp;I) and other organizations within and outside of SoSE&amp;I. Coordinate with associated PoRs for the integration, forecasting, procurement, testing and delivery of platform integrated Network equipment for CS baseline evaluations. Vet NBOIs with vehicle and equipment G3/5/7, G6, G8, PEOs, PMs, TCMs, and other stakeholders. Develop, coordinate, document and assess the updated and final LTI integration activities on 700+ platforms and evaluate the integration flow of multiple production lines of numerous platform types. Develop, update, and finalize the Unit specific NBOIs (one for each Unit touched) and are then vetted with platform and equipment PMs, TRADOC Capability Managers (TCMs), Program Executive Offices (PEOs), G3/5/7, FORSCOM and other stakeholders. Perform Property Book Unit Supply Enhanced (PBUSE) and Standard Army Maintenance System (SAMS) unit analyses to determine the serial and bumper numbers that are used to align platform roles by echelon (based on the Modified Table of Organization and Equipment (MTOE) and Objective Table of Organization and Equipment (OTOE)). Assist in Unit Inventories to confirm vehicle and legacy equipment configurations, confirm vehicle roles and identify/coordinate in lieu of vehicles for shortages. Develop NRE designs for platform and equipment (legacy and CS) configurations that will be required for Safety Release/Confirmation (SR/SC) testing. Coordinate with platform PMs the NRE configurations that are combined to develop a CS Golden platform design candidate list to minimize SR/SC costs. Monitor and assess the development and maturation of the A-kit design and ensure the installation manuals and technical data packages produce a repeatable and consistent integration process to support new equipment fieldings.</p> <p>- IEP&amp;E-CS; CS20-25 Products and Services: Evaluate and synchronize platform and network system SWaP assessment of Network Architectures in collaboration and coordination with platform and network system PMs in support of the CS20-23 Reference Architectures. Evaluate, synchronize, and track platform and network system integration risks and mitigation plans for execution to the NBOI identified in collaboration and coordination with platform and network system PMs. Evaluate, synchronize and track disconnects in platform and network system program acquisition schedules, integration costs, and system requirements across organizations for the development of production ready A&amp;B-kit ICDs and Level II TDPs supporting CS20-25 baseline evaluations. Resolve and elevate operational, technical and programmatic issues for Initial and Reference Architecture Products in collaboration and coordination with SoSE&amp;I-E&amp;I, platform PMs, network system PMs and TCMs. Synchronize CS program schedules through coordination and communication with other organizations within and outside of SoSE&amp;I. Coordinate with associated PoRs for the management, integration, forecasting, procurement, testing and delivery of platform integrated Network equipment for CS baseline evaluations. Support PMs and PEOs in resolution of tasks associated with Network integration. Evaluate, synchronize, and track PM implementation of Vehicular Integration for Command, Control, Communication, Computers, Intelligence, Surveillance, Reconnaissance (C4ISR) / Electronic Warfare (EW) Interoperability</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
(VICTORY) standards in Initial and CS20-25 Reference Architecture products. Begin the planning for CS20-25 Unit specific NBOI requirements and develop and coordinate the IMS with all stakeholders.				
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increases to personnel costs (COLA and salary adjustments)				
<b>Title:</b> Common Operating Environment (COE)		3.154	1.161	1.198
<b>Description:</b> Provide governance and implementation oversight and for the Army SoS Common Operating Environment (COE) and synchronized programmatic planning for COE crossing multiple PEOs and Computing Environments (CEs) in coordination with the Army Staff, Training and Doctrine Command, Research and Development Command, Army Materiel Command, Army Testing and Evaluation Command, the Joint Staff and OSD Staff. This includes providing integrated, cross-portfolio system engineering technical products and configuration management cost benefit analysis, support for TRADOC requirements development and G-8 staffing through AROC approval. Lead COE standards development in support of Army and DoD Standards bodies and integrated architecture development. Provide COE related Verification & Validation (V&V) planning and assessment including management of the Federated Integration Environment, Cross-CE risk reduction and Army Interoperability Certification. Serve as the DA Staff advocate for COE and Cross-Cutting Capabilities (CCCs) development and Application Migration. Provides funding for supervision of Subject Matter Expert Staff used to support execution the tasks following.				
<b>FY 2018 Plans:</b> Engineering Synchronization Oversight and Governance for the Army SoS Common Operating Environment (COE); cross-portfolio system engineering and architecture products; synchronize acquisition planning for COE crossing multiple PEOs and Computing Environments (CEs); and serve as the DA Staff advocate for COE and Cross Cutting Capabilities (CCCs).				
These funds provide continued Oversight and Governance for the Army COE on behalf of the Army Acquisition Executive to include Synchronization of planned COE efforts to deliver the COE materiel solution necessary for the Army to field the Tactical Network envisioned in Mission Command 2020 and Mission Command 2025 guidance. Lead the COE Standards Working Group and provide Data Management of COE policy, guidance, specifications, Engineering Change Proposals, architecture. Advise the Executive Director System of Systems Engineering and Integration and the Army Acquisition Executive on COE matters, provide assessments and reports, and prepares information to support Decision-making. Synchronize analysis, planning information and presentations to inform the Strategic Portfolio Analysis Review (SPAR).				
<b>FY 2019 Plans:</b> This organization provides engineering oversight for Cross-Cutting Capabilities development, standards, interoperability testing and Army Interoperability Certification and Governance for the Army System of Systems Common Operating Environment (COE). Products include cross portfolio system engineering products and architecture; synchronized acquisition planning for COE				

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>crossing multiple PEOs and Computing Environments (CEs); advocacy for COE and Cross Cutting Capabilities (CCCs) within the DA Staff, senior decision bodies and Army commands; oversight of the COE Integration Assessment Program (CIAP); leadership of the COE Standards Working Group; and Data Management of COE policy, guidance, specifications, and Engineering Change Proposals.</p> <p>These funds provide continued oversight and governance for the Army COE on behalf of the Army Acquisition Executive to include synchronization of planned COE efforts to deliver the COE materiel solution necessary for the Army to field the Mission Command tactical network and migration of legacy systems through divestiture. Funds provide staff support to the Executive Director System of Systems Engineering and Integration and the Army Acquisition Executive on COE matters, assessments and reports, and information to support decision-making. Funds provide configuration management, including software version tracking for fielded baselines and configuration management board review of system readiness for certification for to be fielded baselines. Funds provide Federated Integration Environment Coordination. Funding support includes synchronized analysis, planning information and presentations to inform the Strategic Portfolio Analysis Review (SPAR).</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increases to personnel costs (COLA and salary adjustments)</p>				
<p><b>Title:</b> Cyber</p> <p><b>Description:</b> This project funds cyber support to PEOs/PMs to include cybersecurity support to risk management framework, cyber engineering and architecture development, industry cybersecurity engagement, and cyber program oversight and governance, which ensures the secure, affordable, and effective delivery of Army materiel solutions that address critical Army modernization objectives, as well as the delivery of agile and advanced cyber solutions to equip the Army's offensive and defensive forces in the cyberspace domain. These funds support synchronization, analysis and integration of Cyber functions and products.</p> <p><b>FY 2018 Plans:</b> These funds support critical Cyber SMEs for synchronization, analysis and integration of Cyber functions and products. Cyber Programs: - Provide oversight, governance, synchronize and coordinate across the Army for cyberspace operations requirements and capabilities. - Manage the synchronization of multiple efforts between program offices, HQDA, and the Army Cyber Command regarding efforts for the drafting, validation and execution of operational needs statements, appointing an office of primary responsibility, materiel development decisions and other required programmatic support. - Participate in the prioritization of Cyberspace requirements in view of operational imperatives, estimated costs, and available resources; approving an annual plan for cyberspace capability development that assists materiel and capability developers in forecasting resourcing requirements; measuring progress from the prior year's annual plan and forecasting future requirements.</p>		2.086	3.256	3.359



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>- Maintain the Army's Cyber Acquisition strategy/plan to reflect changes in technology and policy/regulation and to address emerging cyber requirements.</p> <p>- Continue to execute cyber innovation challenges by hosting meetings, conferences, conducting market research, working with the Army Contracting Command, PEO and the Army Cyber Command (ARCYBER) and other efforts.</p> <p>- Expand market research to include academia, Industry, International organizations, and specified cooperative security efforts in order to identify and utilize common cyber efforts.</p> <p>Cyber engineering tasks:</p> <p>- Decompose incoming requirements documents for the purpose of gap identification, redundant capability definition or requirement between multiple requirements documents, requirement definition in support of resourcing requirement(s).</p> <p>- Assist in identifying possible vulnerabilities in current weapon systems and analyzing current requirement solutions? concept of operations.</p> <p>- Identify potential commercial industry solutions and techniques used to protect from known and unknown cyber threats.</p> <p>- Analyze what the Army science and technology experts are highlighting as key research areas as it relates to defensive and offensive cyber operations.</p> <p>- Decompose the cyberspace operation requirements to break out the defined Key Performance Parameters and Key System Attributes into clearly defined capabilities, measures of performance and effectiveness, and risks.</p> <p>Cyber Resource Synchronization:</p> <p>- Provide guidance and synchronization of ASA(ALT) PEOs and PMs to Army leadership guidance for cyber resourcing and budget efforts. Serve as liaison to ARCYBER, HQDA, and acquisition community with regards to cyber funding.</p> <p>- Prepare reclamation and attend Congressional hearing appeals for cyberspace operations funding marks.</p> <p>- Provide lead coordination and synchronization across ARCYBER, HQDA, and acquisition community for cyclical Planning, Programing, and Budget Execution events.</p> <p>- Lead coordination and synchronization across acquisition community and HQDA for Budget Estimate Submissions and President's Budget P&amp;R Form submissions.</p> <p>- Consolidate and review cost estimates for cyber PoRs/non-PoRs.</p> <p>- Analyze applicable regulations, policy statements, and program guidelines that impact cyber programs.</p> <p>- Provide data, economic, and cost analyses to develop estimates to support program requirements such as program milestones and required DA and OSD reporting.</p> <p><b>FY 2019 Plans:</b> These funds support synchronization, analysis and integration of Cyber functions and products.</p> <p>Cyber Programs Tasks:</p>				

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>Manage the Cyber Acquisition Task Force (CATF) to provide oversight and governance of cyber program planning and execution activities to include portfolio prioritization, resourcing alignment, requirements validation (Cyber Needs Forms, Requirements Definition Packages, and Capability Drops) and capability synchronization/deconfliction across OCO, DCO, PCTE, Cyber Situational Understanding, and related DoDIN initiatives.</p> <p>Co-lead Line of Effort (LOE) #3: Capability Development (Army Cyberspace Strategy) and provide weekly updates to the Army Cyberspace Council on the goals and objectives LOE #3 Project Plan in collaboration with TRADOC, ARCYBER, and HQDA. Provide architecture and system of systems engineering support to the cyber program portfolio to ensure solutions are optimally designed for efficiency and effectiveness. Support assignment of office of primary responsibility for emerging programs like Cyber Situational Understanding IS ICD and acquisition decisions for all programs.</p> <p>Serve as primary ASA(ALT) POC for joint deconfliction to include programs such as Unified Platform and Joint Command and Control and Situational Awareness and authorities such as USCYBERCOM's Section 807 Acquisition Authority.</p> <p>Identify disruptive and innovation technology for rapid prototyping for the primary purpose of dramatically improving the security posture of the Army's systems (weapon, business, or C4ISR). Host meetings and demonstrations, conduct market research, and coordinate with Army Contracting Command (ACC), PEOs, ARCYBER, TRADOC, AMC, and RDECOM as required.</p> <p>Establish improved transition of S&amp;T projects into cyber programs of record.</p> <p>Mission Assurance and Resilience:            Updates to the Cyber Threat Convergence as related to the current threat actors identified by the intel community.            Maintenance of the Cyber Focal SharePoint site as necessary to ensure access to Cyber Focal, Cyber Programs, CIO Governance, Mission Assurance &amp; Resilience, Cybersecurity, Defense Industrial Base, Internal Cyber Focal, HBSS/AESS, Unsupported Software, Windows 10 Migration, IAVM Patching, Cyber Engineering, Cyber Acquisitions Task Force, Innovation Challenge and Cyber I-WSR. Assist with the advancement of electronic patching compliance implementation. Continue to improve and simplify identification and reporting of cyber vulnerabilities.            Monitor and facilitate PEO's and PM's migration towards Windows 10 for both their Desktop IT and all Windows based PoRs. Assist and respond with data call requests, synchronization efforts and IPR's from DoD CIO, CIO G6, ARCYBER, and the updates to the VCSA. Provide Army stakeholders with weekly updates to include which systems            Monitor and track PEO's and PM's migration out of Windows XP and Server 2003 and report current numbers that will feed the DoD Cybersecurity Scorecard that tracks the use and migration out of unsupported software for all Services.            Coordination of DoD and Army PKI and Authentication requirements across PEO's and PM's. Coordinate and review all program briefings, and input to the PKE Exemption SharePoint site.            Lead for AVRT design, development and implementation, HBSS/AESS integration, IAVA patching.            FY16 NDAA S. 1647 cyber vulnerabilities assessments. Manages, leads and develops annual and final reports, analysis, testing and assessments related to cyber vulnerabilities testing of weapon systems/PoRs. Provides recommendations and guides follow on activities as related to ASA(ALT) weapon systems/PoRs. Supports and leads capstone/Phase 3 NDAA 1647 activities.</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p>Supports cyber hardening events (1553 bus activities and DCGS-A) and other engagements in terms of FY16 NDAA S. 1647 application, leveraging lessons learned and analyses opportunities to further cyber resiliency goals.</p> <p>Co-lead responsibilities to coordinate, shape, develop and support G 3/5/7 DAMO-CY efforts for the creation of an enduring cyber resiliency program/effort for legacy systems in the Operations and Sustainment phase.</p> <p>Monitor, coordinate and facilitate responses back to DoDIG requirements related to cyber posture and plans in terms of Aviation/ UAS inquiries. In addition, respond and coordinate for audit reports (AAA, DAIG, etc.) that may arise that are related to the cyber mission assurance and resilience area.</p> <p>Support the Wideband Global SATCOM cyber working group with ASA(ALT) Cyber SME input to their study guidance activities.</p> <p>Support, facilitate, and coordinate Supply Chain Risk Management OPT activities and initiatives; analyze, assess and implement recommendations and findings where appropriate to ensure cyber resilience for ASA(ALT) POR?s.</p> <p>Cybersecurity Tasks:</p> <p>Obtain Authorization to Operate (ATOs) for Army Rapid Capabilities (Army RCO) systems through the Risk Management Framework (RMF) for the USAEUR ONS Fielding.</p> <p>Lead the ASA(ALT) community and associated PEOs in preparing for upcoming Command Cyber Readiness Inspections (CCRI), unannounced CCRI, and the addition of Command Cyber Operational Readiness Inspections (CCORI). Continue to assist the local NECs with acquiring support for patching, configuring, and implementing Programs of Record to increase cyber posture and achieve passing scores. Continue to support 7th Signal Command as the PEO liaison.</p> <p>Monitor Army Rapid Capabilities (Army RCO) systems through the Risk Management Framework (RMF), complete a Security Controls Assessor-Validator (SCA-V) assessment if systems will continue operation in FY19 and beyond.</p> <p>Defense Industrial Base (DIB) Cyber Security Tasks:</p> <p>Sustain or improve current damage assessment case completion levels at the Defense Cyber Crime Center.</p> <p>Continue to increase the Army acquisition workforce?s awareness of Defense Industrial Base cybersecurity threats and mitigations and minimize unauthorized disclosure of Army information.</p> <p>Engage with the DIB through the DoD CIO DIB CS Program Office to encourage cyber information sharing and address potential long-term issue regarding enhanced cybersecurity and cyber incident damage assessment (CIDA) reporting policies.</p> <p>Deploy final operational capability for the Joint CIDA case management solution to share case data and metrics across all DOD damage assessment management offices and facilitate enterprise-wide risk analysis.</p> <p>In collaboration with the Army Intelligence and Security Command, secure funding to update information technology to meet future damage assessment demands.</p> <p>Work with the OSD Damage Assessment Management Office to modernize damage assessment tool suites to manage increased incident reporting and to identify trends in unauthorized technology transfers.</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Continue to integrate CIDA operations with Joint Acquisition Protection & Exploitation Cell (JAPEC) to facilitate proactive protection of Army controlled technical information (CTI) residing and transiting on contractor-owned systems. Update AR 70-77 to codify CTI identification and safeguarding processes and to improve intelligence support to CIDA process. Conduct cost benefit analysis additional Army resource requirements to meet JAPEC needs. Assist PEOs, PMs, and ASA(ALT) with forecasting costs and resources required with protection of CTI within the DIB, damage assessment recovery operations, and maintaining technology superiority.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increases to personnel costs (COLA and salary adjustments)			
<b>Title:</b> Facilities and IT Support  <b>Description:</b> Provides funding for infrastructure/facilities and IT support.  <b>FY 2018 Plans:</b> Provides funding for infrastructure/facilities. It includes the costs for purchasing/leasing hardware, software, computers, communications equipment and services.  <b>FY 2019 Plans:</b> Provides funding for infrastructure/facilities. It includes the costs for purchasing/leasing hardware, software, computers, communications equipment and services.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decreases to infrastructure costs.	0.533	0.582	0.212
<b>Accomplishments/Planned Programs Subtotals</b>	18.802	15.508	15.610

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• DY3: <i>NIE Test &amp; Evaluation</i>	41.885	58.395	22.683	-	22.683	23.530	23.677	23.541	23.508	Continuing	Continuing
• DY5: <i>Production/Field Coordination for Capability Sets</i>	4.660	4.261	4.242	-	4.242	4.301	4.391	4.369	4.462	Continuing	Continuing
• DZ6: <i>Army Integration Management &amp; Coordination</i>	8.915	6.775	6.753	-	6.753	6.889	6.987	7.132	7.550	Continuing	Continuing
• FG7: <i>Emerging Technology Initiatives</i>	27.665	60.421	0.000	-	0.000	-	-	-	-	Continuing	Continuing

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

**D. Acquisition Strategy**

This project does not have any requirement for direct procurement of hardware or software.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>
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<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Army System of Systems Engineering and Analysis	TBD	TBD : Various	31.574	13.029	Nov 2016	-		-		-		-	0.000	44.603	-
Common Operating Environment (COE)	TBD	TBD : Various	9.815	3.154	Nov 2016	-		-		-		-	0.000	12.969	-
Cyber	TBD	TBD : Various	2.678	2.086	Nov 2016	-		-		-		-	0.000	4.764	-
Army System of System Engineering and Analysis Core Labor	Allot	SoSE&I : Various	-	-		4.479	Nov 2017	4.622	Nov 2018	-		4.622	Continuing	Continuing	-
Army System of System Engineering and Analysis Matrix Labor	MIPR	CERDEC : Various	-	-		0.982	Nov 2017	1.013	Nov 2018	-		1.013	Continuing	Continuing	-
Army System of System Engineering and Analysis SETA Labor	C/CPFF	TBD : Various	-	-		1.091	Nov 2017	1.125	Nov 2018	-		1.125	Continuing	Continuing	-
Army System of System Engineering and Analysis FFRDC Labor	FFRDC	MITRE : Various	-	-		3.956	Nov 2017	4.081	Nov 2018	-		4.081	Continuing	Continuing	-
Common Operating Environment (COE) Core Labor	Allot	SoSE&I : Various	-	-		1.161	Nov 2017	1.198	Nov 2018	-		1.198	Continuing	Continuing	-
Cyber Core Labor	Allot	SoSE&I : Various	-	-		2.076	Nov 2017	2.141	Nov 2018	-		2.141	Continuing	Continuing	-
Cyber Matrix Labor	MIPR	CERDEC : Various	-	-		0.300	Nov 2017	0.309	Nov 2018	-		0.309	Continuing	Continuing	-
Cyber SETA Labor	C/CPFF	TBD : Various	-	-		0.248	Nov 2017	0.256	Nov 2018	-		0.256	Continuing	Continuing	-
Cyber FFRDC Labor	FFRDC	MITRE : Various	-	-		0.633	Nov 2017	0.653	Nov 2018	-		0.653	Continuing	Continuing	-
<b>Subtotal</b>			44.067	18.269		14.926		15.398		-		15.398	Continuing	Continuing	N/A

**Remarks**  
 Note: 1  
 - Program Activities performed at Aberdeen Proving Ground (MD), Taylor Bldg, (Crystal City, VA), Pentagon, (Washington DC), TACOM (Warren, MI)

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Facilities and IT Support	TBD	Various: Note: 1 : TBD	3.387	0.533	Nov 2016	0.582	Nov 2017	0.212	Nov 2018	-		0.212	0.000	4.714	-
<b>Subtotal</b>			3.387	0.533		0.582		0.212		-		0.212	0.000	4.714	N/A

**Remarks**  
 Note:1  
 - Program Activities performed at Aberdeen Proving Ground (MD), Taylor Bldg, (Crystal City, VA), Pentagon, (Washington DC), TACOM (Warren, MI)

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	47.454	18.802	15.508	15.610	-	15.610	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Capability Set (CS) Design:</b>																												
CS18 Architecture Design																												
CS19 Architecture Design																												
CS20 Architecture Design																												
CS21 Architecture Design																												
CS22 Architecture Design																												
CS23 Architecture Design																												
CS24 Architecture Design																												
<b>Common Operating Environment (COE):</b>																												
COE V3.0 CPCE/MCE CDR																												
COE V3.0 CPCE/MCE OT at NIE 18.2																												
COE V3.0 AIC																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DY7 / <i>Army Systems Engineering, Architecture &amp; Analysis</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Capability Set (CS) Design:	1	2018	4	2019
CS18 Architecture Design	1	2016	2	2017
CS19 Architecture Design	1	2017	2	2018
CS20 Architecture Design	1	2018	2	2019
CS21 Architecture Design	1	2019	2	2020
CS22 Architecture Design	1	2020	2	2021
CS23 Architecture Design	1	2021	2	2022
CS24 Architecture Design	1	2022	2	2023
Common Operating Environment (COE):	1	2018	4	2019
COE V3.0 CPCE/MCE CDR	1	2018	1	2018
COE V3.0 CPCE/MCE OT at NIE 18.2	4	2018	4	2018
COE V3.0 AIC	1	2019	1	2019

**Note**

Capability Set (CS)

Common Operating Environment (COE):

Army Interoperability Certification (AIC), Command Post Computing Environment (CPCE), Critical Design Review (CDR), Mounted Computing Environment (MCE), Network Integration Evaluation (NIE), Operational Test (OT)

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>					<b>Project (Number/Name)</b> DZ6 / <i>Army Integration Management &amp; Coordination</i>		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
DZ6: <i>Army Integration Management &amp; Coordination</i>	-	8.915	6.775	6.753	-	6.753	6.889	6.987	7.132	7.550	0.000	51.001
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project funds the "shared" resources that support the technical and management (i.e. headquarters, resource management, acquisition, human resources, and operations) aspects of the Army's Integrated Evaluations, System of Systems Engineering and Analysis efforts, coordination of Capability Set (CS) Fieldings, and the Army Rapid Capabilities Office (RCO). Effectively utilizing "shared" resources reduces overall cost to the program. The personnel funded by this project provide staff functions for the Brigade Analysis, Integration and Evaluation program missions and the RCO.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<p><b>Title:</b> Program Management and Integration</p> <p><b>Description:</b> This effort funds for all "shared" resources that supports SoSE&amp;I and the Army Rapid Capabilities Office (RCO).</p> <p><b>FY 2018 Plans:</b> This effort includes program, business, operations, and personnel management support. It includes the following types of activities: Program management, contracting, financial management, cost analysis, personnel management, operations, security management, information management, facilities and infrastructure management, Pentagon liaison, and knowledge management. It also includes program oversight for Program Manager, Position, Navigation, and Timing (PNT).</p> <p><b>FY 2019 Plans:</b> This effort includes program, business, operations, and personnel management support. It includes the following types of activities: Program management, contracting, financial management, cost analysis, personnel management, operations, security management, information management, facilities, and infrastructure management. It also includes program oversight for Program Manager, Position, Navigation, and Timing (PNT).</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increases in Personnel Costs (COLA &amp; Adjustments)</p>	8.107	6.062	6.209
<p><b>Title:</b> Facilities and IT Support</p> <p><b>Description:</b> Provides funding for infrastructure/facilities and IT support.</p> <p><b>FY 2018 Plans:</b></p>	0.808	0.713	0.544

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DZ6 / <i>Army Integration Management &amp; Coordination</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Provides funding for infrastructure / facilities, and IT support from Network connectivity to purchasing/leasing hardware, software, computers, communications equipment and services.  <b>FY 2019 Plans:</b> Provides funding for infrastructure / facilities, and IT support from Network connectivity to purchasing/leasing hardware, software, computers, communications equipment and services.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decreases in infrastructure costs.			
<b>Accomplishments/Planned Programs Subtotals</b>	8.915	6.775	6.753

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• DY3: <i>NIE Test &amp; Evaluation</i>	41.885	58.395	22.683	-	22.683	23.530	23.677	23.541	23.508	Continuing	Continuing
• DY5: <i>Production/Field Coordination for Capability Sets</i>	4.660	4.261	4.242	-	4.242	4.301	4.391	4.369	4.462	Continuing	Continuing
• DY7: <i>Army Systems Engineering, Architecture &amp; Analysis</i>	18.802	15.508	15.610	-	15.610	24.377	24.760	25.449	25.939	Continuing	Continuing
• FG7: <i>Emerging Technology Initiatives</i>	27.665	60.421	0.000	-	0.000	-	-	-	-	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

This project includes the purchase of IT hardware, software and service support; general office and operational supplies.

**E. Performance Metrics**

N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>											<b>Date:</b> February 2018				
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>				<b>Project (Number/Name)</b> DZ6 / <i>Army Integration Management &amp; Coordination</i>							

<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
SoSE&I Program Management and Integration	TBD	Various Note: 1 : TBD	20.631	8.107	Nov 2016	6.062	Nov 2017	6.209	Nov 2018	-		6.209	Continuing	Continuing	Continuing
<b>Subtotal</b>			20.631	8.107		6.062		6.209		-		6.209	Continuing	Continuing	N/A

**Remarks**  
 Note: 1  
 - Program Activities performed at Aberdeen Proving Ground (MD), TACOM (Warren MI), Taylor Bldg, (Crystal City, VA), Pentagon, (Washington DC).

<b>Support (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Facilities and IT Support	TBD	Various Note: 1 : TBD	2.999	0.808	Nov 2016	0.713	Nov 2017	0.544	Nov 2018	-		0.544	Continuing	Continuing	Continuing
<b>Subtotal</b>			2.999	0.808		0.713		0.544		-		0.544	Continuing	Continuing	N/A

**Remarks**  
 Note:1  
 - Program Activities performed at Aberdeen Proving Ground (MD), TACOM (Warren MI), Taylor Bldg, (Crystal City, VA), Pentagon, (Washington DC), FT Bliss (TX), White Sands Missile Range (NM).

	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	23.630	8.915	6.775	6.753	-	6.753	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DZ6 / <i>Army Integration Management &amp; Coordination</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
NIE 17.2 Planning - Execution																												
JWA 18.1 Planning - Execution																												
NIE 18.2 Planning - Execution																												
JWA 19.1 Planning - Execution																												
JWA 20.1 Planning - Execution																												
JWA 21.1 Planning - Execution																												
CS17 Capability Set Fielding																												
CS18 Capability Set Fielding																												
CS19 Capability Set Fielding																												
CS20 Capability Set Fielding																												
CS21 Capability Set Fielding																												
CS22 Capability Set Fielding																												
CS23 Capability Set Fielding																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date: February 2018</b>		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>		<b>Project (Number/Name)</b> DZ6 / <i>Army Integration Management &amp; Coordination</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
CS24 Capability Set Fielding																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> DZ6 / <i>Army Integration Management &amp; Coordination</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
NIE 17.2 Planning - Execution	3	2016	1	2018
JWA 18.1 Planning - Execution	3	2016	3	2018
NIE 18.2 Planning - Execution	2	2017	2	2019
JWA 19.1 Planning - Execution	3	2016	4	2019
JWA 20.1 Planning - Execution	1	2018	4	2020
JWA 21.1 Planning - Execution	1	2019	4	2021
CS17 Capability Set Fielding	1	2015	1	2018
CS18 Capability Set Fielding	3	2017	1	2019
CS19 Capability Set Fielding	1	2018	1	2020
CS20 Capability Set Fielding	1	2018	2	2021
CS21 Capability Set Fielding	1	2019	2	2022
CS22 Capability Set Fielding	1	2020	2	2023
CS23 Capability Set Fielding	1	2021	2	2024
CS24 Capability Set Fielding	1	2022	2	2025

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>					<b>Project (Number/Name)</b> FG7 / <i>Emerging Technology Initiatives</i>		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
FG7: <i>Emerging Technology Initiatives</i>	-	27.665	60.421	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	88.086
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Equipment mix and configuration may change based on changes in operational environment and circumstances.

\*Project FG7 Emerging Technology Initiatives was created in support of the Army Rapid Capabilities Office (RCO). This project was realigned to PE0605054A Emerging Technologies Initiatives in FY2019 for greater transparency of the Army RCO efforts.

**A. Mission Description and Budget Item Justification**

This Project funds the prototyping and demonstration of selected technology enabled capabilities to support advanced Soldier, ground, aviation, and Command, Control, Communications, Computers Intelligence & Reconnaissance (C4ISR) systems and equipment.

The Primary goal is to take technologies to Technology Readiness Level (TRL) 7 and 8 through a collaborative and accelerated acquisition process. Technologies will be demonstrated in relevant environments, performing tactical/operational scenarios. Efforts will focus on high-priority, threat-based projects with the intent to deliver an operationally effective capability within one to five years. Efforts will include accelerated material development and competitive prototyping based on anticipated and emerging threats and opportunities. This Project provides the Army an improved mechanism to effectively confront emerging threats and advance America's military dominance. Efforts include development, acquisition, assessment, maturation, and transition of prototype technologies to acquisition programs in Cyber; Electronic Warfare (EW); Positioning, Navigation and Timing (PNT); Survivability and other high priority emerging threats and opportunities. Funds may also allow for acceleration of critical Program of Record capabilities to counter urgent and emerging threats. The Army Rapid Capabilities Office (RCO) assesses the provided capabilities to improve future solutions, to inform future Army capability requirements, and to potentially transition the capability to an Army acquisition program.

The Army RCO expedites the provisioning and fielding of critical combat materiel capabilities to the Warfighter to meet Combatant Commanders' needs. The Army RCO was established per Headquarters, Department of the Army, memo, SUBJECT: Establishment of the Army Rapid Capabilities Office, signed by the Secretary of the Army: Eric K. Fanning, dated 11 August 2016.

The RCO assesses Commercial-Off-The Shelf (COTS), Government Off-The- Shelf (GOTS), and Non-Developmental Item (NDI) (non-standard equipment) solutions for modification and/or integration to address changes in contested environments with enduring materiel solutions for forces deployed globally. Procure prototypes and evaluate solutions to be fielded and transition to an acquisition program for production and sustainment.

The RCO capabilities focus areas are:

- Cyber
- Electronic Warfare (EW)
- Position, Navigation and Timing (PNT)
- Survivability



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> FG7 / <i>Emerging Technology Initiatives</i>		
Operational Needs Statements (ONS) Any other operational needs that become a priority as designated by the Army Board of Directors (BOD)				
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<b>Title:</b> Maturation, Prototyping, Assessment, and Integration of Emerging and Essential Technologies		27.665	60.421	-
<b>Description:</b> This effort selects technologies that show high promise for advancing and accelerating capabilities required under acquisition programs and develops and evaluates associated prototypes for accelerated identification, assessment, and transition to an acquisition program for production and fielding. It also demonstrates integrated technologies within a high fidelity and realistic operating environment and transitions them to a formal program of record on an accelerated basis. This effort also includes analysis, integration and evaluation of emerging capabilities on air and ground platforms to reduce risk and support technology insertions.				
<b>FY 2018 Plans:</b> These funds will be used to identify, develop, procure, modify, and evaluate prototypes providing capability prioritized by the Board of Directors (BOD) in the areas of Cyber, EW, PNT, Survivability, and Other critical capability gaps. Funding supports infrastructure, procurement of prototypes, engineering and material for integration, field support representation, early acquisition documentation, system modification, and development and operational testing needed to transition a procurement ready solution to an acquisition program for execution.				
Electronic Warfare Phase 1 Requirements (In support of USAREUR ONS ? 16-21509) - will continue integration and assessment that began in FY17 for Ground EW capability with enhanced and networked for Prophet, Versatile Radio Observation & Direction Finding (VROD) / Modular Adaptive Transmitter (VMAX) and Sabre Junction.				
Electronic Warfare Phase 2 Requirements (In support of USAREUR ONS ? 16-21509) - will continue integration and assessment that began in FY17 of air EW capability. Funding will acquire long lead prototypes, conduct non-recurring integration engineering and risk reduction exercises, and enable further development of ground EW prototype capabilities.				
Positioning, Navigation and Timing Phase 1 Requirements (In support of USAREUR ONS ? 16-21509) - will continue integration and assessment of the DAGR Distributed Device Enhancement (D3E) w/Anti-Jam (AJ) Antenna and Global Navigation Satellite System (GNSS) Sensors to participate in the Joint Warfighting Assessment (JWA) 18.1. Non-recurring engineering and integration of the D3E/AJ onto the Bradley, Abrams, Stryker and Paladin platforms is required in FY18 to obtain a Capabilities and Limitations (C&L) report to enable Urgent Materiel Release (UMR).				
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>				

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> FG7 / <i>Emerging Technology Initiatives</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
*Project FG7 Emerging Technology Initiatives was created in support of the Army Rapid Capabilities Office (RCO). This project was realigned to PE0605054A Emerging Technologies Initiatives in FY2019 for greater transparency of the Army RCO efforts.			
<b>Accomplishments/Planned Programs Subtotals</b>	27.665	60.421	-

**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• DY3: <i>NIE Test &amp; Evaluation</i>	41.885	58.395	22.683	-	22.683	23.530	23.677	23.541	23.508	Continuing	Continuing
• DY5: <i>Production/Field Coordination for Capability Sets</i>	4.660	4.261	4.242	-	4.242	4.301	4.391	4.369	4.462	Continuing	Continuing
• DY7: <i>Army Systems Engineering, Architecture &amp; Analysis</i>	18.802	15.508	15.610	-	15.610	24.377	24.760	25.449	25.939	Continuing	Continuing
• DZ6: <i>Army Integration Management &amp; Coordination</i>	8.915	6.775	6.753	-	6.753	6.889	6.987	7.132	7.550	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**  
 The Army RCO capitalizes on current and emerging technologies to provide rapid solutions to address emerging threats and high impact capability opportunities of U.S. Army Forces deployed globally. This is accomplished in one of two ways: 1) adapting COTS/GOTS/NDI equipment to meet operational needs and 2) developing emerging deployable capability through research and development organizations, academia, and industry. The RCO uses streamlined acquisition methods, processes and techniques to rapidly acquire capability; these methods vary by project. The Rapid Capabilities Office will have a dedicated contracting staff, with the flexibility to use both traditional and non-traditional contracting approaches. To reach non-traditional vendors, RCO will use non-standard contracting methods, such as Other Transaction Authority instruments. Where practicable, prototypes will be acquired using competitive procedures. Projects will be transitioned to an approved acquisition program for production and sustainment. Operational assessments will be conducted to provide feedback in support of Army requirements generation, prototype maturation, and future capability development.

**E. Performance Metrics**  
 N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> FG7 / <i>Emerging Technology Initiatives</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EW Program Management	Various	PM Electronic Warfare & Cyber : APG, MD	-	-		1.618		-		-		-	0.000	1.618	-
PNT Program Management	Various	PM PNT : Various	-	-		1.279		-		-		-	0.000	1.279	-
<b>Subtotal</b>			-	-		2.897		-		-		-	0.000	2.897	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Maturation, Prototyping, Assessment, and Integration of Emerging and Essential Technologies	C/TBD	TBD : TBD	-	27.665	Mar 2017	30.010		-		-		-	Continuing	Continuing	Continuing
EW VROD/VMAX Software Development	MIPR	I2WD : APG, MD	-	-		1.197		-		-		-	0.000	1.197	-
EW Air Risk Reduction	C/CPFF	General Atomics : Multiple	-	-		7.760		-		-		-	0.000	7.760	-
EW TORO Development	MIPR	Air Force : TBD	-	-		5.300		-		-		-	0.000	5.300	-
EW Sabre Fury Development	C/CPFF	SRC : Syracuse, NY	-	-		2.088		-		-		-	0.000	2.088	-
EW ISA Software Development	C/CPFF	MTEQ : APG, MD	-	-		0.914		-		-		-	0.000	0.914	-
EW EWPMT Development	C/CPFF	Raytheon : Ft. Wayne, IN	-	-		1.977		-		-		-	0.000	1.977	-
PNT D3E Integration	C/CPFF	GPS Source : Pueblo, CO	-	-		0.752		-		-		-	0.000	0.752	-
<b>Subtotal</b>			-	27.665		49.998		-		-		-	Continuing	Continuing	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> FG7 / <i>Emerging Technology Initiatives</i>
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EW VROD/VMAX Information Assurance	MIPR	I2WD : APG, MD	-	-		0.522		-		-		-	0.000	0.522	-
EW Prophet Safety Support	MIPR	CECOM : APG, MD	-	-		0.075		-		-		-	0.000	0.075	-
PNT Engineering Support	C/CPFF	CERDEC : APG, MD	-	-		1.178		-		-		-	0.000	1.178	-
<b>Subtotal</b>			-	-		1.775		-		-		-	0.000	1.775	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EW Sabre Fury Software Test and Information Assurance	MIPR	TBD : TBD	-	-		0.950		-		-		-	0.000	0.950	-
EW RIM Test Articles	C/IDIQ	Army Research Laboratory : APG, MD	-	-		2.450		-		-		-	0.000	2.450	-
EW EWPMT Test	C/CPFF	Raytheon : Ft. Wayne, IN	-	-		0.727		-		-		-	0.000	0.727	-
PNT Customer Test	MIPR	ATEC WSMR : WSMR, NM	-	-		0.897		-		-		-	0.000	0.897	-
PNT Pseudolite test	MIPR	ATEC WSMR : WSMR, NM	-	-		0.217		-		-		-	0.000	0.217	-
PNT JWA 18.1/19.1	MIPR	ATEC : OCONUS	-	-		0.510		-		-		-	0.000	0.510	-
<b>Subtotal</b>			-	-		5.751		-		-		-	0.000	5.751	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	27.665	60.421	-	-	-	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> FG7 / <i>Emerging Technology Initiatives</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>RCO EW Phase I Development</b>																												
RCO EW Phase I Lab Based Risk Reduction																												
RCO EW Phase I NIE 17.2 NET																												
RCO EW Phase I NIE 17.2 VALEX																												
RCO EW Phase I NIE 17.2 EW Dry Run																												
RCO EW Saber Guardian 17																												
RCO EW Phase I NIE 17.2 EW Assessment																												
RCO EW Phase I YPG C&L Test																												
RCO EW Phase I Deployment																												
<b>RCO EW Phase II Development</b>																												
<b>RCO PNT Sensor Development (fixed and mobile)</b>																												
RCO PNT Test Planning																												
RCO PNT NRE and Integration on Stryker Platforms																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> FG7 / <i>Emerging Technology Initiatives</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
RCO PNT NRE and Integration on Heavy Platforms																																
RCO PNT Laboratory Testing of PNT Systems																																
RCO PNT Pseudolite Risk Reduction Testing																																
RCO PNT Safety Release for Customer Test																																
RCO PNT Customer Test																																
RCO PNT C&L and Safety Confirmation																																
RCO PNT Deployment Decision Package																																
RCO PNT BOD Deployment Decision																																
RCO PNT Purchase A Kits																																
RCO PNT Sensor Purchase/Site Surveys																																
RCO PNT Ship A kits to USAREUR																																
RCO Begin Deployment to USAREUR Units																																
RCO OSD Effort Initiation & Engineer Analysis																																

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> FG7 / <i>Emerging Technology Initiatives</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
RCO OSD Operational Assessment FY19																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> FG7 / <i>Emerging Technology Initiatives</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
RCO EW Phase I Development	2	2017	4	2017
RCO EW Phase I Lab Based Risk Reduction	2	2017	3	2017
RCO EW Phase I NIE 17.2 NET	3	2017	3	2017
RCO EW Phase I NIE 17.2 VALEX	3	2017	3	2017
RCO EW Phase I NIE 17.2 EW Dry Run	4	2017	4	2017
RCO EW Saber Guardian 17	4	2017	4	2017
RCO EW Phase I NIE 17.2 EW Assessment	4	2017	4	2017
RCO EW Phase I YPG C&L Test	4	2017	1	2018
RCO EW Phase I Deployment	2	2018	2	2018
RCO EW Phase II Development	1	2018	4	2018
RCO PNT Sensor Development (fixed and mobile)	4	2017	3	2018
RCO PNT Test Planning	4	2017	2	2018
RCO PNT NRE and Integration on Stryker Platforms	4	2017	3	2018
RCO PNT NRE and Integration on Heavy Platforms	1	2018	3	2018
RCO PNT Laboratory Testing of PNT Systems	3	2017	2	2018
RCO PNT Pseudolite Risk Reduction Testing	2	2018	2	2018
RCO PNT Safety Release for Customer Test	2	2018	2	2018
RCO PNT Customer Test	3	2018	3	2018
RCO PNT C&L and Safety Confirmation	3	2018	3	2018
RCO PNT Deployment Decision Package	3	2018	3	2018
RCO PNT BOD Deployment Decision	4	2018	4	2018
RCO PNT Purchase A Kits	3	2018	2	2019



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**Exhibit R-4A, RDT&E Schedule Details: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604798A / <i>Brigade Analysis, Integration and Evaluation</i>	<b>Project (Number/Name)</b> FG7 / <i>Emerging Technology Initiatives</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
RCO PNT Sensor Purchase/Site Surveys	1	2019	2	2019
RCO PNT Ship A kits to USAREUR	1	2019	3	2019
RCO Begin Deployment to USAREUR Units	4	2019	4	2019
RCO OSD Effort Initiation & Engineer Analysis	1	2018	4	2018
RCO OSD Operational Assessment FY19	1	2019	4	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)					PE 0604802A / Weapons and Munitions Engineering Development							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	75.845	145.232	183.100	-	183.100	153.853	142.606	94.042	49.891	0.000	844.569
613: MORTAR SYSTEMS	-	17.642	20.115	28.106	-	28.106	24.586	7.184	2.249	0.000	0.000	99.882
EC4: Non-Standard Simulator Munitions	-	0.000	2.839	3.150	-	3.150	2.644	2.121	2.159	0.000	0.000	12.913
ED7: Advanced Multipurpose (AMP) Cartridge	-	30.014	31.655	27.720	-	27.720	0.000	0.000	0.000	0.000	0.000	89.389
EL9: Ammunitions Logistics Prototyping	-	0.102	0.686	2.016	-	2.016	2.302	1.683	0.697	0.988	0.000	8.474
EP3: Reduced Range Ammunition - Small Caliber	-	0.000	0.000	2.473	-	2.473	8.280	14.826	10.129	8.003	0.000	43.711
EP4: One-Way Luminescence for Small Caliber Ammo	-	0.000	2.688	6.085	-	6.085	6.472	12.247	5.324	6.422	0.000	39.238
EP5: Adv Armor-Piercing (ADVAP) for Small Caliber Ammo	-	12.452	11.571	21.019	-	21.019	4.783	13.953	6.918	6.446	0.000	77.142
EP7: Aviation Airborne Expandable Countermeasures	-	0.000	7.500	7.222	-	7.222	6.920	2.113	16.207	0.000	0.000	39.962
EU4: 40mm HV Improved High Explosive Dual Purpose	-	0.292	3.191	7.210	-	7.210	13.055	2.935	2.313	0.000	0.000	28.996
EU5: .50 Caliber All-Purpose Tactical cartridge (APTC)*	-	0.000	0.000	0.000	-	0.000	0.000	8.401	9.289	0.000	0.000	17.690
EU6: 155mm High Explosive Extended Range Artillery	-	0.000	0.000	6.926	-	6.926	4.943	2.966	0.000	0.000	0.000	14.835
EU7: Enhanced Lethality Cannon Munitions	-	0.000	20.500	7.915	-	7.915	7.908	7.907	0.000	0.000	0.000	44.230
EU8: Improved Multi-Option Fuze	-	0.000	8.000	7.915	-	7.915	9.885	0.000	0.000	0.000	0.000	25.800
EW1: 40mm Low Velocity Ammunition	-	0.000	9.678	13.269	-	13.269	14.032	21.302	1.482	0.000	0.000	59.763

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b>					<b>R-1 Program Element (Number/Name)</b>							
2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>					PE 0604802A / <i>Weapons and Munitions Engineering Development</i>							
FA6: <i>30mm Lethality</i>	-	0.000	12.000	13.851	-	13.851	8.897	11.860	6.918	0.000	0.000	53.526
S36: <i>Precision Guidance Kit</i>	-	15.343	14.809	28.223	-	28.223	30.150	25.695	20.178	17.757	0.000	152.155
XT6: <i>30mm Anti-Personnel and Counter-Air - Eng Dev*</i>	-	0.000	0.000	0.000	-	0.000	8.996	4.942	4.941	4.940	0.000	23.819
XV2: <i>Extended Range 120mm Mortar*</i>	-	0.000	0.000	0.000	-	0.000	0.000	2.471	5.238	5.335	0.000	13.044

\*This project's R-2a exhibit has been suppressed due to funding not beginning until after FY 2019

**Note**

In FY 2019, Program Element (PE) 0603639A, Project EL7, Reduced Range Ammunition will transition to PE 0604802A, Project EP3, Reduced Range Ammunition - Small Caliber. This Project is not a New Start.

In FY 2019, PE 0603639A, Project EU1, Enhanced Lethality Cannon Munitions will transition to PE 0604802A, Project EU6, 155mm High Explosive Extended Range Artillery. This Project is not a New Start.

**A. Mission Description and Budget Item Justification**

This Program Element funds multiple efforts for engineering development of weapons and munitions systems.

Project 613: This Project supports both the High Explosive Guided Mortar (HEGM) and the Weaponized Universal Lightweight Fire-control (WULF).

The High Explosive Guided Mortar (HEGM) project funds engineering development of precision guidance systems applicable to Indirect Fire mortar weapon systems. HEGM provides a precision capability to support the close fight in urban and complex terrain, while at the same time, reducing collateral damage. HEGM provides precision accuracy and effectiveness for 120mm mortar systems using precision guidance systems that will effectively reduce target delivery error. The HEGM capability will be developed through the use of improved guidance and control components and advanced airframe design that allow sufficient maneuver of the cartridge in flight to correct for induced error providing the ability to engage targets without the need to adjust fire.

The Weaponized Universal Lightweight Fire-control (WULF) project funds engineering development of fire-control systems applicable to Indirect Fire mortar weapon systems. WULF is a digital sight integrated with digital fire-control that is designed for aiming of the M252 81mm mortar system and other man portable mortar systems (60mm and 120mm). The digital sight unit and Fire Control will allow the Soldier to replace the mortar systems faster and fire more accurately. WULF will improve the accuracy of the M252 mortar.

Project EC4: This project will standardize various pyrotechnic that simulate battlefield effects. The Army's Combat Training Centers (CTCs) are currently using non-standard munitions to replicate both conventional and asymmetric warfare battlefield effects. These modified commercial-off-the-shelf products have not been type classified, material released, and are not safe or sustainable for use by Soldiers. This effort will develop and demonstrate various pyrotechnics/simulators to replicate both conventional and asymmetric warfare battlefield affects such as: Black smoke signature (burning vehicles, buildings, and equipment); Yellow smoke signature (chemical, biological or nuclear effects); Macro pyrotechnics to simulate hostile fire and small Improvised Explosive Devices (IEDs) during mounted operations in urban

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	
<p>terrain; Micro pyrotechnics to simulate indoor hostile fire and IED effects that are capable of being integrated into existing facilities; Rocket Propelled Grenade (RPG) on a wire to replicate the flight of a Rocket Propelled Grenade; High Order Blast Effect (HOBE) used to replicate a Vehicle Borne Improvised Explosive Device (VBIED), building explosions, and other significant explosive events; Artillery airburst (LA45) simulator to replicate indirect fire; simulator to replicate a STINGER (LA47) firing; Tracer Fire-back simulator to replicate enemy small arms fire and anti-aircraft fire. Standardization will reduce training costs, eliminate redundancies between systems, mitigate environmental concerns and safety risks associated with realistic scenario based training.</p> <p>Project ED7: The Advanced Multi Purpose (AMP) program is a direct fire line of sight 120mm large caliber munition under development for the Abrams Main Battle Tank. AMP has three modes of operation including point detonate, point detonate delay, and airburst. AMP is the materiel solution for breaching double reinforced concrete walls and defeating Anti Tank Guided Missile (ATGM) teams from 50m to 2000m (T) and 50m to 4500m (O), a validated gap that cannot currently be met with existing stockpiled ammunition. In addition to added capability, AMP will also consolidate the capabilities of four existing stockpiled 120mm munitions, thereby addressing the users' battlecarry dilemma by allowing them to load a single munition that is capable of defeating multiple targets including ATGM teams, reinforced walls, personnel, light armor, bunkers, and obstacles. The full performance of the AMP is obtained with an Abrams equipped Ammunition Data Link breech modification, the same required by the 120mm M829A4 cartridge that achieved Milestone C in FY 2014 and achieved Full Materiel Release in FY 2015. FY 2019 will support the continuation of Engineering and Manufacturing Development (EMD) Phase 2 and transition into Low Rate Initial Production (LRIP). This includes the completion of the Developmental Test and Evaluation (DT&amp;E) cartridge build, initiation and completion of DT&amp;E, and Milestone C. Continue to evaluate the scalability for future combat platforms. Conduct fuze risk reduction effort with potential second source supplier. Demonstrate feasibility of a training round for AMP.</p> <p>Project EL9: This project supports the future force by improving the distribution, management, reliability and survivability of ammunition through the advanced development, integration, and demonstration of logistics system enablers. These enablers will improve the efficiency and effectiveness of ammunition operations, to include retrograde, while reducing the logistics footprint on the battlefield. Technology areas addressed include handling, distribution, and management (strategic and tactical), prognostics, diagnostics, and asset visibility, explosives safety, and adaptive and environmentally friendly packaging and palletization. The efficient deployment and sustainment of reliable ammunition is vital to success on the battlefield. This project enhances the operational effectiveness of the ammunition logistics system to ensure the distribution of reliable ammunition to the warfighter. FY 2019 funding will be used to integrate the munitions health monitoring system and continue to integrate passive time/temperature exposure sensors with additional developmental ammunition items and conduct qualification tests for both.</p> <p>Project EP3: The small caliber Reduced Range Ammunition (RRA) Project is a critical technology development in response to the 7.62mm and .50 caliber Capabilities Development Documents (CDD). The overall objective of RRA is to provide training ammunition suitable for use on military installations with Surface Danger Zone (SDZ) restrictions. The relatively long maximum range of the 7.62mm and .50 caliber service ammunition poses challenges on training ranges in range restricted areas. RRA will mitigate a training gap on installations by providing a materiel solution that meets training needs while shortening and condensing the SDZ. This will allow soldiers to train with 7.62mm and .50 caliber weapons on restricted ranges. The RRA cartridge design will be compatible with all Army 7.62mm and .50 caliber weapons, but specifically optimized to work in the M240 and M2 Machine Guns. FY 2019 funding will support Milestone (MS) B activities to include Request for Proposal (RFP), Preliminary Design Review (PDR) and Engineering and Manufacturing Development (EMD) Contract Award for the 7.62mm caliber variant. Funding will also explore lessons learned from the Marine Corp .50 Caliber Reduced Range Ammunition effort and other various options to satisfy the .50 Caliber reduced range requirement.</p>		

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
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<p>Project EP4: The One Way Luminescence (OWL) project is a critical technology development in response to the 7.62mm and 5.56mm Families of Ammunition Capabilities Development Documents (CDD) and .50 Caliber Munitions CDD. Current small caliber ammunition tracer rounds are a pyrotechnic tracer mix which allows enemy forces to see the trace round and track its trajectory back to the shooter. OWL projects objective is to develop and field a full day/night tracer round, replace the current pyrotechnic cartridges with trace cartridges that are only visible to the shooter and soldiers in close proximity, increasing soldier survivability. 7.62mm is the immediate focus followed by 5.56mm OWL cartridges and later followed by .50 Caliber cartridges. FY 2019 funding will support post Milestone B (MS B) activities to include Engineering and Manufacturing Development (EMD), Design Verification Testing (DVT), Preliminary Design Review (PDR), and a User Assessment (UA) for the 7.62mm caliber ammunition.</p> <p>Project EP5: This project supports both the Advanced Armor-Piercing ammunition and the Next Generation Squad Weapon (NGSW) Family of Ammunition.</p> <p>Advanced Armor-Piercing (ADVAP): The ADVAP project is a critical technology development in response to the 7.62mm and 5.56mm Family of Ammunition Capabilities Development Documents (CDD). The nomenclature for the 7.62mm ADVAP is XM1158. The overall objective of the ADVAP project is to develop and Full Materiel Release (FMR) both 7.62mm XM1158 cartridge for the M240 machine gun and ADVAP ammunition in calibers below 7.62mm. The objective is to provide overmatch capability to defeat advanced light armored threats within typical machine gun engagement ranges. FY 2019 funding supports continuation of Engineering and Manufacturing Development (EMD) efforts and activities to accelerate the project.</p> <p>Next Generation Squad Weapon (NGSW) Family of Ammunition: The NGSW ammo is a new ammunition technology under development for use in the Next Generation Squad Weapon systems. The objective is to develop and Full Materiel Release (FMR) the new ammunition. FY 2019 funding supports Engineering and Manufacturing Development (EMD) efforts and activities to accelerate the project for the Enhanced Performance Round (EPR) variant and the Advanced Armor-Piercing (ADVAP) variant. Follow-on development efforts for additional NGSW ammunition variants including tracer ammunition, blank ammunition, and reduced range ammunition will start in FY 2022.</p> <p>Project EP7: This project will support Integrated System Design (ISD), System Capability (SC) and Manufacturing Process Demonstrations (MPD) on current pyrotechnic munitions and tunable pyrotechnic aircraft counter measures and decoys. The project will also support ISD, SC and MPD on new expendable countermeasure munitions that will protect Army aircraft from advanced and current guided missile threats. Activities include modeling and simulation, flight testing, qualification testing, engineering to reduce size and weight, environmental considerations, safety enhancements, manufacturing enhancements, qualification of other service and foreign munitions that could meet current requirements, product improvements, insertion of new technologies to increase performance, and enhancement of current flare solutions for new and existing aircraft. Systems include impulse cartridges, pen flares, hand held signals, trip flares, simulators, marine markers, smoke pots, smoke grenades, rail road flares and other type of emergency/distress devices, aircraft expendables (to include Radio Frequency (RF) expendables), and primers used in munitions systems.</p> <p>Project EU4: 40mm Improved High Explosive Dual Purpose (I-HEDP) is a new capability identified as a Warfighter requirement in the 40mm High Velocity I-HEDP Capability Development Document (CDD). The I-HEDP tactical cartridge provides the warfighter with the ability to achieve the required lethal effects against enemy personnel in the open and to defeat personnel targets in defilade position. Additionally, the I-HEDP cartridge will be able to defeat unarmored and lightly armored vehicles. FY 2019 funding supports Engineering and Manufacturing Development (EMD) activities including source selection, contract award, Design Engineering Tests (DET), and technical design.</p>		

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	
<p>Project EU6: The 155mm High Explosive Extended Range Artillery Projectile project will evaluate, develop and qualify extended range technologies, including the XM1113 in 39 caliber weapon systems with legacy propellants. The XM113 effort is a government owned materiel solution for long-range cannon artillery projectile that will increase range by 10km+ in 39 caliber weapon systems, and contain twice as much rocket motor grains as the current 155mm long range cannon projectile that is now obsolete. The XM1113 will leverage enhanced lethality cannon munition technologies to compensate for increased rocket motor volume. This design will utilize a high fragmentation steel body with a streamlined ogive and a high performance rocket motor. The projectile body is filled with an insensitive munition (IM) high explosive (HE) and a supplementary charge. FY 2019 will support the completion of the Developmental Test phase of Engineering &amp; Manufacturing Development (EMD) and the completion of the Critical Design Review (CDR) in 4Q FY 2019.</p> <p>Project EU7: The Enhanced Lethality Cannon Munitions (ELCM) project will accelerate the qualification of Lithographic Fragmentation Technology (LFT) on the 155mm XM1128 high explosive projectile, per HQDA G-8 Directed Requirement for a Rapid Bridging Solution for the 155mm Dual Purpose Improved Conventional Munition 22 December 2016. The project addresses requirements for increased lethality of 155mm high explosive unitary projectiles (Initial Draft Requirements for the XM1128 with Lithographic Fragmentation Technology, 24 February 2017). The ELCM project will also evaluate, develop and qualify new lethality technologies for 155mm cannon artillery munitions and evaluate their effectiveness in mitigating evolving and derived capability gaps, and support transition to production. The ELCM project will support testing of the Israeli Military Industries (IMI) Systems M999 advanced cluster munition, per HQDA G-8 Directed Requirement for a Rapid Bridging Solution for the 155mm Dual Purpose Improved Conventional Munition 22 December 2016. The project will complete a lethality arena test on the M999 submunitions to be conducted at the IMI facility in Israel. FY 2019 will support the completion of the Product Qualification Testing (PQT) test series for the XM1128 and the finalization of the Capability Production Document (CPD) by 4Q FY 2019.</p> <p>Project EU8: The Improved Multi-Option Fuze project will integrate the results of Budget Activity 04, Program Element 0603639A, Project EU2 and qualify/Type Classify (TC) new improved Multi-Option Fuzes (iMOFA/iMOFM) with Government-owned Next Generation Proximity Sensor (NGPS) capabilities containing built-in exportability attributes previously matured via OSD-sponsored tech base efforts under the Joint Fuze Technology Program and Defense Exportability Features (DEF) Congressional Pilot Program. Continuing FMS sales of non-precision artillery and mortar ammunition fuzes containing proximity technology will increase the incidence of reverse engineering (RE) and threat of electronic countermeasures (ECM). If realized, these threats will negate the current battlefield advantages of U.S. troops. The pending policy-driven loss of Cannon DPICM will further increase the importance of NGPS / Height of Burst (HoB) fuzing capabilities to efficiently engage enemy target sets. This Project will develop and qualify safe, affordable, reliable Proximity/HoB fuzing solution for non-precision Cannon artillery and Mortar munitions that are resistant to adversary exploitation via ECM and RE threats.</p> <p>Project EW1: High Explosive Air Burst (HEAB) is a new capability identified as a Warfighter requirement in the Capability Development Document (CDD), 40mm Low Velocity (LV) Family of Ammunition Annex. The 40mm LV HEAB tactical cartridge allows the warfighter to engage targets at increased effective ranges using the 40mm M203/M320 Grenade Launcher. The HEAB cartridge provides the grenadier with a higher probability of achieving a first shot kill against enemy personnel, coupled with the ability to defeat personnel targets in defilade positions at increased effective ranges with greater accuracy and lethality. When deployed against point and area targets, the cartridge inflicts incapacitating effects against personnel at increased ranges beyond those offered by the current M433 High Explosive Dual Purpose (HEDP) cartridge. The cartridge provides lethal effects against targets with improved accuracy and greater standoff ranges increasing Soldier Survivability. FY 2019 supports Engineering and Manufacturing Development (EMD) effort for competing prototypes and continues EMD design activities.</p>		

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>
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The 40mm Low Velocity (LV) Door Breach (DB), XM1167, cartridge allows the grenadier to conduct a ballistic breach of an existing door creating an entry point into a building or other structure. This capability is critical during Urban Operations, while having stand-off ability to conduct ballistic breach at ranges up to 50 meters away, with a single-shot, and without pause between actual breach and entry of initial force. The 40mm DB cartridge will provide the small unit with the capability to conduct breaching operations; allowing the Warfighter to create an entry point in a structure allowing an assault element to enter and begin clearing operations, which is the most difficult type of operation that Soldiers may face in an urban environment. The 40mm DB cartridge will reduce collateral damage and friendly casualties associated with breaching operations. The deployment of 40mm DB cartridges will enable the small unit to gain and maintain a tactical advantage through efficiency of combat power and momentum. FY 2019 supports Design Engineering Testing (DET) and Developmental Test and Evaluation (DT&E).

Project FA6: The 30mm Lethality Project funds development of a suite of 30x173mm caliber cartridges, which includes anti-personnel tactical and training cartridges and anti-materiel tactical and training cartridges. The objective is to enhance the operational effectiveness and lethality of the Stryker Infantry Carrier Vehicle (ICV) and any Army Fighting Vehicles that are equipped with a 30x173mm weapon system. The tactical cartridges will provide an organic direct fire capability to support infantry at a greater range and will improve lethality when engaging dismounted infantry and like armored vehicles. The training cartridges will be ballistically matched to the tactical cartridges, allowing the Warfighter to train in a cost effective manner. This Project will leverage earlier efforts in support of the Stryker Operational Needs Statement for Increased Lethality. FY 2019 funding will continue to support the ammunition qualification activities and development of performance specifications in support of the 30x173mm Programmable Airburst Munitions - Tracer (PABM-T) Urgent Materiel Release (UMR). FY 2019 effort also includes activities for developing/qualifying a 30x173mm Programmable Airburst Muniton (PABM) along with an initial Design Engineering Test (DET). The objective is to field airburst capable 30x173mm cartridges and programming/communication units for use in Stryker ICV and/or Army Future Fighting Vehicles.

Project S36: The Precision Guidance Kit (PGK) is a course correcting fuze that provides near precision accuracy and efficiency for current and future 155mm High Explosive (HE) projectiles by eliminating a portion of the inherent errors associated with ballistic firing solutions which effectively reduces the number of projectiles required to execute fire missions. PGK utilizes a Global Positioning System (GPS) receiver and internal Guidance and Navigation Computer to accomplish its mission with point detonating and height of burst fuzing functions. The PGK M1156E1 effort will incorporate and qualify state of the art technologies to increase the functionality of PGK in GPS degraded environments as well as compatibility with the Army's new long range cannon and projectiles which will be fielded during the PGK Life Cycle.

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	99.165	145.232	147.492	-	147.492
Current President's Budget	75.845	145.232	183.100	-	183.100
Total Adjustments	-23.320	0.000	35.608	-	35.608
• Congressional General Reductions	-0.040	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-4.480	-			
• Adjustments to Budget Years	-	-	35.608	-	35.608
• Budget Adjustments - Unrealized FY17 RAA	-18.800	-	-	-	-



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development				<b>Project (Number/Name)</b> 613 / MORTAR SYSTEMS			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
613: MORTAR SYSTEMS	-	17.642	20.115	28.106	-	28.106	24.586	7.184	2.249	0.000	0.000	99.882
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The High Explosive Guided Mortar (HEGM) project funds engineering development of precision guidance systems applicable to Indirect Fire mortar weapon systems. HEGM provides a precision capability to support the close fight in urban and complex terrain, while at the same time, reducing collateral damage. HEGM provides precision accuracy and effectiveness for 120mm mortar systems using precision guidance systems that will effectively reduce target delivery error. The HEGM capability will be developed through the use of improved guidance and control components and advanced airframe design that allow sufficient maneuver of the cartridge in flight to correct for induced error providing the ability to engage targets without the need to adjust fire.

The Weaponized Universal Lightweight Fire-control (WULF) project funds engineering development of fire-control systems applicable to Indirect Fire mortar weapon systems. WULF is a digital sight integrated with digital fire-control that is designed for aiming of the M252 81mm mortar system and other man portable mortar systems (60mm and 120mm). The digital sight unit and Fire Control will allow the Soldier to emplace the mortar systems faster and fire more accurately. WULF will improve the accuracy of the M252 mortar.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> HEGM	15.719	17.780	28.106	-	28.106
<b>Description:</b> Engineering and Manufacturing Development Phase (EMD).					
<b>FY 2018 Plans:</b> Project in the Preliminary Design EMD phase. Activities will include Preliminary Design Review (PDR), award of follow on developmental efforts, and initiation of detailed design phase.					
<b>FY 2019 Base Plans:</b> Project continues in the Detailed Design EMD phase. Activities will include System Design Review (SDR), award of follow on developmental efforts, and initiation of Production Prove Out phase.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 full and open FAR based contract award for detailed design phase to achieve Critical Design Review (CDR) and deliver hardware for qualification testing.					
<b>Title:</b> WULF	1.923	2.335	-	-	-

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> 613 / MORTAR SYSTEMS
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<b>Description:</b> Engineering development and software integration.					
<b>FY 2018 Plans:</b> Project in the Preliminary Design EMD phase. Activities will include Preliminary Design Review, engineering development, and software refinement of matured prototype to support the off Line-Replacement-Unit Environmental test and Software Development Engineering testing.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Efforts will focus on technology maturation and software development in preparation for full development and qualification in FY 2020 and FY 2021.					
<b>Accomplishments/Planned Programs Subtotals</b>	17.642	20.115	28.106	-	28.106

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• E25511: HEGM	-	-	0.000	-	0.000	-	18.075	25.004	53.996	Continuing	Continuing
• K99200: Computer Ballistics: LHMBBC XM32	5.924	8.117	8.553	0.960	9.513	8.151	7.564	7.487	7.492	0.000	54.248

**Remarks**  
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**D. Acquisition Strategy**  
HEGM - The Acquisition Strategy was approved by the Milestone Decision Authority (MDA) in 2Q FY 2017. HEGM will be procured using a Performance Specification (P-Spec). The strategy will use a DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) initiative and a Federal Acquisition Regulations (FAR) contract. The DOTC OTA initiative resulted in multiple awards to cover the Preliminary Design Phase requirements for FY 2017. A single Full and Open FAR contract is anticipated to be awarded for the completion of EMD, Low Rate Initial Production (LRIP) and first 3 years of Full Rate Production (FRP).

WULF - Was developed under the U.S. Army Armament Research, Development and Engineering Center (ARDEC) Science & Technology initiative and currently assessed at Technology Readiness Level (TRL) 6 maturity (prototype demonstrated in a relevant environment). An Acquisition Decision Memorandum (ADM) was approved in 3Q FY 2017 by PEO Ammunition. The project is managed as a Modification Work Order (MWO) to M252A1 with a tailored Acquisition Strategy, leveraging existing FIRECON-F and/or DOTC contract to multiple vendors.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> 613 / <i>MORTAR SYSTEMS</i>

<b><u>E. Performance Metrics</u></b> N/A
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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> 613 / MORTAR SYSTEMS
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<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
HEGM System Engineering Phase 1	MIPR	DoD Ordnance Technology Consortium (DOTC) - General Dynamics OTS : Bothell, WA	-	4.413	Jun 2017	0.750	Jan 2018	-		-		-	0.000	5.163	5.163
HEGM System Engineering Phase 1	MIPR	DoD Ordnance Technology Consortium (DOTC) - BAE Systems : Nashu, NH	-	4.413	Jun 2017	0.750	Jan 2018	-		-		-	0.000	5.163	5.163
HEGM System Engineering Phase 1	MIPR	DoD Ordnance Technology Consortium (DOTC) - Orbital ATK : Plymouth, MN	-	4.413	Jun 2017	0.750	Jan 2018	-		-		-	0.000	5.163	5.163
HEGM System Development Phase 2	C/CPIF	TBD : TBD	-	-		11.105	Jun 2018	20.248	Jan 2019	-		20.248	0.000	31.353	44.593
HEGM - Fire Control	MIPR	Armament Reasech, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	-	0.115	Sep 2017	0.250	Mar 2018	2.800	Dec 2018	-		2.800	0.000	3.165	-
WULF System Development	C/CPFF	TBD : TBD	-	1.100	Sep 2017	0.741	Mar 2018	-		-		-	0.000	1.841	-
<b>Subtotal</b>			-	14.454		14.346		23.048		-		23.048	0.000	51.848	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
HEGM - Project Manager Office	PO	Office of the Project Manager (PM) Combat Ammunition	-	0.575	Jun 2017	0.975	Dec 2017	-		-		-	0.000	1.550	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> 613 / MORTAR SYSTEMS
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		Systems (CAS) : Picatinny Arsenal, NJ													
HEGM - ARDEC Engineering Support	MIPR	Armament Reasech, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	-	1.440	Jun 2017	2.100	Dec 2017	2.558	Dec 2018	-		2.558	0.000	6.098	-
WULF - Project Manager Office	PO	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	-	0.080	Jun 2017	0.180	Dec 2017	-		-		-	0.000	0.260	-
WULF - ARDEC Engineering Support	MIPR	Armament Reasech, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	-	0.743	Jun 2017	0.617	Dec 2017	-		-		-	0.000	1.360	-
<b>Subtotal</b>			-	2.838		3.872		2.558		-		2.558	0.000	9.268	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
HEGM - Developmental Testing	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	-	0.350	Sep 2017	1.100	Sep 2018	2.500	Sep 2019	-		2.500	0.000	3.950	-
WULF - Environmental Testing	MIPR	TBD : TBD	-	-		0.527	Sep 2018	-		-		-	0.000	0.527	-
WULF - System Level Developmental Testing	MIPR	TBD : TBD	-	-		0.270	Sep 2018	-		-		-	0.000	0.270	-
<b>Subtotal</b>			-	0.350		1.897		2.500		-		2.500	0.000	4.747	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>							<b>Date: February 2018</b>					
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions <i>Engineering Development</i>				<b>Project (Number/Name)</b> 613 / MORTAR SYSTEMS					

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	17.642	20.115	28.106	-	28.106	0.000	65.863	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> 613 / <i>MORTAR SYSTEMS</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023					
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
HEGM - Materiel Development Decision (MDD)	▲ 1 MDD																													
HEGM - Preliminary Design (SYS Eng Phase 1)			■ Preliminary Design																											
HEGM - Preliminary Design Review (PDR)							▲ 3 PDR																							
HEGM - Milestone B (MS-B)							▲ 4 MS-B																							
HEGM - EMD Detailed Design (SYS DEV Phase 2)									■ EMD Detailed Design																					
HEGM - Critical Design Review (CDR)													▲ 5 CDR																	
HEGM - EMD Production Prove Out (SYS DEV Phase 3)															■ EMD Production Prove Out															
HEGM - Production Readiness Review (PRR)																					▲ 6 PRR									
HEGM - Milestone C (MS-C)																					▲ 7 MS-C									
HEGM - First Article Acceptance Test (FAAT)																						■ FAAT								
HEGM - Initial Operational Test & Evaluation (IOT&E)																							■ IOT&E							
HEGM - Full Materiel Release (FMR)																									▲ 8 FMR					
HEGM - Initial Operational Capability (IOC)																											▲ 9 IOC			

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date: February 2018</b>		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>		<b>Project (Number/Name)</b> 613 / <i>MORTAR SYSTEMS</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023																			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																
HEGM - Full Rate Production (FRP)																									▲ 10 FRP																			
WULF - Acquisition Decision Memorandum (ADM)																									▲ 2 ADM																			
WULF - Engineering & Manufacturing Development																													EMD															
WULF - EMD Software Development (EMD SW)																													EMD Software Development															
WULF - EMD Hardware Development (EMD HW)																													EMD Hardware Development															



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> 613 / <i>MORTAR SYSTEMS</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
HEGM - Materiel Development Decision (MDD)	2	2017	2	2017
HEGM - Preliminary Design (SYS Eng Phase 1)	3	2017	4	2018
HEGM - Preliminary Design Review (PDR)	4	2018	4	2018
HEGM - Milestone B (MS-B)	4	2018	4	2018
HEGM - EMD Detailed Design (SYS DEV Phase 2)	4	2018	2	2020
HEGM - Critical Design Review (CDR)	2	2020	2	2020
HEGM - EMD Production Prove Out (SYS DEV Phase 3)	2	2020	4	2021
HEGM - Production Readiness Review (PRR)	4	2021	4	2021
HEGM - Milestone C (MS-C)	4	2021	4	2021
HEGM - First Article Acceptance Test (FAAT)	2	2022	2	2022
HEGM - Initial Operational Test & Evaluation (IOT&E)	3	2022	3	2022
HEGM - Full Materiel Release (FMR)	1	2023	1	2023
HEGM - Initial Operational Capability (IOC)	2	2023	2	2023
HEGM - Full Rate Production (FRP)	3	2023	3	2023
WULF - Acquisition Decision Memorandum (ADM)	3	2017	3	2017
WULF - Engineering & Manufacturing Development	4	2017	4	2018
WULF - EMD Software Development (EMD SW)	4	2017	4	2018
WULF - EMD Hardware Development (EMD HW)	1	2018	4	2018

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development				<b>Project (Number/Name)</b> EC4 / Non-Standard Simulator Munitions			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EC4: Non-Standard Simulator Munitions	-	0.000	2.839	3.150	-	3.150	2.644	2.121	2.159	0.000	0.000	12.913
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project will standardize various pyrotechnic that simulate battlefield effects. The Army's Combat Training Centers (CTCs) are currently using non-standard munitions to replicate both conventional and asymmetric warfare battlefield effects. These modified commercial-off-the-shelf products have not been type classified, material released, and are not safe or sustainable for use by Soldiers. This effort will develop and demonstrate various pyrotechnics/simulators to replicate both conventional and asymmetric warfare battlefield affects such as: Black smoke signature (burning vehicles, buildings, and equipment); Yellow smoke signature (chemical, biological or nuclear effects); Macro pyrotechnics to simulate hostile fire and small Improvised Explosive Devices (IEDs) during mounted operations in urban terrain; Micro pyrotechnics to simulate indoor hostile fire and IED effects that are capable of being integrated into existing facilities; Rocket Propelled Grenade (RPG) on a wire to replicate the flight of a Rocket Propelled Grenade; High Order Blast Effect (HOBE) used to replicate a Vehicle Borne Improvised Explosive Device (VBIED), building explosions, and other significant explosive events; Artillery airburst (LA45) simulator to replicate indirect fire; simulator to replicate a STINGER (LA47) firing; Tracer Fire-back simulator to replicate enemy small arms fire and anti-aircraft fire. Standardization will reduce training costs, eliminate redundancies between systems, mitigate environmental concerns and safety risks associated with realistic scenario based training.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Standardize Special Use Ammunition	-	2.839	3.150	-	3.150
<b>Description:</b> Standardize non-standard pyrotechnic battlefield effects currently used by CTCs .					
<b>FY 2018 Plans:</b> This project will support the Engineering Manufacturing and Development (EMD) phase for Force on Force Black Smoke signature (burning vehicles, buildings, and equipment), Artillery airburst simulator and Tracer/STINGER simulators. Material Release (MR) the LA45 and LA47; TC and Full Material Release (FMR) for Black Smoke Force on Target (FOT) cartridge. Test & Evaluate (T&E) and commence TC activities for FOT yellow smoke and Force on Force (FOF) black smoke, T&E Rocket Propelled Grenade (RPG) on a wire and Vehicle Borne Improvised Explosive Device (VBIED).					
<b>FY 2019 Base Plans:</b> This project will support the Engineering Manufacturing and Development (EMD) phase for Force on Force Black Smoke signature (burning vehicles, buildings, and equipment). Material Release (MR) the LA45 and LA47; TC					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EC4 / <i>Non-Standard Simulator Munitions</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
and Full Material Release (FMR) for Black Smoke Force on Target (FOT) cartridge. T&E and commence TC activities for FOT yellow smoke and Force on Force (FOF) black smoke, T&E RPG on a wire and VBIED.					
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> FY19 funding increased by \$311k for additional product development efforts.					
<b>Accomplishments/Planned Programs Subtotals</b>	-	2.839	3.150	-	3.150

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• E88404: <i>Simulators, Non-Standard, Special Effects for CTCs; SSN E88404</i>	0.979	1.632	1.663	-	1.663	1.699	1.750	0.283	-	0.000	8.006

**Remarks**

**D. Acquisition Strategy**  
The Acquisition strategy is for a family of special use ammunition that will be developed in incremental phases as funding and requirements are approved. Milestone Decision Document (MDD) Approval 4th Qtr FY2018. Initial special use ammunition will be black and yellow smoke munitions followed by new increments that will defeat threats outlined in the requirements documents developed by US Army Training and Doctrine Command (TRADOC).

**E. Performance Metrics**  
N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EC4 / Non-Standard Simulator Munitions
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	MIPR	PM Close Combat Systems : PICATINNY ARSENAL	0.289	-		0.095	Feb 2018	0.061	Feb 2019	-		0.061	0.000	0.445	-
<b>Subtotal</b>			0.289	-		0.095		0.061		-		0.061	0.000	0.445	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/FFP	ARDEC : PICATINNY ARSENAL	1.134	-		1.164	Jul 2018	1.489	May 2019	-		1.489	0.000	3.787	-
<b>Subtotal</b>			1.134	-		1.164		1.489		-		1.489	0.000	3.787	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering Support	MIPR	ARDEC : Picatinny Arsenal	0.802	-		0.580	Feb 2018	0.600	Feb 2019	-		0.600	0.000	1.982	-
<b>Subtotal</b>			0.802	-		0.580		0.600		-		0.600	0.000	1.982	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	MIPR	ARDEC : Picatinny	0.541	-		1.000	Aug 2018	1.000	Jun 2019	-		1.000	0.000	2.541	-
<b>Subtotal</b>			0.541	-		1.000		1.000		-		1.000	0.000	2.541	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EC4 / <i>Non-Standard Simulator Munitions</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Matériel Development Decision Special Use Ammunition Pyrotechnic MDD																												
Review/qualify Marine Corps test data for LA45/LA47																												
MS B Force on Target Simulator																												
Conduct T&E, TC/MR black smoke cartridge																												
Evaluate Marine Corps TC/MR																												
Force on Force Black Smoke Development																												
MS B Force on Force Simulator																												
Conduct T&E, TC/MR Force on Force Yellow Smoke																												
MS C Force on Target Simulator																												
MS C Force on Force Simulator																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EC4 / <i>Non-Standard Simulator Munitions</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Materiel Development Decision Special Use Ammunition Pyrotechnics	2	2017	2	2018
Review/qualify Marine Corps test data for LA45/LA47	2	2018	3	2018
MS B Force on Target Simulator	4	2018	4	2018
Conduct T&E, TC/MR black smoke cartridge	4	2018	1	2019
Evaluate Marine Corps TC/MR	2	2019	3	2019
Force on Force Black Smoke Development	1	2019	2	2020
MS B Force on Force Simulator	2	2019	2	2019
Conduct T&E, TC/MR Force on Force Yellow Smoke	3	2019	4	2019
MS C Force on Target Simulator	3	2020	3	2020
MS C Force on Force Simulator	1	2021	1	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development			<b>Project (Number/Name)</b> ED7 / Advanced Multipurpose (AMP) Cartridge				
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
ED7: Advanced Multipurpose (AMP) Cartridge	-	30.014	31.655	27.720	-	27.720	0.000	0.000	0.000	0.000	0.000	89.389
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Advanced Multi Purpose (AMP) program is a direct fire line of sight 120mm large caliber munition under development for the Abrams Main Battle Tank. AMP has three modes of operation including point detonate, point detonate delay, and airburst. AMP is the materiel solution for breaching double reinforced concrete walls and defeating Anti Tank Guided Missile (ATGM) teams from 50m to 2000m (T) and 50m to 4500m (O), a validated gap that cannot currently be met with existing stockpiled ammunition. In addition to added capability, AMP will also consolidate the capabilities of four existing stockpiled 120mm munitions, thereby addressing the users' battlecarry dilemma by allowing them to load a single munition that is capable of defeating multiple targets including ATGM teams, reinforced walls, personnel, light armor, bunkers, and obstacles. The full performance of the AMP is obtained with an Abrams equipped Ammunition Data Link breach modification, the same required by the 120mm M829A4 cartridge that achieved Milestone C in FY 2014 and achieved Full Materiel Release in FY 2015. FY 2019 will support the continuation of Engineering and Manufacturing Development (EMD) Phase 2 and transition into Low Rate Initial Production (LRIP). This includes the completion of the Developmental Test and Evaluation (DT&E) cartridge build, initiation and completion of DT&E, and Milestone C. Continue to evaluate the scalability for future combat platforms. Conduct fuze risk reduction effort with potential second source supplier. Demonstrate feasibility of a training round for AMP.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Engineering and Manufacturing Development (EMD) Phase 1	2.039	-	-	-	-
<b>Description:</b> Develop, demonstrate and qualify the AMP 120mm large caliber munition.					
<b>Title:</b> Downselect / Engineering and Manufacturing Development (EMD) Phase 2	27.975	-	-	-	-
<b>Description:</b> Design, develop and test components and cartridges leading to a design freeze. The final design will then be carried forward to Developmental Test and Evaluation (DT&E) qualification testing to demonstrate the cartridge's ability to meet performance requirements prior to production.					
<b>Title:</b> Engineering and Manufacturing Development (EMD) Phase 2	-	31.155	19.152	-	19.152
<b>Description:</b> Design, develop and test components and cartridges leading to a design freeze. The final design will then be carried forward to Developmental Test and Evaluation (DT&E) qualification testing to demonstrate the cartridge's ability to meet performance requirements prior to production.					
<b>FY 2018 Plans:</b>					



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> ED7 / <i>Advanced Multipurpose (AMP) Cartridge</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Engineering Manufacturing Development Phase 2 is continuing and the execution of safety and performance tests which optimize the subsystems for performance is occurring. Cartridges are being manufactured and procured for the third Cartridge Integration Test. In addition, the Critical Design Review (CDR) is being conducted and the initiation of the Developmental Test and Evaluation (DT&E) cartridge build is taking place.					
<b>FY 2019 Base Plans:</b> Engineering Manufacturing Development Phase 2 will continue with the completion of the Developmental Test & Evaluation (DT&E) build, initiation and completion of DT&E which will include Limited User and Live Fire Testing, Initial Operation Test Planning, preparation for transition to Low Rate Initial Production at Milestone C, and Milestone C approval.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Engineering and Manufacturing Development (EMD) Phase 2 work continues into FY 2019					
<b>Title:</b> Evaluation for Future Combat Platforms					
<b>Description:</b> Evaluation of the scalability for future combat platforms.					
<b>FY 2018 Plans:</b> Evaluation of the scalability for future combat platforms.					
<b>FY 2019 Base Plans:</b> Efforts will continue on the evaluation of the scalability for future combat platforms					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Evaluation of the scalability for future combat platforms effort continues into FY 2019					
<b>Title:</b> Fuze Risk Reduction					
<b>Description:</b> Conduct fuze risk reduction effort with potential second source supplier					
<b>FY 2019 Base Plans:</b> Fuze risk reduction effort with potential second source supplier will be conducted					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Fuze risk reduction effort with potential second source supplier will be conducted					
<b>Title:</b> Training Round Demonstration					
	-	0.500	0.573	-	0.573
	-	-	5.891	-	5.891
	-	-	2.104	-	2.104

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> ED7 / Advanced Multipurpose (AMP) Cartridge
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<b>Description:</b> Demonstrate feasibility of a training round for AMP					
<b>FY 2019 Base Plans:</b> Feasibility of a training round for AMP will be demonstrated.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Feasibility of a training round for AMP will be demonstrated.					
<b>Accomplishments/Planned Programs Subtotals</b>	30.014	31.655	27.720	-	27.720

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• E88105: CTG, 120MM TANK, HEMP-T, XM1147	-	-	24.598	-	24.598	29.548	39.485	47.408	47.426	0.000	188.465

**Remarks**

**D. Acquisition Strategy**  
The AMP Program achieved Milestone B and entered EMD in FY 2015. EMD consists of two phases; Phase 1 awarded two contracts in FY 2015 to competitively prototype. A cartridge demonstration test was conducted and was used to support downselect to a single contractor for EMD Phase 2, which will lead to Milestone C in 2019 followed by two Low Rate Initial Productions in FY 2019 and FY 2020 and one optional year of full procurement in FY 2021. Explore options to increase future competition.

**E. Performance Metrics**  
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions Engineering Development				ED7 / Advanced Multipurpose (AMP) Cartridge							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Manager Maneuver Ammunition Systems (PM-MAS) Labor and travel	Various	Picatinny : NJ	1.747	1.750		1.260		1.121		-		1.121	Continuing	Continuing	Continuing
Orbital Alliant Techsystems Operations (OATK)	C/CPIF	OATK : Plymouth, MN	32.450	22.354		23.741		4.702		-		4.702	Continuing	Continuing	Continuing
General Dynamics Ordnance and Tactical Systems (GDOTS)	C/TBD	GDOTS : St Petersburg, FL	-	-		-		5.657		-		5.657	Continuing	Continuing	Continuing
<b>Subtotal</b>			34.197	24.104		25.001		11.480		-		11.480	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Army Research, Development and Engineering Center (ARDEC)	MIPR	Picatinny : NJ	4.411	1.950		2.350		3.125		-		3.125	Continuing	Continuing	Continuing
<b>Subtotal</b>			4.411	1.950		2.350		3.125		-		3.125	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Yuma Test Center	MIPR	Yuma Proving Ground : AZ	1.500	2.423		2.295		9.931		-		9.931	Continuing	Continuing	Continuing
Aberdeen Test Center	MIPR	Aberdeen Proving Ground : MD	2.219	1.537		2.009		3.184		-		3.184	Continuing	Continuing	Continuing
<b>Subtotal</b>			3.719	3.960		4.304		13.115		-		13.115	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Army							<b>Date:</b> February 2018				
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development			<b>Project (Number/Name)</b> ED7 / Advanced Multipurpose (AMP) Cartridge				
	<b>Prior Years</b>	<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	42.327	30.014		31.655		27.720	-	27.720	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> ED7 / <i>Advanced Multipurpose (AMP) Cartridge</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Engineering and Manufacturing Development (EMD) Phase I	[Redacted]				[Redacted]																							
EMD Contract Phase II Award / Down-Select	▲ 1																											
Engineering and Manufacturing Development (EMD) Phase II	[Redacted]				[Redacted]																							
Critical Design Review					▲ 2 CDR																							
Developmental Test and Evaluation (DT&E)									[Redacted]																			
Milestone C									▲ 3 MS C																			
Low Rate Initial Production 1									[Redacted]																			
Live Fire Test and Evaluation													[Redacted] LFT&E															
Initial Operational Test and Evaluation													[Redacted] IOT&E															
Low Rate Initial Production 2													[Redacted]															
Evaluation for Future Combat Platforms					[Redacted]																							
Training Round Demonstration									[Redacted]																			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> ED7 / <i>Advanced Multipurpose (AMP) Cartridge</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Engineering and Manufacturing Development (EMD) Phase I	4	2015	1	2017
EMD Contract Phase II Award / Down-Select	2	2017	2	2017
Engineering and Manufacturing Development (EMD) Phase II	2	2017	3	2019
Critical Design Review	3	2018	3	2018
Developmental Test and Evaluation (DT&E)	1	2019	3	2019
Milestone C	3	2019	3	2019
Low Rate Initial Production 1	3	2019	3	2020
Live Fire Test and Evaluation	2	2020	2	2020
Initial Operational Test and Evaluation	2	2020	2	2020
Low Rate Initial Production 2	3	2020	3	2021
Evaluation for Future Combat Platforms	1	2018	4	2018
Training Round Demonstration	1	2019	4	2019

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development					<b>Project (Number/Name)</b> EL9 / Ammunitions Logistics Prototyping		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EL9: Ammunitions Logistics Prototyping	-	0.102	0.686	2.016	-	2.016	2.302	1.683	0.697	0.988	0.000	8.474
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

In FY 2019 Program Element (PE) 0604802A, Project EL9, Ammunition Logistics Prototyping will transition to E80100 Project 155mm Extended Range M982.

**A. Mission Description and Budget Item Justification**

This project supports the future force by improving the distribution, management, reliability and survivability of ammunition through the advanced development, integration, and demonstration of logistics system enablers. These enablers will improve the efficiency and effectiveness of ammunition operations, to include retrograde, while reducing the logistics footprint on the battlefield. Technology areas addressed include handling, distribution, and management (strategic and tactical), prognostics, diagnostics, and asset visibility, explosives safety, and adaptive and environmentally friendly packaging and palletization. The efficient deployment and sustainment of reliable ammunition is vital to success on the battlefield. This project enhances the operational effectiveness of the ammunition logistics system to ensure the distribution of reliable ammunition to the warfighter. FY19 funding will be used to integrate the munitions health monitoring system and continue to integrate passive time/temperature exposure sensors with additional developmental ammunition items and conduct qualification tests for both.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Munitions Survivability and Logistics Enablers	0.102	0.686	2.016	-	2.016
<b>Description:</b> This program will develop ammunition logistics systems that improve munitions survivability and logistics					
<b>FY 2018 Plans:</b> Integrate the munitions health monitoring system with developmental ammunition items and conduct qualification tests. Integrate passive time/temperature exposure sensor with developmental ammunition items and conduct qualification testing.					
<b>FY 2019 Base Plans:</b> Integrate the munitions health monitoring system with additional developmental ammunition items and conduct qualification tests. Continue to integrate passive time/temperature exposure sensor with developmental ammunition items and conduct qualification testing.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EL9 / <i>Ammunitions Logistics Prototyping</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Funding in FY 2019 is increased due to the need for integration and qualification testing of additional developmental ammunition items.					
<b>Accomplishments/Planned Programs Subtotals</b>	0.102	0.686	2.016	-	2.016

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

In FY 2019 Program Element (PE) 0604802A, Project EL9, Ammunition Logistics Prototyping will transition to E80100 Project 155mm Extended Range M982

**D. Acquisition Strategy**

The acquisition strategy is to develop and test the Munitions Health Monitoring items and conduct a Technology Readiness Assessment (TRA) to ensure readiness for insertion at Milestone B into families of end items.

**E. Performance Metrics**

N/A



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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604802A / Weapons and Munitions Engineering Development				EL9 / Ammunitions Logistics Prototyping								
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Contractor	C/TBD	TBD : TBD	-	-		0.300		0.750		-		0.750	0.000	1.050	-	
<b>Subtotal</b>			-	-		0.300		0.750		-		0.750	0.000	1.050	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
ARDEC	MIPR	Picatinny Arsenal : NJ	-	0.102		0.186		0.616	Dec 2018	-		0.616	0.000	0.904	-	
<b>Subtotal</b>			-	0.102		0.186		0.616		-		0.616	0.000	0.904	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Operational Testing - RRAPDS	RO	Yuma Proving Ground : Yuma Arizona	-	-		0.200		0.650	Mar 2019	-		0.650	0.000	0.850	-	
<b>Subtotal</b>			-	-		0.200		0.650		-		0.650	0.000	0.850	N/A	
<b>Project Cost Totals</b>			-	0.102		0.686		2.016		-		2.016	0.000	2.804	N/A	
<b>Remarks</b>																

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EL9 / Ammunitions Logistics Prototyping

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023																															
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																												
System Development - Munitions Health Monitoring System																																																								
System Development - Low Cost Thermal Indicator																																																								
System Development - Next Generation Temperature/Humidity Sensor																																																								

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EL9 / <i>Ammunitions Logistics Prototyping</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
System Development - Munitions Health Monitoring System	2	2018	4	2023
System Development - Low Cost Thermal Indicator	3	2017	2	2023
System Development - Next Generation Temperature/Humidity Sensor	2	2019	4	2023

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development				<b>Project (Number/Name)</b> EP3 / Reduced Range Ammunition - Small Caliber			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EP3: <i>Reduced Range Ammunition - Small Caliber</i>	-	0.000	0.000	2.473	-	2.473	8.280	14.826	10.129	8.003	0.000	43.711
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

The effort under Program Element (PE) 0603639A, Project EL7, Reduced Range Ammunition (RRA), will transition in FY 2019 to PE 0604802A, Project EP3, Reduced Range Ammunition - Small Caliber. PE 0604802A, Project EP3, RRA funding continues the development work of 7.62mm and supports Engineering and Manufacturing Development (EMD) in FY 2019. The project is not a new start.

**A. Mission Description and Budget Item Justification**

The small caliber Reduced Range Ammunition (RRA) Project is a critical technology development in response to the 7.62mm and .50 caliber Capabilities Development Documents (CDD). The overall objective of RRA is to provide training ammunition suitable for use on military installations with Surface Danger Zone (SDZ) restrictions. The relatively long maximum range of the 7.62mm and .50 caliber service ammunition poses challenges on training ranges in range restricted areas. RRA will mitigate a training gap on installations by providing a materiel solution that meets training needs while shortening and condensing the SDZ. This will allow soldiers to train with 7.62mm and .50 caliber weapons on restricted ranges. The RRA cartridge design will be compatible with all Army 7.62mm and .50 caliber weapons, but specifically optimized to work in the M240 and M2 Machine Guns. FY 2019 funding will support Milestone (MS) B activities to include Request for Proposal (RFP), Preliminary Design Review (PDR) and Engineering and Manufacturing Development (EMD) Contract Award for the 7.62mm caliber variant. Funding will also explore lessons learned from the Marine Corp .50 Caliber Reduced Range Ammunition effort and other various options to satisfy the .50 Caliber reduced range requirement.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Engineering and Manufacturing Development	-	-	2.473	-	2.473
<b>Description:</b> Engineering and Manufacturing Development (EMD) Contract for 7.62mm Reduced Range Ammunition.					
<b>FY 2019 Base Plans:</b> FY 2019 activities will include various Milestone B activities for 7.62mm to include Industry Day, release Request for Proposal (RFP), perform a System Functional Review, conduct bid sample testing in support of contract award for Engineering and Manufacturing Development (EMD), and conduct a Preliminary Design Review (PDR).					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EP3 / Reduced Range Ammunition - Small Caliber
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
The 7.62mm RRA project transitions from Program Element (PE) 0603639A, Project EL7, in FY 2019 to PE 0604802A, Project EP3					
<b>Accomplishments/Planned Programs Subtotals</b>	-	-	2.473	-	2.473

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• EL7: Reduced Range Ammunition	1.314	7.600	7.618	-	7.618	-	-	-	-	0.000	16.532

**Remarks**  
Program Element 0604802A, Project EP3, Reduced Range Ammunition transitioned from PE 0603639A, Project EL7, RRA in FY 2019. EL7 Reduced Range Ammunition is not a new start in FY 2019.

**D. Acquisition Strategy**  
After 7.62mm Milestone (MS) B in FY 2019, the Government intends to award an Engineering and Manufacturing Development (EMD) contract. The Government will then award a competitive contract for 7.62mm Pre-Production Qualification Testing (PPQT) hardware in FY 2020. The .50 Caliber effort follows a similar strategy starting in FY 2018. After .50 Caliber Reduced Range Ammunition (RRA) MS B in FY 2020, the Government intends to award a competitive EMD contract.

**E. Performance Metrics**  
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604802A / Weapons and Munitions Engineering Development				EP3 / Reduced Range Ammunition - Small Caliber								
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Manager Maneuver Ammunition Systems (PM MAS)	MIPR	Picatinny Arsenal : New Jersey	-	-		-		0.173		-		0.173	Continuing	Continuing	Continuing	
Development Contract	C/FFP	TBD : TBD	-	-		-		1.100		-		1.100	Continuing	Continuing	Continuing	
<b>Subtotal</b>			-	-		-		1.273		-		1.273	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Armament Research Development and Engineering Center (ARDEC)	MIPR	Picatinny Arsenal : New Jersey	-	-		-		0.900		-		0.900	0.000	0.900	-	
<b>Subtotal</b>			-	-		-		0.900		-		0.900	0.000	0.900	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Engineering Tests	MIPR	Aberdeen Test Center : Aberdeen, Maryland	-	-		-		0.300		-		0.300	Continuing	Continuing	Continuing	
<b>Subtotal</b>			-	-		-		0.300		-		0.300	Continuing	Continuing	N/A	
<b>Project Cost Totals</b>			-	-		0.000		2.473		-		2.473	Continuing	Continuing	N/A	
<b>Remarks</b>																

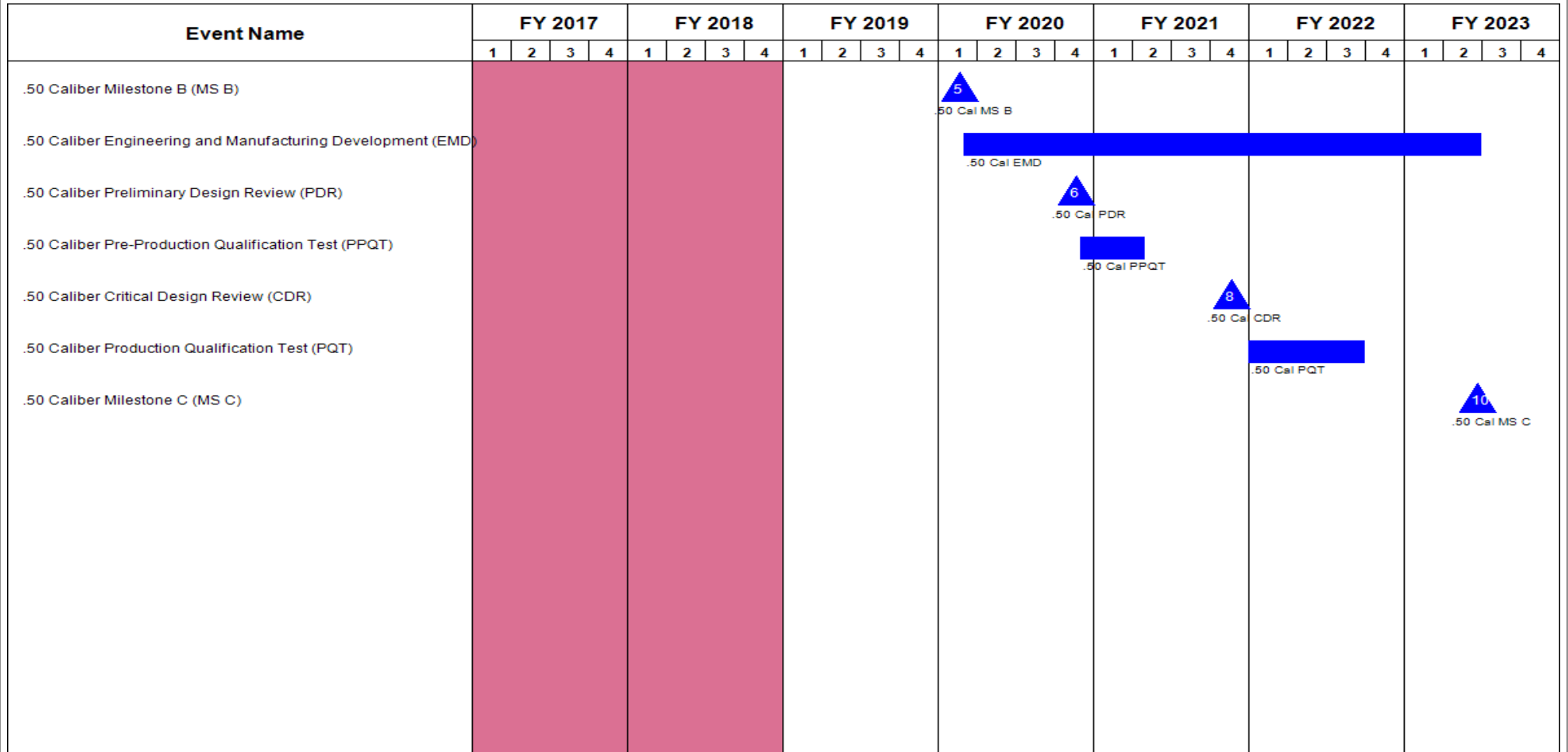
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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EP3 / Reduced Range Ammunition - Small Caliber

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023									
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4						
7.62mm Multiple Concept Design Evaluations	[Redacted]																																	
7.62mm Materiel Development Decision (MDD)				▲ 7.62mm MDD																														
7.62mm Design Verification Test (DVT)								■ 7.62mm DVT																										
7.62mm Milestone B (MS B)												▲ 7.62mm MS B																						
7.62mm Engineering and Manufacturing Development (EMD)									[Redacted]																									
7.62mm Preliminary Design Review (PDR)												▲ 7.62mm PDR																						
7.62mm Pre-Production Qualification Test (PPQT)																■ 7.62mm PPQT																		
7.62mm Critical Design Review (CDR)																				▲ 7.62mm CDR														
7.62mm Production Qualification Test (PQT)																								■ 7.62mm PQT										
7.62mm Milestone C (MS C)																																▲ 7.62mm MS C		
.50 Caliber Multiple Concept Design Evaluations					[Redacted]																													
.50 Caliber Materiel Development Decision (MDD)								▲ .50 Cal MDD																										
.50 Caliber Design Verification Test (DVT)												■ .50 Cal DVT																						

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EP3 / <i>Reduced Range Ammunition - Small Caliber</i>





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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EP3 / <i>Reduced Range Ammunition - Small Caliber</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
7.62mm Multiple Concept Design Evaluations	1	2017	4	2018
7.62mm Materiel Development Decision (MDD)	4	2017	4	2017
7.62mm Design Verification Test (DVT)	2	2018	3	2018
7.62mm Milestone B (MS B)	1	2019	1	2019
7.62mm Engineering and Manufacturing Development (EMD)	1	2019	2	2022
7.62mm Preliminary Design Review (PDR)	4	2019	4	2019
7.62mm Pre-Production Qualification Test (PPQT)	2	2020	4	2020
7.62mm Critical Design Review (CDR)	2	2021	2	2021
7.62mm Production Qualification Test (PQT)	4	2021	2	2022
7.62mm Milestone C (MS C)	2	2022	2	2022
.50 Caliber Multiple Concept Design Evaluations	1	2018	1	2020
.50 Caliber Materiel Development Decision (MDD)	2	2018	2	2018
.50 Caliber Design Verification Test (DVT)	2	2019	3	2019
.50 Caliber Milestone B (MS B)	1	2020	1	2020
.50 Caliber Engineering and Manufacturing Development (EMD)	1	2020	2	2023
.50 Caliber Preliminary Design Review (PDR)	4	2020	4	2020
.50 Caliber Pre-Production Qualification Test (PPQT)	4	2020	2	2021
.50 Caliber Critical Design Review (CDR)	4	2021	4	2021
.50 Caliber Production Qualification Test (PQT)	1	2022	3	2022
.50 Caliber Milestone C (MS C)	2	2023	2	2023

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development				<b>Project (Number/Name)</b> EP4 / One-Way Luminescence for Small Caliber Ammo			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EP4: One-Way Luminescence for Small Caliber Ammo	-	0.000	2.688	6.085	-	6.085	6.472	12.247	5.324	6.422	0.000	39.238
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

The small caliber One Way Luminescence (OWL) technology applies to multiple calibers. In FY 2018, the 7.62mm variant transitions from Program Element (PE) 0603639A, Project EB8, OWL for Small Caliber Ammunition to PE 0604802A, Project EP4, One-Way Luminescence for Small Caliber Ammo; the project is not a new start. OWL develops a new tracer technology and applies it to multiple calibers. The initial focus was on 7.62mm ammunition in FY 2015 followed by 5.56mm in FY 2018. As the technology matures the project transitions to PE 0604802A, Project EP4 starting in FY 2018 for 7.62mm OWL, and FY 2021 for 5.56mm OWL. The OWL cartridge will be compatible with all Army Small Caliber weapon systems, but optimized for Machine Guns and will provide improved lethality/target effects over the current tracer munition.

**A. Mission Description and Budget Item Justification**

The One Way Luminescence (OWL) project is a critical technology development in response to the 7.62mm and 5.56mm Families of Ammunition Capabilities Development Documents (CDD) and .50 Caliber Munitions CDD. Current small caliber ammunition tracer rounds are a pyrotechnic tracer mix which allows enemy forces to see the trace round and track its trajectory back to the shooter. OWL projects objective is to develop and field a full day/night tracer round, replace the current pyrotechnic cartridges with trace cartridges that are only visible to the shooter and soldiers in close proximity, increasing soldier survivability. 7.62mm is the immediate focus followed by 5.56mm OWL cartridges and later followed by .50 Caliber cartridges. FY 2019 funding will support post Milestone B (MS B) activities to include Engineering and Manufacturing Development (EMD), Design Verification Testing (DVT), Preliminary Design Review (PDR), and a User Assessment (UA) for the 7.62mm caliber ammunition.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Technology Maturation and Risk Reduction (TMRR)	-	2.688	-	-	-
<b>Description:</b> One Way Luminescence (OWL) will develop and demonstrate a full day/night tracer technology that eliminates the shortcomings of current legacy tracers.					
<b>FY 2018 Plans:</b> FY 2018 efforts will include preparation for MS B achievement, contract award for 7.62mm EMD Phase, and Design Verification Tests (DVT).					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EP4 / <i>One-Way Luminescence for Small Caliber Ammo</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
EMD down-select contract planned for in FY 2019.					
<b>Title:</b> Engineering and Manufacturing Development (EMD)	-	-	6.085	-	6.085
<b>FY 2019 Base Plans:</b> FY 2019 activities will support the continuation of EMD and early manufacturing efforts with the 7.62mm OWL design. 7.62mm designs will undergo Verification Testing, Preliminary Design Review (PDR), and a User Assessment (UA).					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> EMD down-select contract planned for in FY 2019.					
<b>Accomplishments/Planned Programs Subtotals</b>	-	2.688	6.085	-	6.085

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• EB8: OWL for Small Caliber Ammunition	-	1.200	2.200	-	2.200	2.000	-	-	-	Continuing	Continuing

**Remarks**  
One Way Luminescence (OWL) is a new tracer technology that will be applied to multiple calibers. The initial focus was on 7.62mm ammunition in FY 2015 followed by 5.56mm in FY 2018; and later followed by the .50 Caliber. As the technology matures it will be transitioned from Program Element 0603639A, Project EB8 to Program Element 0604802A, Project EP4 in FY 2018 for 7.62mm, and FY 2021 for 5.56mm. The OWL cartridge will be compatible with all Army Small Caliber weapon systems, but optimized for Machine Guns and will provide improved lethality/target effects over the current tracer munition.

**D. Acquisition Strategy**  
The OWL concept will be developed through Government and Industry prototyping efforts. A Technology Readiness Assessment (TRA) was conducted in FY 2015 and FY 2016 to measure the progress of the designs. The FY 2017 TRA was conducted to evaluate the industry and Government concepts in order to proceed with the 7.62mm Engineering and Manufacturing Development (EMD). The 5.56mm and .50 Caliber cartridges will follow the 7.62mm schedule with Engineering and Manufacturing Development (EMD) starting in FY 2021. The new tracer cartridges will replace legacy tracers in each of the various small caliber configurations.

**E. Performance Metrics**  
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604802A / Weapons and Munitions Engineering Development				EP4 / One-Way Luminescence for Small Caliber Ammo								
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Manager Maneuver Ammunition Systems (PM MAS) - Labor & Travel	Various	Picatinny Arsenal : New Jersey	-	-		0.274		0.085		-		0.085	Continuing	Continuing	Continuing	
EMD Contractor To Be Determined	TBD	To Be Determined : To Be Determined	-	-		1.422		2.600		-		2.600	Continuing	Continuing	Continuing	
<b>Subtotal</b>			-	-		1.696		2.685		-		2.685	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Armament Research Development and Engineering Center (ARDEC)	MIPR	Picatinny Arsenal : New Jersey	-	-		0.892		2.200		-		2.200	Continuing	Continuing	Continuing	
<b>Subtotal</b>			-	-		0.892		2.200		-		2.200	Continuing	Continuing	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
U.S. Army Aberdeen Test Center (ATC)	MIPR	Aberdeen Proving Ground : Maryland	-	-		0.100		0.850		-		0.850	Continuing	Continuing	Continuing	
Independent Testing	TBD	TBD : TBD	-	-		-		0.150		-		0.150	Continuing	Continuing	Continuing	
User Evaluation	TBD	TBD : TBD	-	-		-		0.200		-		0.200	Continuing	Continuing	Continuing	
<b>Subtotal</b>			-	-		0.100		1.200		-		1.200	Continuing	Continuing	N/A	
<b>Project Cost Totals</b>			-	-		2.688		6.085		-		6.085	Continuing	Continuing	N/A	

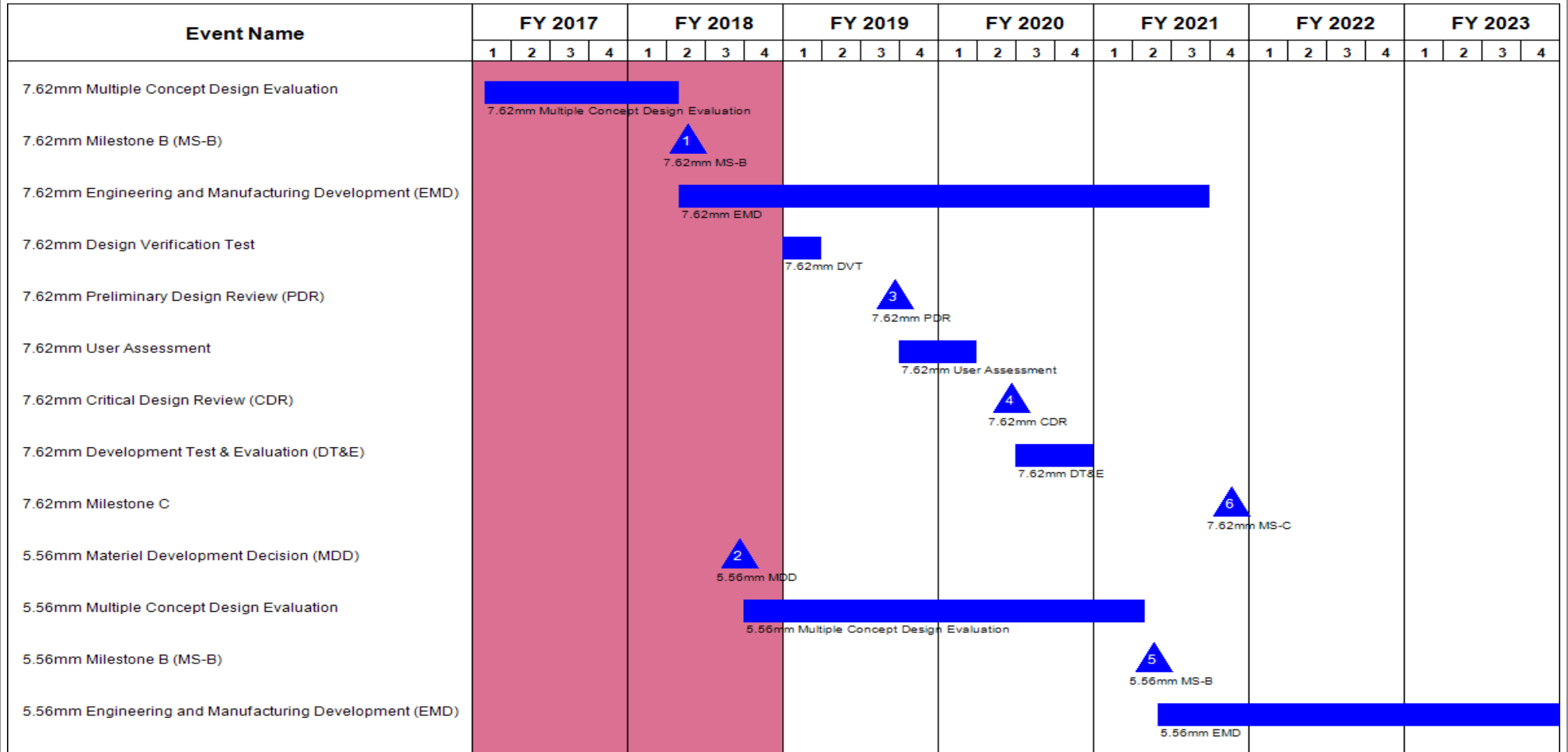
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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Army							<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>			<b>Project (Number/Name)</b> EP4 / <i>One-Way Luminescence for Small Caliber Ammo</i>				
	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	

**Remarks**

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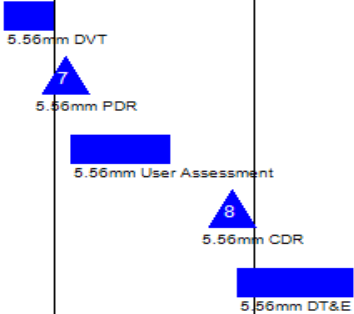
<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EP4 / One-Way Luminescence for Small Caliber Ammo



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EP4 / <i>One-Way Luminescence for Small Caliber Ammo</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023															
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4												
5.56mm Design Verification Test																																								
5.56mm Preliminary Design Review (PDR)																																								
5.56mm User Assessment																																								
5.56mm Critical Design Review (CDR)																																								
5.56mm Development Test & Evaluation (DT&E)																																								



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EP4 / <i>One-Way Luminescence for Small Caliber Ammo</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
7.62mm Multiple Concept Design Evaluation	1	2015	2	2018
7.62mm Milestone B (MS-B)	2	2018	2	2018
7.62mm Engineering and Manufacturing Development (EMD)	2	2018	3	2021
7.62mm Design Verification Test	1	2019	1	2019
7.62mm Preliminary Design Review (PDR)	3	2019	3	2019
7.62mm User Assessment	4	2019	1	2020
7.62mm Critical Design Review (CDR)	2	2020	2	2020
7.62mm Development Test & Evaluation (DT&E)	3	2020	4	2020
7.62mm Milestone C	4	2021	4	2021
5.56mm Materiel Development Decision (MDD)	3	2018	3	2018
5.56mm Multiple Concept Design Evaluation	4	2018	2	2021
5.56mm Milestone B (MS-B)	2	2021	2	2021
5.56mm Engineering and Manufacturing Development (EMD)	2	2021	3	2024
5.56mm Design Verification Test	4	2021	4	2021
5.56mm Preliminary Design Review (PDR)	1	2022	1	2022
5.56mm User Assessment	1	2022	3	2022
5.56mm Critical Design Review (CDR)	4	2022	4	2022
5.56mm Development Test & Evaluation (DT&E)	4	2022	2	2023



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development				<b>Project (Number/Name)</b> EP5 / Adv Armor-Piercing (ADVAP) for Small Caliber Ammo			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EP5: Adv Armor-Piercing (ADVAP) for Small Caliber Ammo	-	12.452	11.571	21.019	-	21.019	4.783	13.953	6.918	6.446	0.000	77.142
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

The small caliber Advanced Armor-Piercing (ADVAP) technology applies to multiple calibers. In FY 2017, Program Element (PE) 0603639A, Project EC2, Adv Armor-Piercing (ADVAP) for Small Cal Ammo transitioned to PE 0604802A, Project EP5, Adv Armor-Piercing (ADVAP) for Small Cal Ammo for development of the 7.62mm ammunition. The follow-on effort for ADVAP ammunition calibers below 7.62mm begins in FY 2019. Project EC2 is not a new start in FY 2019. In FY 2021, Program Element (PE) 0603639A, Project EC2, ADVAP will transition to PE 0604802A, Project EP5, ADVAP to continue development efforts on ADVAP ammunition calibers below 7.62mm.

**A. Mission Description and Budget Item Justification**

**Advanced Armor-Piercing (ADVAP):** The ADVAP project is a critical technology development in response to the 7.62mm and 5.56mm Family of Ammunition Capabilities Development Documents (CDD). The nomenclature for the 7.62mm ADVAP is XM1158. The overall objective of the ADVAP project is to develop and Full Materiel Release (FMR) both 7.62mm XM1158 cartridge for the M240 machine gun and ADVAP ammunition in calibers below 7.62mm. The objective is to provide overmatch capability to defeat advanced light armored threats within typical machine gun engagement ranges. FY 2019 funding supports continuation of Engineering and Manufacturing Development (EMD) efforts and activities to accelerate the project.

**Next Generation Squad Weapon (NGSW) Family of Ammunition:** The NGSW ammo is a new ammunition technology under development for use in the Next Generation Squad Weapon systems. The objective is to develop and Full Materiel Release (FMR) the new ammunition. FY 2019 funding supports Engineering and Manufacturing Development (EMD) efforts and activities to accelerate the project for the Enhanced Performance Round (EPR) variant and the Advanced Armor-Piercing (ADVAP) variant. Follow-on development efforts for additional NGSW ammunition variants including tracer ammunition, blank ammunition, and reduced range ammunition will start in FY 2022.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> 7.62mm Engineering & Manufacturing Development (EMD)	12.452	11.571	12.750	-	12.750
<b>Description:</b> Develop, demonstrate, and qualify XM1158 Small Caliber Ammunition 7.62mm Advanced Armor Piercing (ADVAP) cartridges in order to defeat threat targets and provide overmatch capability versus a broad spectrum of hard targets.					
<b>FY 2018 Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EP5 / Adv Armor-Piercing (ADVAP) for Small Caliber Ammo

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
FY 2018 efforts are focused on Engineering and Manufacturing Development (EMD) to include maturing manufacturing as well as optimization of the cartridge designs, and Pre-Production Qualification Test (PPQT) to support Critical Design Review (CDR) and Production Qualification Test (PQT) in FY 2019.  <b>FY 2019 Base Plans:</b> FY 2019 efforts will focus on continuing the support of Engineering and Manufacturing Development (EMD) activities such as Developmental Testing and Evaluation (DT&E). FY 2019 also includes an Urgent Materiel Release (UMR) to accelerate the fielding of the 7.62mm ADVAP cartridge and preparation for an accelerated Milestone C accomplishment at the end of FY 2019.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Program increase in FY 2019 to continue planned FY 2019 EMD activities.					
<b>Title:</b> NGSW Ammo Engineering & Manufacturing Development (EMD)  <b>Description:</b> Develop, demonstrate, and qualify new ammunition for the Next Generation Squad Weapon (NGSW) systems.  <b>FY 2019 Base Plans:</b> Milestone B will occur in FY 2019 and Engineering and Manufacturing Development (EMD) activities will commence for the Enhanced Performance Round (EPR) and the Advanced Armor Piercing (ADVAP) variants. Concept evaluation will be conducted, leading to Developmental Testing (DT) in preparation for Preliminary Design Review in FY 2020.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Program increase in FY 2019 to start planned FY 2019 EMD activities for the new ammunition for the Next Generation Squad Weapon (NGSW) systems.	-	-	8.269	-	8.269
<b>Accomplishments/Planned Programs Subtotals</b>	12.452	11.571	21.019	-	21.019

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• EC2: Adv Armor-Piercing (ADVAP) for Small Cal Ammo	-	-	3.760	-	3.760	6.821	-	-	-	0.000	10.581
• F57510: CTG, 7.62mm Advanced Armor Piercing, XM1158	-	-	25.000	-	25.000	21.013	22.984	25.682	25.692	0.000	120.371

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EP5 / <i>Adv Armor-Piercing (ADVAP) for Small Caliber Ammo</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

EC2-RDTE/Adv Armor-Piercing (ADVAP) for Small Cal Ammo: This funding line continues the development, technology maturation, and Pre-Engineering & Manufacturing Development (Pre-EMD) work on ADVAP cartridges in calibers below 7.62mm.

F57510-AMMO/CTG, 7.62mm Advanced Armor Piercing, XM1158: This funding line supports the procurement of 7.62mm M1158 Advanced Armor-Piercing (ADVAP) Ball Cartridges 4Ball/1 M62A1 Tracer linked Cartridges.

**D. Acquisition Strategy**

Advanced Armor-Piercing (ADVAP): The ADVAP ammunition programs will use a Government developed design and manufacturing processes. Multiple component contracts will be awarded to purchase raw materials and equipment. In FY 2017, the 7.62mm variant, achieved Milestone B; completed Production Decision Review (PDR), and Integrated Baseline Review (IBR) leading to the establishment of the Performance Measurement Baseline and the approval to begin manufacturing the Pre-Production Qualification Testing (PPQT) sample. Developmental efforts on ADVAP ammunition in calibers below 7.62mm, starting in FY 2019, will follow a similar strategy as the 7.62mm with planned accelerated FY 2020 MS B achievement.

Next Generation Squad Weapon (NGSW) Family of Ammunition: The Next Generation Squad Weapon (NGSW) ammunition program will utilize competitive development contracts with two competing concepts/designs for the Enhanced Performance Round (EPR) variant and the Advanced Armor-Piercing (ADVAP) variant. Two contractors will be funded through Engineering & Manufacturing Development (EMD) with a final down-select to one design prior by Milestone C in FY 2022. Follow-on development efforts for additional NSGW ammunition variants including tracer ammunition, blank ammunition, and reduced range ammunition will start in FY 2022.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EP5 / Adv Armor-Piercing (ADVAP) for Small Caliber Ammo
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<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ADVAP Program Manager Maneuver Ammunition Systems (PM MAS) - Labor & Travel	Various	Picatinny Arsenal : New Jersey	-	0.190		0.200		0.242		-		0.242	Continuing	Continuing	Continuing
ADVAP Raw Materials	Various	TW : New Jersey	-	3.196		3.161		3.200		-		3.200	Continuing	Continuing	Continuing
ADVAP Facilitization and Prototyping	MIPR	Picatinny Arsenal : New Jersey	-	1.142		1.200		1.200		-		1.200	Continuing	Continuing	Continuing
NGSW Program Manager Maneuver Ammunition Systems (PM MAS) - Labor & Travel	Various	Picatinny Arsenal : New Jersey	-	-		-		0.219		-		0.219	Continuing	Continuing	Continuing
NGSW EMD Contract (Vendor 1)	C/CPFF	To Be Determined : To Be Determined	-	-		-		2.125		-		2.125	0.000	2.125	-
NGSW EMD Contract (Vendor 2)	C/CPFF	To Be Determined : To Be Determined	-	-		-		2.125		-		2.125	0.000	2.125	-
<b>Subtotal</b>			-	4.528		4.561		9.111		-		9.111	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ADVAP Armament Research Development and Engineering Center (ARDEC)	MIPR	Picatinny Arsenal : New Jersey	-	4.687		2.205		4.303		-		4.303	Continuing	Continuing	Continuing
ADVAP Army Research Lab (ARL)	MIPR	Aberdeen Proving Ground : Maryland	-	1.566		1.250		1.010		-		1.010	Continuing	Continuing	Continuing
ADVAP Manufacturing Support	C/FP	UTRS : New Jersey	-	0.600		2.400		-		-		-	0.000	3.000	-
ADVAP Facilitization Support	MIPR	Armament Research Development and Engineering Center :	-	0.618		-		-		-		-	0.000	0.618	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions Engineering Development				EP5 / Adv Armor-Piercing (ADVAP) for Small Caliber Ammo							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
		Picatinny Arsenal, New Jersey													
NGSW Armament Research Development and Engineering Center (ARDEC)	MIPR	Picatinny Arsenal : New Jersey	-	-		-		2.000		-		2.000	Continuing	Continuing	Continuing
NGSW Army Research Lab (ARL)	MIPR	Aberdeen Proving Ground : Maryland	-	-		-		0.300		-		0.300	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	7.471		5.855		7.613		-		7.613	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
ADVAP U.S. Army Aberdeen Test Center (ATC)	MIPR	Aberdeen Proving Ground : Maryland	-	0.103		0.300		0.870		-		0.870	Continuing	Continuing	Continuing
ADVAP Limited User Test	MIPR	Maneuver Battle Labs : Fort Benning, Georgia	-	-		-		0.150		-		0.150	Continuing	Continuing	Continuing
ADVAP ARDEC Testing	MIPR	ARDEC : Picatinny Arsenal, New Jersey	-	0.350		0.855		0.650		-		0.650	0.000	1.855	-
ADVAP ARL Live Fire Test and Evaluation	MIPR	ARL : Aberdeen, Maryland	-	-		-		1.125		-		1.125	0.000	1.125	-
NGSW U.S. Army Aberdeen Test Center (ATC)	MIPR	Aberdeen Proving Ground : Maryland	-	-		-		0.500		-		0.500	Continuing	Continuing	Continuing
NGSW ARDEC Testing	MIPR	ARDEC : Picatinny Arsenal, New Jersey	-	-		-		0.300		-		0.300	Continuing	Continuing	Continuing
NGSW ARL Test and Evaluation	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		-		0.700		-		0.700	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	0.453		1.155		4.295		-		4.295	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Army							<b>Date:</b> February 2018				
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development				<b>Project (Number/Name)</b> EP5 / Adv Armor-Piercing (ADVAP) for Small Caliber Ammo				

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	12.452	11.571	21.019	-	21.019	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EP5 / Adv Armor-Piercing (ADVAP) for Small Caliber Ammo

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
ADVAP 7.62mm Advanced Concept Development	[Bar]				[Bar]																							
ADVAP 7.62mm Prototype Test & Evaluation	[Bar]				[Bar]																							
ADVAP 7.62mm Milestone B	1																											
ADVAP 7.62mm Engineering & Manufacturing Development	[Bar]				[Bar]				[Bar]																			
ADVAP 7.62mm Preliminary Design Review (PDR)	2																											
ADVAP 7.62mm Pre-Production Qualification Testing (PPQT)					3																							
ADVAP 7.62mm Critical Design Review (CDR)					3																							
ADVAP 7.62mm Development Test & Evaluation									5																			
ADVAP 7.62mm Urgent Materiel Release (UMR)									7																			
ADVAP 7.62mm Milestone C									7				8															
ADVAP 7.62mm Full Materiel Release (FMR)									7				8															
ADVAP Small Caliber Ammunition Advanced Concept Development									[Bar]				[Bar]															
ADVAP Small Caliber Ammunition Prototype Test & Evaluation									[Bar]				[Bar]															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EP5 / Adv Armor-Piercing (ADVAP) for Small Caliber Ammo

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
ADVAP Small Caliber Ammunition Materiel Development Decision (MDD)									4																											
ADVAP SC Ammo Materiel Development Decision (MDD)									4																											
ADVAP Small Caliber Ammunition Milestone B																	10																			
ADVAP Small Caliber Ammunition Milestone B																	10																			
ADVAP Small Caliber Ammunition Engineering & Manufacturing Development																																				
ADVAP SC Ammo EMD																																				
ADVAP Small Caliber Ammunition Preliminary Design Review (PDR)																	11																			
ADVAP SC Ammo PDR																	11																			
ADVAP Small Caliber Ammunition Pre-Production Qualification Testing (PPQT)																																				
ADVAP SC Ammo PPQT																																				
ADVAP Small Caliber Ammunition Critical Design Review (CDR)																									14											
ADVAP SC Ammo CDR																									14											
ADVAP Small Caliber Ammunition Milestone C																													17							
ADVAP SC Ammo MS-C																													17							
NGSW Ammo Concept Development																																				
NGSW Ammo Concept Development																																				
NGSW Ammo Milestone B									6																											
NGSW Ammo MS-B									6																											
NGSW Ammo Engineering & Manufacturing Development																																				
NGSW Ammo EMD																																				
NGSW Ammo Developmental Testing (DT)																																				
NGSW Ammo DT																																				
NGSW Ammo Preliminary Design Review (PDR)													9																							
NGSW Ammo PDR													9																							
NGSW Ammo Pre-Production Qualification Testing (PPQT)																																				
NGSW Ammo PPQT																																				



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EP5 / Adv Armor-Piercing (ADVAP) for Small Caliber Ammo

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
NGSW Ammo Critical Design Review (CDR)																	12 ▲ NGSW Ammo CDR												
NGSW Ammo Production Qualification Testing (PQT)																					■ NGSW Ammo PQT								
NGSW Ammo Milestone C																									13 ▲ NGSW Ammo MS-C				
NGSW Ammo First Unit Equipped																													15 ▲ NGSW Ammo FUE
NGSW Family of Ammo Milestone B																													16 ▲ NGSW FoA MS-B
NGSW Family of Ammo Concept Development																													■ NGSW FoA Concept Devel

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EP5 / <i>Adv Armor-Piercing (ADVAP) for Small Caliber Ammo</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
ADVAP 7.62mm Advanced Concept Development	1	2015	1	2017
ADVAP 7.62mm Prototype Test & Evaluation	1	2015	1	2017
ADVAP 7.62mm Milestone B	1	2017	1	2017
ADVAP 7.62mm Engineering & Manufacturing Development	2	2017	4	2019
ADVAP 7.62mm Preliminary Design Review (PDR)	2	2017	2	2017
ADVAP 7.62mm Pre-Production Qualification Testing (PPQT)	1	2018	1	2018
ADVAP 7.62mm Critical Design Review (CDR)	2	2018	2	2018
ADVAP 7.62mm Development Test & Evaluation	1	2019	3	2019
ADVAP 7.62mm Urgent Materiel Release (UMR)	2	2019	2	2019
ADVAP 7.62mm Milestone C	4	2019	4	2019
ADVAP 7.62mm Full Materiel Release (FMR)	1	2020	1	2020
ADVAP Small Caliber Ammunition Advanced Concept Development	1	2019	3	2020
ADVAP Small Caliber Ammunition Prototype Test & Evaluation	1	2019	3	2020
ADVAP Small Caliber Ammunition Materiel Development Decision (MDD)	1	2019	1	2019
ADVAP Small Caliber Ammunition Milestone B	4	2020	4	2020
ADVAP Small Caliber Ammunition Engineering & Manufacturing Development	4	2020	1	2023
ADVAP Small Caliber Ammunition Preliminary Design Review (PDR)	2	2021	2	2021
ADVAP Small Caliber Ammunition Pre-Production Qualification Testing (PPQT)	4	2021	2	2022
ADVAP Small Caliber Ammunition Critical Design Review (CDR)	3	2022	3	2022
ADVAP Small Caliber Ammunition Milestone C	1	2023	1	2023
NGSW Ammo Concept Development	1	2019	2	2019
NGSW Ammo Milestone B	2	2019	2	2019

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EP5 / <i>Adv Armor-Piercing (ADVAP) for Small Caliber Ammo</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
NGSW Ammo Engineering & Manufacturing Development	2	2019	1	2022
NGSW Ammo Developmental Testing (DT)	3	2019	4	2019
NGSW Ammo Preliminary Design Review (PDR)	3	2020	3	2020
NGSW Ammo Pre-Production Qualification Testing (PPQT)	3	2020	1	2021
NGSW Ammo Critical Design Review (CDR)	2	2021	2	2021
NGSW Ammo Production Qualification Testing (PQT)	3	2021	4	2021
NGSW Ammo Milestone C	1	2022	1	2022
NGSW Ammo First Unit Equipped	4	2022	4	2022
NGSW Family of Ammo Milestone B	4	2022	4	2022
NGSW Family of Ammo Concept Development	4	2022	1	2025

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development				<b>Project (Number/Name)</b> EP7 / Aviation Airborne Expandable Countermeasures			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EP7: Aviation Airborne Expandable Countermeasures	-	0.000	7.500	7.222	-	7.222	6.920	2.113	16.207	0.000	0.000	39.962
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project will support Integrated System Design (ISD), System Capability (SC) and Manufacturing Process Demonstrations (MPD) on current pyrotechnic munitions and tunable pyrotechnic aircraft counter measures and decoys. The project will also support ISD, SC and MPD on new expendable countermeasure munitions that will protect Army aircraft from advanced and current guided missile threats. Activities include modeling and simulation, flight testing, qualification testing, engineering to reduce size and weight, environmental considerations, safety enhancements, manufacturing enhancements, qualification of other service and foreign munitions that could meet current requirements, product improvements, insertion of new technologies to increase performance, and enhancement of current flare solutions for new and existing aircraft. Systems include impulse cartridges, pen flares, hand held signals, trip flares, simulators, marine markers, smoke pots, smoke grenades, rail road flares and other type of emergency/distress devices, aircraft expendables (to include Radio Frequency (RF) expendables), and primers used in munitions systems.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Improvements to countermeasure flares	-	7.500	7.222	-	7.222
<b>Description:</b> This program will develop improvements to legacy countermeasure flare solutions and qualify them for Army use.					
<b>FY 2018 Plans:</b> Conduct flight effectiveness testing on Army platforms based on Modeling and Simulation (M&S) results. Generate necessary documentation to support Airworthiness (AWR) and fielding of new countermeasure solutions.					
<b>FY 2019 Base Plans:</b> Conduct flight effectiveness testing on Army platforms based on M&S results. Generate necessary documentation to support Airworthiness (AWR) and fielding of new countermeasure solutions. Develop required documentation to support milestone decision.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY19 funding decreased by \$278k due to reduced testing requirements and decreased management costs.					
<b>Accomplishments/Planned Programs Subtotals</b>	-	7.500	7.222	-	7.222

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EP7 / Aviation Airborne Expandable Countermeasures
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• EB9: EB9 - Tunable Pyrotechnic Aircraft Countermeasure Flares	2.367	1.000	2.500	-	2.500	1.200	-	-	-	0.000	7.067

**Remarks**

**D. Acquisition Strategy**

The Acquisition strategy is under development and Milestone Decision Authority (MDA) was approved in 3Q FY2017. It is anticipated that these items will be restricted to the National Technology and Industrial Base (NTIB).

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EP7 / Aviation Airborne Expandable Countermeasures
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<b>Management Services (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Program Management	MIPR	PM CCS : Picatinny Arsenal	-	-		0.100		0.022	Jan 2019	-		0.022	0.000	0.122	-
<b>Subtotal</b>			-	-		0.100		0.022		-		0.022	0.000	0.122	N/A

<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Product Development	MIPR	VARIOUS : VARIOUS	-	-		4.500	Jan 2018	4.500	Jan 2019	-		4.500	0.000	9.000	-
<b>Subtotal</b>			-	-		4.500		4.500		-		4.500	0.000	9.000	N/A

<b>Support (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Engineering Support	MIPR	ARDEC : Picatinny Arsenal	-	-		0.800	Dec 2017	0.800	Dec 2018	-		0.800	0.000	1.600	-
<b>Subtotal</b>			-	-		0.800		0.800		-		0.800	0.000	1.600	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Test & Evaluation	MIPR	AED : Redstone Arsenal	-	-		2.100		1.900	Apr 2019	-		1.900	0.000	4.000	-
<b>Subtotal</b>			-	-		2.100		1.900		-		1.900	0.000	4.000	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EP7 / Aviation Airborne Expandable Countermeasures	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Milestone A Cloud Countermeasures (CM)									▲ 1																				
Develop Modeling and Simulation CM solutions and payload configurations																													
Milestone A Rader Guided																	▲ 2												
Test & Evaluation of countermeasure solutions																													
Milestone B Cloud CM																					▲ 3								



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EP7 / <i>Aviation Airborne Expandable Countermeasures</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Milestone A Cloud Countermeasures (CM)	4	2018	4	2018
Develop Modeling and Simulation CM solutions and payload configurations	4	2018	1	2020
Milestone A Rader Guided	4	2018	4	2018
Test & Evaluation of countermeasure solutions	1	2019	4	2020
Milestone B Cloud CM	1	2020	1	2020

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development			<b>Project (Number/Name)</b> EU4 / 40mm HV Improved High Explosive Dual Purpose				
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EU4: 40mm HV Improved High Explosive Dual Purpose	-	0.292	3.191	7.210	-	7.210	13.055	2.935	2.313	0.000	0.000	28.996
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

40mm Improved High Explosive Dual Purpose (I-HEDP) is a new capability identified as a Warfighter requirement in the 40mm High Velocity I-HEDP Capability Development Document (CDD). The I-HEDP tactical cartridge provides the warfighter with the ability to achieve the required lethal effects against enemy personnel in the open and to defeat personnel targets in defilade position. Additionally, the I-HEDP cartridge will be able to defeat unarmored and lightly armored vehicles. FY 2019 funding supports Engineering and Manufacturing Development (EMD) activities including source selection, contract award, Design Engineering Tests (DET), and technical design.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Pre Engineering Manufacturing Development Activities	0.292	-	-	-	-
<b>Description:</b> Creating performance specifications, test plans, and Milestone B preparations ahead of Engineering and Manufacturing Development (EMD) award.					
<b>Title:</b> Engineering Manufacturing Development Activities	-	3.191	-	-	-
<b>Description:</b> After Milestone B approval, Request for Proposal (RFP) documents and EMD Bid Sample planning and testing needs to be accomplished.					
<b>FY 2018 Plans:</b> Funding in FY 2018 supports key activities in preparation for the Milestone B decision, Request for Proposal, the Engineering and Manufacturing Development (EMD) Bid sample testing and initiation of technical design activities.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Project EU4 was a new start in FY 2017. FY 2018 funding increased for planned EMD activities.					
<b>Title:</b> Engineering Manufacturing Development Award	-	-	7.210	-	7.210
<b>Description:</b> Following RFP release and bid sample test, contract award and engineering tests will be conducted.					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EU4 / <i>40mm HV Improved High Explosive Dual Purpose</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p><b><i>FY 2019 Base Plans:</i></b> Funding in FY 2019 supports EMD activities including Source Selection, Contract Award, Design Engineering Tests (DET), and technical design.</p> <p><b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> FY 2019 funding supports continuation of planned EMD activities.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	0.292	3.191	7.210	-	7.210

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The 40mm High Velocity Improved High Explosive Dual Purpose (I-HEDP) cartridge will be developed through a competitive Engineering and Manufacturing Development (EMD) program. Milestone B approval will be followed by the award to one EMD contractor after the bid sample testing and source selection evaluation. The contractor will mature the I-HEDP cartridge through Design Engineering Testing (DET). Shortcomings and deficiencies will be corrected prior to subjecting the final design to the Developmental Test & Evaluation (DT&E). The test results will support the documentation for Milestone C and Type Classification-Limited Procurement (TC-LP) scheduled for FY 2021. After Milestone C is achieved, a contract will be awarded for Low Rate Initial Production (LRIP) followed by two production year options.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions Engineering Development				EU4 I 40mm HV Improved High Explosive Dual Purpose							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Manager Maneuver Ammunition Systems (PM MAS)	Various	Picatinny Arsenal : NJ	-	0.014		0.487		0.372		-		0.372	Continuing	Continuing	Continuing
Contractor 1 EMD Award	C/FFP	TBD : TBD	-	-		-		2.000		-		2.000	Continuing	Continuing	-
<b>Subtotal</b>			-	0.014		0.487		2.372		-		2.372	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Armament Research Development Engineering Center (ARDEC)	MIPR	Picatinny Arsenal : NJ	-	0.278		1.213		2.050		-		2.050	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	0.278		1.213		2.050		-		2.050	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Bid Sample Test	MIPR	Aberdeen Test Center : Aberdeen, MD	-	-		1.491		-		-		-	Continuing	Continuing	Continuing
Design Engineering Test (DET)	MIPR	Aberdeen Test Center : Aberdeen Proving Ground, MD	-	-		-		2.788		-		2.788	0.000	2.788	-
<b>Subtotal</b>			-	-		1.491		2.788		-		2.788	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			-	0.292		3.191		7.210		-		7.210	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EU4 / <i>40mm HV Improved High Explosive Dual Purpose</i>
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Remarks</b>									

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EU4 I 40mm HV Improved High Explosive Dual Purpose

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Milestone B Support Documents	[Redacted]																															
	Documentation																															
Milestone B					1 ▲ MS-B																											
Engineering Manufacturing Development													[Redacted]																			
					EMD																											
Bid Sample Shoot Off													[Redacted]																			
									Bld Sample Shoot																							
Engineering Manufacturing Development Contract Award																																
									2 ▲ EMD Contract Award																							
Test Readiness Review for Design Engineering Test																																
									3 ▲ TRR DET																							
Design Engineering Test (DET)													[Redacted]																			
									DET																							
Test Readiness Review for Developmental Test & Evaluation (DT&E)																																
													4 ▲ TRR DT&E																			
Developmental Test & Evaluation																	[Redacted]															
													DT&E																			
Milestone C /Type Classification-Limited Procurement																																
																	5 ▲ MS-C/TC-LP															
Low Rate Initial Production (LRIP) Contract Award																																
																	6 ▲ LRIP Contract Award															
Live Fire Test and Evaluation (LFT&E)																					[Redacted]											
																					LFT&E											
Operational Test and Evaluation (OT&E)																									[Redacted]							
																									OT&E							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EU4 / <i>40mm HV Improved High Explosive Dual Purpose</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Milestone B Support Documents	2	2017	1	2018
Milestone B	2	2018	2	2018
Engineering Manufacturing Development	3	2018	3	2021
Bid Sample Shoot Off	4	2018	2	2019
Engineering Manufacturing Development Contract Award	3	2019	3	2019
Test Readiness Review for Design Engineering Test	4	2019	4	2019
Design Engineering Test (DET)	4	2019	2	2020
Test Readiness Review for Developmental Test & Evaluation (DT&E)	3	2020	3	2020
Developmental Test & Evaluation	4	2020	2	2021
Milestone C /Type Classification-Limited Procurement	3	2021	3	2021
Low Rate Initial Production (LRIP) Contract Award	3	2021	3	2021
Live Fire Test and Evaluation (LFT&E)	3	2022	3	2022
Operational Test and Evaluation (OT&E)	3	2022	3	2022

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development				<b>Project (Number/Name)</b> EU6 / 155mm High Explosive Extended Range Artillery			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EU6: 155mm High Explosive Extended Range Artillery	-	0.000	0.000	6.926	-	6.926	4.943	2.966	0.000	0.000	0.000	14.835
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

In FY 2019, PE 0603639A, Project EU1, Enhanced Lethality Cannon Munitions will transition to PE 0604802A, Project EU6, 155mm High Explosive Extended Range Artillery. This Project is not a New Start.

**A. Mission Description and Budget Item Justification**

The 155mm High Explosive Extended Range Artillery Projectile project will evaluate, develop and qualify extended range technologies, including the XM1113 in 39 caliber weapon systems with legacy propellants. The XM113 effort is a government owned materiel solution for long-range cannon artillery projectile that will increase range by 10km+ in 39 caliber weapon systems, and contain twice as much rocket motor grains as the current 155mm long range cannon projectile that is now obsolete. The XM1113 will leverage enhanced lethality cannon munition technologies to compensate for increased rocket motor volume. This design will utilize a high fragmentation steel body with a streamlined ogive and a high performance rocket motor. The projectile body is filled with an insensitive munition (IM) high explosive (HE) and a supplementary charge. FY 2019 will support the completion of the Developmental Test phase of Engineering & Manufacturing Development (EMD) and the completion of the Critical Design Review (CDR) in 4Q FY 2019.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> 155mm HE Rocket Assist Project (RAP) Extended Range	-	-	6.926	-	6.926
<b>Description:</b> Evaluate, Develop, and Qualify Extended Range Technologies.					
<b>FY 2019 Base Plans:</b> FY 2019 will support the completion of the Developmental Test phase of Engineering & Manufacturing Development (EMD) and the completion of the Critical Design Review (CDR) in 4Q FY 2019.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase in funding in FY 2019 due to continuation of XM1113 munitions from PE 0603639A, Project EU1 Enhanced Lethality Cannon Munitions for prototyping of enhanced lethality warhead technologies. This coincides with Technology Readiness Level 6 demonstration of XM1113 rocket motor technologies to feed into XM1113 EMD efforts.					
<b>Accomplishments/Planned Programs Subtotals</b>	-	-	6.926	-	6.926



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EU6 / 155mm High Explosive Extended Range Artillery
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• EU1: <i>Enhanced Lethality Cannon Munitions</i>	9.486	10.000	0.000	-	0.000	-	-	-	-	0.000	19.486

**Remarks**

In FY 2019, PE 0603639A, Project EU1, Enhanced Lethality Cannon Munitions will transition to PE 0604802A, Project EU6, 155mm High Explosive Extended Range Artillery. This Project is not a New Start.

**D. Acquisition Strategy**

Prototyping will be awarded in 1Q FY 2019 through a DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) to multiple vendors (subcontractors to U.S. Government system integrator) through EMD. The U.S. Government will lead EMD effort to complete development in the 39 caliber weapon system in 3Q FY 2021.

**E. Performance Metrics**

NA

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions Engineering Development				EU6 / 155mm High Explosive Extended Range Artillery							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
XM1113 HE-RAP Prototyping	MIPR	DoD Ordnance Technology Consortium (DOTC) : TBD	-	-		-		3.000	Nov 2018	-		3.000	17.000	20.000	-
<b>Subtotal</b>			-	-		-		3.000		-		3.000	17.000	20.000	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
XM1113 Engineering Support	MIPR	Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	-	-		-		3.426	Oct 2018	-		3.426	11.400	14.826	-
<b>Subtotal</b>			-	-		-		3.426		-		3.426	11.400	14.826	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
XM1113 Testing	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	-	-		-		0.500	Mar 2018	-		0.500	9.500	10.000	-
<b>Subtotal</b>			-	-		-		0.500		-		0.500	9.500	10.000	N/A
<b>Project Cost Totals</b>			-	-		0.000		6.926		-		6.926	37.900	44.826	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Army							<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>			<b>Project (Number/Name)</b> EU6 / <i>155mm High Explosive Extended Range Artillery</i>				
	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EU6 / <i>155mm High Explosive Extended Range Artillery</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
XM1113 MS-B									1 MS-B																			
XM1113 Developmental Test (DT)																												
XM1113 Critical Design Review (CDR)																	2 CDR											
XM1113 Production Qualification Testing (PQT)																												
XM1113 MS-C																									3 MS-C			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EU6 / <i>155mm High Explosive Extended Range Artillery</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
XM1113 MS-B	1	2019	1	2019
XM1113 Developmental Test (DT)	1	2019	4	2019
XM1113 Critical Design Review (CDR)	4	2019	4	2019
XM1113 Production Qualification Testing (PQT)	1	2020	4	2021
XM1113 MS-C	4	2021	4	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development					<b>Project (Number/Name)</b> EU7 / Enhanced Lethality Cannon Munitions		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EU7: Enhanced Lethality Cannon Munitions	-	0.000	20.500	7.915	-	7.915	7.908	7.907	0.000	0.000	0.000	44.230
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Enhanced Lethality Cannon Munitions (ELCM) project will accelerate the qualification of Lithographic Fragmentation Technology (LFT) on the 155mm XM1128 high explosive projectile, per HQDA G-8 Directed Requirement for a Rapid Bridging Solution for the 155mm Dual Purpose Improved Conventional Munition 22 December 2016. The project addresses requirements for increased lethality of 155mm high explosive unitary projectiles (Initial Draft Requirements for the XM1128 with Lithographic Fragmentation Technology, 24 February 2017). The ELCM project will also evaluate, develop and qualify new lethality technologies for 155mm cannon artillery munitions and evaluate their effectiveness in mitigating evolving and derived capability gaps, and support transition to production. The ELCM project will support testing of the Israeli Military Industries (IMI) Systems M999 advanced cluster munition, per HQDA G-8 Directed Requirement for a Rapid Bridging Solution for the 155mm Dual Purpose Improved Conventional Munition 22 December 2016. The project will complete a lethality arena test on the M999 submunitions to be conducted at the IMI facility in Israel. FY 2019 will support the completion of the Product Qualification Testing (PQT) test series for the XM1128 and the finalization of the Capability Production Document (CPD) by 4Q FY 2019.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> 155mm XM1128 High Explosive Projectile	-	18.500	7.915	-	7.915
<b>Description:</b> Evaluate, Develop, and Qualify Enhanced Lethality Technologies.					
<b>FY 2018 Plans:</b> Accelerate and initiate Engineering & Manufacturing Development (EMD) of the XM1128 LFT. Complete EMD prototyping to begin Production Qualification Testing (PQT) series.					
<b>FY 2019 Base Plans:</b> FY 2019 will support the completion of the Product Qualification Testing (PQT) test series for the XM1128 and the finalization of the Capability Production Document (CPD) by 4Q FY 2019.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> This is an accelerated program due to the continuation of XM1128 munitions transitioning from PE 0603639A Project EU1, Enhanced Lethality Cannon Munitions for prototyping of enhanced lethality warhead technologies.					
<b>Title:</b> 155mm M999 IMI Projectile with M99 Submunitions	-	2.000	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EU7 / Enhanced Lethality Cannon Munitions

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Description:</b> M999 testing assessment of performance, safety, and UXO rates.					
<b>FY 2018 Plans:</b> Complete Fire Control Integration (FCI) for the M999. Conduct safety and performance testing.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> This is an assessment program to evaluate non-developmental items and is a one time cost in FY 2018.					
<b>Accomplishments/Planned Programs Subtotals</b>	-	20.500	7.915	-	7.915

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• EU1: <i>Enhanced Lethality Cannon Munitions</i>	9.486	10.000	0.000	-	0.000	-	-	-	-	0.000	19.486

**Remarks**

**D. Acquisition Strategy**  
XM1128 High Explosive munition will be accelerated for qualification, per HQDA G-8 Directed Requirement for a Rapid Bridging Solution for the 155mm Dual Purpose Improved Conventional Munition (DPICM) 22 December 2016, as an inherent part of the Rapid Bridging solution for 155mm DPICM. Prototyping will be awarded beginning in 1Q FY 2018 through DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) initiatives to multiple vendors (subcontractors to U.S. Government system integrator) through EMD. The U.S. Government will lead EMD effort to complete development by end 1Q FY 2020. Milestone C approval is in 3Q FY 2020.

**E. Performance Metrics**  
N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EU7 / Enhanced Lethality Cannon Munitions
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<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
XM1128 PQT Hardware	MIPR	Various : TBD	-	-		10.070		0.830		-		0.830	0.140	11.040	-
<b>Subtotal</b>			-	-		10.070		0.830		-		0.830	0.140	11.040	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
M999 Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	-	-		0.200		-		-		-	0.000	0.200	-
M999 Engineering Support	MIPR	Armament Reasech, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	-	-		1.800		-		-		-	0.000	1.800	-
XM1128 Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	-	-		1.000		-		-		-	0.000	1.000	-
XM1128 Engineering Support	MIPR	Armament Reasech Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	-	-		3.960		3.185	Mar 2019	-		3.185	1.377	8.522	-
XM1128 Firing Table Software Updates	MIPR	Armament Reasech Development and Engineering Center (ARDEC) : Adelphi, MD	-	-		-		2.900	Aug 2019	-		2.900	0.000	2.900	-
<b>Subtotal</b>			-	-		6.960		6.085		-		6.085	1.377	14.422	N/A





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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EU7 / Enhanced Lethality Cannon Munitions

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
XM1128 Prototyping																												
XM1128 Milestone B																												
XM1128 Lethality Testing																												
XM1128 Lethality Assessment																												
XM1128 Baseline Prototyping																												
XM1128 Critical Design Review (CDR)																												
XM1128 Performance Qualification Testing (PQT)																												
XM1128 Milestone C																												
M999 CTTSO Testing																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EU7 / <i>Enhanced Lethality Cannon Munitions</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
XM1128 Prototyping	3	2017	1	2018
XM1128 Milestone B	1	2018	1	2018
XM1128 Lethality Testing	4	2017	2	2018
XM1128 Lethality Assessment	2	2018	2	2018
XM1128 Baseline Prototyping	3	2018	1	2020
XM1128 Critical Design Review (CDR)	4	2018	4	2018
XM1128 Performance Qualification Testing (PQT)	1	2019	2	2020
XM1128 Milestone C	3	2020	3	2020
M999 CTTSO Testing	4	2018	3	2019

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development					<b>Project (Number/Name)</b> EU8 / Improved Multi-Option Fuze		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EU8: Improved Multi-Option Fuze	-	0.000	8.000	7.915	-	7.915	9.885	0.000	0.000	0.000	0.000	25.800
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Improved Multi-Option Fuze project will integrate the results of Budget Activity 04, Program Element 0603639A, Project EU2 and qualify/Type Classify (TC) new improved Multi-Option Fuzes (iMOFA/iMOFM) with Government-owned Next Generation Proximity Sensor (NGPS) capabilities containing built-in exportability attributes previously matured via OSD-sponsored tech base efforts under the Joint Fuze Technology Program and Defense Exportability Features (DEF) Congressional Pilot Program. Continuing FMS sales of non-precision artillery and mortar ammunition fuzes containing proximity technology will increase the incidence of reverse engineering (RE) and threat of electronic countermeasures (ECM). If realized, these threats will negate the current battlefield advantages of U.S. troops. This Project will develop and qualify safe, affordable, reliable Proximity/HoB fuzing solution for non-precision Cannon artillery and Mortar munitions that are resistant to adversary exploitation via ECM and RE threats.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Improved Multi-Option Fuze Development	-	8.000	7.915	-	7.915
<b>Description:</b> Develop and qualify improved multi-option fuze technologies.					
<b>FY 2018 Plans:</b> Prepare and award the Engineering and Manufacturing Development (EMD) contracts as well as the EMD design, development, and fabrication of initial improved Multi-option fuzes for follow-on engineering tests and qualification of new iMOFA/iMOFM TDP based on Government-owned Next Generation Proximity Sensor (NGPS) w/Built-In HOB DEF technology.					
<b>FY 2019 Base Plans:</b> FY 2019 will support the preparation and incrementing of EMD contracts utilizing the DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) for preliminary iMOFM design and detailed iMOFA design, the fabrication of hardware and the conducting of developmental verification tests, the preparations for and execution of an iMOFM Preliminary Design Review (PDR) and an iMOFA Critical Design Review (CDR), and the completion of iMOFA Product Qualification Test (PQT) plans and the fabrication of test hardware.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EU8 / <i>Improved Multi-Option Fuze</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continued level of effort in support of EMD contracts in FY 2019.					
<b>Accomplishments/Planned Programs Subtotals</b>	-	8.000	7.915	-	7.915

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• EU2: <i>Improved Multi-Option Fuze (iMOFA/iMOFM)</i>	7.588	-	0.000	-	0.000	-	-	-	-	0.000	7.588

**Remarks**

**D. Acquisition Strategy**

Improved Multi-Option Fuze programs of record via subsequent Engineering and Manufacturing Development (EMD) program for Type Classification (TC) into existing multi- option fuzes for Cannon Artillery and Mortar Munitions with supporting detailed government-owned Technical Data Packages (TDPs) to enable "build to print" by Industry. Qualified iMOFA will be a Technology Readiness Level (TRL) 8 TC design with a mature TDP for production. Parallel iMOFM effort will be a qualified TRL 8 design and replace current MOFMs in appropriate ongoing production mortar cartridges.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EU8 / Improved Multi-Option Fuze
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<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Improved Multi-Option Fuze Development and Component Prototypes	MIPR	DoD Ordnance Technology Consortium (DOTC) - TBD : Various	-	-		0.700	Nov 2017	-		-		-	0.000	0.700	-
Improved Multi-Option Fuze Test Hardware & PQT Support	MIPR	DoD Ordnance Technology Consortium (DOTC) - TBD : Various	-	-	4.300	Jun 2018		5.915	Nov 2018	-		5.915	7.000	17.215	-
<b>Subtotal</b>			-	-		5.000		5.915		-		5.915	7.000	17.915	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	-	-		0.500		-		-		-	0.000	0.500	-
Engineering Support	MIPR	Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	-	-		-		0.500	Nov 2018	-		0.500	0.350	0.850	-
<b>Subtotal</b>			-	-		0.500		0.500		-		0.500	0.350	1.350	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Improved Multi-Option Fuze Test and Evaluations	MIPR	Armament Research, Development and Engineering Center	-	-		2.200	Nov 2017	0.900	Nov 2018	-		0.900	0.600	3.700	-



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EU8 / Improved Multi-Option Fuze

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Identify, Develop, and Prototype Candidate for Technology Solution; BA4 EU8																												
Conduct Performance-Related Developmental Tests; BA4 PE 0603639A EU2																												
Evaluate Prototype Solution & Transition Technology; BA4 PE 0603639A EU2																												
Fabricate Prototypes; BA5 PE 0604802A EU8																												
Conduct Evaluations and Design Reviews; BA5 PE 0604802A EU8																												
Fabricate System Level Qualification Hardware; BA5 PE 0604802A EU8																												
Safety, Reliability and Environmental Testing; BA5 PE 0604802A EU8																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EU8 / <i>Improved Multi-Option Fuze</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Identify, Develop, and Prototype Candidate for Technology Solution; BA4 EU2	3	2017	1	2019
Conduct Performance-Related Developmental Tests; BA4 PE 0603639A EU2	1	2018	3	2018
Evaluate Prototype Solution & Transition Technology; BA4 PE 0603639A EU2	2	2018	1	2019
Fabricate Prototypes; BA5 PE 0604802A EU8	2	2018	4	2018
Conduct Evaluations and Design Reviews; BA5 PE 0604802A EU8	4	2018	3	2019
Fabricate System Level Qualification Hardware; BA5 PE 0604802A EU8	3	2019	1	2020
Safety, Reliability and Environmental Testing; BA5 PE 0604802A EU8	1	2020	2	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development					<b>Project (Number/Name)</b> EW1 / 40mm Low Velocity Ammunition		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EW1: 40mm Low Velocity Ammunition	-	0.000	9.678	13.269	-	13.269	14.032	21.302	1.482	0.000	0.000	59.763
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Funds in the Program Element 0604802A, Project EW1 program include both the 40mm Low Velocity High Explosive Air Burst (HEAB) XM1166 and 40mm Low Velocity Door Breach (DB) XM1167 funds beginning in FY 2018. The DB XM1167 funds will be on this line until a separate funding line is established. The 40mm Door Breach Program is a new start in FY 2018.

**A. Mission Description and Budget Item Justification**

High Explosive Air Burst (HEAB) is a new capability identified as a Warfighter requirement in the Capability Development Document (CDD), 40mm Low Velocity (LV) Family of Ammunition Annex. The 40mm LV HEAB tactical cartridge allows the warfighter to engage targets at increased effective ranges using the 40mm M203/M320 Grenade Launcher. The HEAB cartridge provides the grenadier with a higher probability of achieving a first shot kill against enemy personnel, coupled with the ability to defeat personnel targets in defilade positions at increased effective ranges with greater accuracy and lethality. When deployed against point and area targets, the cartridge inflicts incapacitating effects against personnel at increased ranges beyond those offered by the current M433 High Explosive Dual Purpose (HEDP) cartridge. The cartridge provides lethal effects against targets with improved accuracy and greater standoff ranges increasing Soldier Survivability. FY 2019 supports Engineering and Manufacturing Development (EMD) effort for competing prototypes and continues EMD design activities.

The 40mm Low Velocity (LV) Door Breach (DB), XM1167, cartridge allows the grenadier to conduct a ballistic breach of an existing door creating an entry point into a building or other structure. This capability is critical during Urban Operations, while having stand-off ability to conduct ballistic breach at ranges up to 50 meters away, with a single-shot, and without pause between actual breach and entry of initial force. The 40mm DB cartridge will provide the small unit with the capability to conduct breaching operations; allowing the Warfighter to create an entry point in a structure allowing an assault element to enter and begin clearing operations, which is the most difficult type of operation that Soldiers may face in an urban environment. The 40mm DB cartridge will reduce collateral damage and friendly casualties associated with breaching operations. The deployment of 40mm DB cartridges will enable the small unit to gain and maintain a tactical advantage through efficiency of combat power and momentum. FY 2019 supports Design Engineering Testing (DET) and Developmental Test and Evaluation (DT&E).

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> 40mm Low Velocity High Explosive Air Burst (HEAB), XM1166	-	5.500	12.269	-	12.269
<b>Description:</b> Engineering Manufacturing Development					
<b>FY 2018 Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EW1 / 40mm Low Velocity Ammunition

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>FY 2018 Award two contracts for competing prototypes and activities will include fabrication and testing of prototype hardware for design optimization.</p> <p><b>FY 2019 Base Plans:</b> FY 2019 activities include the first LV-HEAB design, a Test Readiness Review (TRR), Design Engineering Test (DET 1) build and DET 1 Testing.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 funding required for continued development and start of testing.</p>					
<p><b>Title:</b> 40mm Low Velocity Door Breach (DB), XM1167</p> <p><b>Description:</b> Engineering Manufacturing Development Activities</p> <p><b>FY 2018 Plans:</b> FY 2018 primary activities include Milestone B approval and Bid Sample Test competition. Activities in support of contract award include developing performance specifications, releasing the Request for Proposals, evaluating proposals, and awarding a single contract.</p> <p><b>FY 2019 Base Plans:</b> FY 2019 activities include a Test Readiness Review (TRR), Design Engineering Testing (DET), and Developmental Test &amp; Evaluation (DT&amp;E).</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 funding required for continued testing and evaluation of the 40mm door breaching round ammunition.</p>	-	4.178	1.000	-	1.000
<b>Accomplishments/Planned Programs Subtotals</b>	-	9.678	13.269	-	13.269

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• 694: Medium Caliber Ammunition 0603639A 694	2.170	-	0.000	-	0.000	-	-	-	-	0.000	2.170
• E71005: CTG, 40mm LV, IRAP	-	-	0.000	-	0.000	-	-	16.082	15.594	0.000	31.676
<b>Remarks</b>											

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EW1 / <i>40mm Low Velocity Ammunition</i>

**D. Acquisition Strategy**

The HEAB cartridge will be developed through a competitive Engineering and Manufacturing Development (EMD) program. As part of the pre-EMD activities, Cooperative Research and Development Agreement (CRADA) Testing with contractors will occur to evaluate potential designs. For EMD, the Government anticipates awarding two Full and Open competitive contracts. After Developmental Test & Evaluation (DT&E) the government will down-select to a single contractor for Low Rate Initial Production (LRIP) and two production year options.

The Door Breach cartridge will be developed through a Competitive Bid Sample Test followed by a single award for an EMD program, which will consist of a 12-month qualification effort.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EW1 / 40mm Low Velocity Ammunition
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<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Project Manager Maneuver Ammunition Systems (PM MAS) labor and travel	Various	Picatinny Arsenal : NJ	-	-		0.600		-		-		-	Continuing	Continuing	Continuing
Contractor 1 40mm LV HEAB XM1166	C/CPFF	TBD : TBD	-	-		1.896		4.562		-		4.562	0.000	6.458	-
Contractor 2 40mm LV HEAB XM1166	C/CPFF	TBD : TBD	-	-		1.896		4.562		-		4.562	0.000	6.458	-
Project Manager Maneuver Ammunition Systems (PM MAS) labor and travel 40mm LV Door Breach XM1167	Various	Picatinny Arsenal : NJ	-	-		0.630		-		-		-	Continuing	Continuing	Continuing
Contractor 1 40mm LV Door Breach XM1167	C/FFP	TBD : TBD	-	-		1.735		0.600		-		0.600	0.000	2.335	-
<b>Subtotal</b>			-	-		6.757		9.724		-		9.724	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Armament Research Development Engineering Center (ARDEC) - 40mm LV HEAB XM1166	MIPR	Picatinny Arsenal : NJ	-	-		1.108		2.351		-		2.351	Continuing	Continuing	Continuing
Armament Research Development Engineering Center (ARDEC) - 40mm LV Door Breach XM1167	MIPR	Picatinny Arsenal : NJ	-	-		1.257		0.300		-		0.300	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	-		2.365		2.651		-		2.651	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army Date: February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EW1 / 40mm Low Velocity Ammunition
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Bid Sample Test 40mm LV Door Breach XM1167	MIPR	TBD : TBD	-	-		0.556		-		-		-	0.000	0.556	-
DT&E 40mm LV Door Breach XM1167	MIPR	TBD : TBD	-	-		-		0.100		-		0.100	0.000	0.100	-
DET 1 LV HEAB XM1166	MIPR	TBD : TBD	-	-		-		0.794		-		0.794	0.000	0.794	-
<b>Subtotal</b>			-	-		0.556		0.894		-		0.894	0.000	1.450	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	-	9.678	13.269	-	13.269	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EW1 / 40mm Low Velocity Ammunition

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
40mm HEAB XM1166 CRADA Testing	[REDACTED]																											
					HEAB Testing																							
40mm HEAB XM1166 Milestone B					3 HEAB MS-B																							
40mm HEAB XM1166 Engineering Manufacturing Development					4 HEAB EMD																							
40mm HEAB XM1166 Contract Awards					4 HEAB Contract Awards																							
40mm HEAB XM1166 Preliminary Design Review									6 HEAB PDR																			
40mm HEAB XM1166 Design Engineering Test DET 1									HEAB DET 1																			
40mm HEAB XM1166 Design Engineering Test DET 2													HEAB DET 2															
40mm HEAB XM1166 Design Engineering Test DET 3																	HEAB DET 3											
40mm HEAB XM1166 Critical Design Review																	8 HEAB CDR											
40mm HEAB XM1166 Developmental Test & Evaluation																	HEAB DT&E											
40mm HEAB XM1166 Milestone C																					9 HEAB MS-C							
40mm HEAB XM1166 Low Rate Initial Production																					HEAB LRIP							
LV Door Breach XM1167 Milestone B					1 DB MS-B																							

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> EW1 / 40mm Low Velocity Ammunition

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
LV Door Breach XM1167 Request For Proposal Release					2 ▲ DB RFP																							
LV Door Breach XM1167 Bid Sample Test					DB Bid Sample																							
LV Door Breach XM1167 Engineering Manufacturing Development Contract Award					5 ▲ DB EMD Contract Award																							
LV Door Breach XM1167 Engineering Manufacturing Development					DB EMD																							
LV Door Breach XM1167 Developmental Test & Evaluation					DB DT&E																							
LV Door Breach XM1167 Milestone C					7 ▲ DB MS-C																							



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> EW1 / <i>40mm Low Velocity Ammunition</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
40mm HEAB XM1166 CRADA Testing	3	2017	1	2018
40mm HEAB XM1166 Milestone B	3	2018	3	2018
40mm HEAB XM1166 Engineering Manufacturing Development	3	2018	1	2022
40mm HEAB XM1166 Contract Awards	4	2018	4	2018
40mm HEAB XM1166 Preliminary Design Review	2	2019	2	2019
40mm HEAB XM1166 Design Engineering Test DET 1	4	2019	4	2019
40mm HEAB XM1166 Design Engineering Test DET 2	2	2020	3	2020
40mm HEAB XM1166 Design Engineering Test DET 3	1	2021	2	2021
40mm HEAB XM1166 Critical Design Review	3	2021	3	2021
40mm HEAB XM1166 Developmental Test & Evaluation	4	2021	2	2022
40mm HEAB XM1166 Milestone C	3	2022	3	2022
40mm HEAB XM1166 Low Rate Initial Production	3	2022	3	2023
LV Door Breach XM1167 Milestone B	2	2018	2	2018
LV Door Breach XM1167 Request For Proposal Release	3	2018	3	2018
LV Door Breach XM1167Bid Sample Test	3	2018	4	2018
LV Door Breach XM1167 Engineering Manufacturing Development Contract Award	4	2018	4	2018
LV Door Breach XM1167 Engineering Manufacturing Development	4	2018	4	2019
LV Door Breach XM1167 Developmental Test & Evaluation	3	2019	4	2019
LV Door Breach XM1167 Milestone C	1	2020	1	2020

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development				<b>Project (Number/Name)</b> FA6 / 30mm Lethality			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
FA6: 30mm Lethality	-	0.000	12.000	13.851	-	13.851	8.897	11.860	6.918	0.000	0.000	53.526
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

30mm Lethality is not a new start in FY 2018. In FY 2018 Program Element (PE) 0603639A, Project 694, will transition to PE 0604802A, Project FA6.

**A. Mission Description and Budget Item Justification**

The 30mm Lethality Project funds development of a suite of 30x173mm caliber cartridges, which includes anti-personnel tactical and training cartridges and anti-materiel tactical and training cartridges. The objective is to enhance the operational effectiveness and lethality of the Stryker Infantry Carrier Vehicle (ICV) and any Army Fighting Vehicles that are equipped with a 30x173mm weapon system. The tactical cartridges will provide an organic direct fire capability to support infantry at a greater range and will improve lethality when engaging dismounted infantry and like armored vehicles. The training cartridges will be ballistically matched to the tactical cartridges, allowing the Warfighter to train in a cost effective manner. This Project will leverage earlier efforts in support of the Stryker Operational Needs Statement for Increased Lethality. FY 2019 funding will continue to support the ammunition qualification activities and development of performance specifications in support of the 30x173mm Programmable Airburst Munitions - Tracer (PABM-T) Urgent Materiel Release (UMR). FY 2019 effort also includes activities for developing/qualifying a 30x173mm Programmable Airburst Munition (PABM) along with an initial Design Engineering Test (DET). The objective is to field airburst capable 30x173mm cartridges and programming/communication units for use in Stryker ICV and/or Army Future Fighting Vehicles.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> 30X173mm Suite of Ammunition	-	12.000	13.851	-	13.851
<b>Description:</b> Engineering and Manufacturing Development Preparatory Activities and Ammunition Qualification Activities.					
<b>FY 2018 Plans:</b> FY 2018 primary activities include awarding the contract to purchase qualification hardware for suite of four ammunition and preparing for contracts to develop/qualify a 30x173mm Programmable Airburst Munition (PABM).					
<b>FY 2019 Base Plans:</b> FY 2019 primary activities include initiation of Design Engineering Testing (DET) and Design Verification Testing (DVT) of the 30x173mm anti-personnel and anti-personnel training cartridges, as well as Development Contract Awards and DET of the 30x173mm Programmable Airburst Munition (PABM).					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> FA6 / 30mm Lethality

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Increase will allow for the continued development of Stryker ammunition.					
<b>Accomplishments/Planned Programs Subtotals</b>	-	12.000	13.851	-	13.851

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• E07610: CTG, 30MM, Progrmabl Air Burst Mun, Mk310, single	-	-	17.536	-	17.536	14.546	11.565	17.509	19.497	0.000	80.653
• E07306: CTG, 30MM, TP-T, Mk239, single	6.437	14.550	0.000	3.000	3.000	7.870	3.000	11.188	3.000	0.000	49.045
• E07406: CTG, 30mm Hi Expl Incendry-T(HEI-T), Mk238	9.176	14.300	8.281	6.000	14.281	8.430	14.588	12.978	12.980	0.000	86.733
• E09191: CTG, 30MM, TPFSDS-T, Mk317 (sabot trnr), single	5.581	15.000	11.123	4.000	15.123	-	15.619	-	11.621	0.000	62.944
• E09292: CTG, 30MM, APFSDS-T, Mk258, single	13.754	25.500	13.447	12.000	25.447	13.660	25.888	26.111	26.050	0.000	156.410

**Remarks**

**D. Acquisition Strategy**

A Request for Proposal (RFP) will be sent to industry soliciting responses to the requirements of Army Performance Specifications for the following items: 30x173mm anti-materiel tactical cartridge, 30x173mm anti-materiel training cartridge, 30x173mm anti-personnel tactical cartridge, and 30x173mm anti-personnel training cartridge. Contracts will be awarded to viable contractors for the development and qualification of each family of cartridges (anti-personnel family and anti-materiel family). Contractor designs will be subjected to Design Verification Tests. Based on technical performance/maturity and cost, production contracts may be awarded for each family of cartridges. The objective is to qualify two contract sources for the each cartridge.

In support of the 30x173mm programmable airburst munition (PABM), an RFP will be sent to industry. Multiple contracts will be awarded for development and design engineering tests. The Government will down-select and award a single contract to complete Developmental Test and Evaluation (DT&E) in support of Milestone C.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604802A / Weapons and Munitions Engineering Development				FA6 / 30mm Lethality								
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Manager Maneuver Ammunition Systems (PM MAS) labor and travel	Various	Picatinny Arsenal : NJ	-	-		0.400		0.400		-		0.400	Continuing	Continuing	Continuing	
Ammo Development/Qualification Contract	Option/TBD	TBD : TBD	-	-		8.000		10.551		-		10.551	Continuing	Continuing	Continuing	
<b>Subtotal</b>			-	-		8.400		10.951		-		10.951	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Armament Research, Development, and Engineering Center (ARDEC)	MIPR	Picatinny Arsenal : NJ	-	-		2.600		1.900		-		1.900	Continuing	Continuing	Continuing	
<b>Subtotal</b>			-	-		2.600		1.900		-		1.900	Continuing	Continuing	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Qualification Testing	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	-		-		1.000		-		1.000	Continuing	Continuing	Continuing	
Design Engineering Test 1 (DET 1)	MIPR	Aberdeen Proving Grounds : Aberdeen Proving Ground, MD	-	-		1.000		-		-		-	0.000	1.000	-	
<b>Subtotal</b>			-	-		1.000		1.000		-		1.000	Continuing	Continuing	N/A	

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>								<b>Date:</b> February 2018				
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development				<b>Project (Number/Name)</b> FA6 / 30mm Lethality				
	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	-	-	12.000		13.851		-		13.851	Continuing	Continuing	N/A

Remarks

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> FA6 / 30mm Lethality

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Release Request for Proposal					RFP																											
Qualification Contract Award									3 Qual Award																							
Qualification (Non-Airburst Cartridges)									Qualification																							
Design Engineering Test & Design Verification Test anti-personnel													DET and DVT anti-pers																			
Milestone C (anti-personnel cartridges)																					7 MS-C Anti-Pers											
Design Engineering Test & Design Verification Test anti-materiel																	DET and DVT anti-mat															
Milestone C (anti-materiel cartridges)																									8 MS-C Anti-Mat							
PABM P-Spec Development and Design									PABM P-Spec Dev																							
PABM Request for Proposal													PABM RFP																			
PABM Milestone B									2 PABM MS-B																							
PABM Engineering & Manufacturing and Development (EMD)									PABM EMD																							
PABM Development Contract Awards													4 PABM Awards																			
PABM Design Engineering Test 1																	PABM DET 1															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> FA6 / <i>30mm Lethality</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
PABM Design Engineering Test 2																	PABM DET 2																			
PABM Down-select Contract Award																	6				PABM EMD Down-select															
PABM Developmental Test & Evaluation (DT&E)																	PABM DT&E																			
PABM Milestone C																	9				PABM MS C															
PABM Live Fire Test and Evaluation (LFT&E)																	PABM LFT&E																			
PABM Initial Operational Test and Evaluation (IOT&E)																	PABM IOT&E																			
PABM UMR Contract Award	1				PABM UMR Contract Award																															
PABM UMR Safety Qualification Build																	PABM UMR Qual Build																			
PABM UMR Safety Qualification Test																	PABM UMR Qual Test																			
PABM UMR Live Fire Test and Evaluation																	PABM UMR LFT&E																			
PABM UMR Urgent Materiel Release																	5				PABM UMR Materiel Release															

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> FA6 / <i>30mm Lethality</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Release Request for Proposal	1	2018	2	2018
Qualification Contract Award	3	2018	3	2018
Qualification (Non-Airburst Cartridges)	3	2018	4	2021
Design Engineering Test & Design Verification Test anti-personnel	4	2019	2	2021
Milestone C (anti-personnel cartridges)	3	2021	3	2021
Design Engineering Test & Design Verification Test anti-materiel	3	2020	4	2021
Milestone C (anti-materiel cartridges)	1	2022	1	2022
PABM P-Spec Development and Design	1	2018	3	2018
PABM Request for Proposal	4	2018	1	2019
PABM Milestone B	2	2018	2	2018
PABM Engineering & Manufacturing and Development (EMD)	2	2018	1	2022
PABM Development Contract Awards	3	2019	3	2019
PABM Design Engineering Test 1	4	2019	1	2020
PABM Design Engineering Test 2	2	2020	3	2020
PABM Down-select Contract Award	3	2020	3	2020
PABM Developmental Test & Evaluation (DT&E)	2	2021	4	2021
PABM Milestone C	1	2022	1	2022
PABM Live Fire Test and Evaluation (LFT&E)	3	2022	1	2023
PABM Initial Operational Test and Evaluation (IOT&E)	3	2022	1	2023
PABM UMR Contract Award	4	2017	4	2017
PABM UMR Safety Qualification Build	4	2017	3	2018
PABM UMR Safety Qualification Test	3	2018	4	2018



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**Exhibit R-4A, RDT&E Schedule Details:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> FA6 / <i>30mm Lethality</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
PABM UMR Live Fire Test and Evaluation	2	2019	2	2019
PABM UMR Urgent Materiel Release	3	2019	3	2019

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development				<b>Project (Number/Name)</b> S36 / Precision Guidance Kit			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
S36: Precision Guidance Kit	-	15.343	14.809	28.223	-	28.223	30.150	25.695	20.178	17.757	0.000	152.155
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Precision Guidance Kit (PGK) is a course correcting fuze that provides near precision accuracy and efficiency for current and future 155mm High Explosive (HE) projectiles by eliminating a portion of the inherent errors associated with ballistic firing solutions which effectively reduces the number of projectiles required to execute fire missions. PGK utilizes a Global Positioning System (GPS) receiver and internal Guidance and Navigation Computer to accomplish its mission with point detonating and height of burst fuzing functions. The PGK M1156E1 effort will incorporate and qualify state of the art technologies to increase the functionality of PGK in GPS degraded environments as well as compatibility with the Army's new long range cannon and projectiles which will be fielded during the PGK Life Cycle.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Contractor Engineering and Manufacturing Development (EMD)	11.744	10.264	24.927	-	24.927
<b>Description:</b> Contractor Engineering and Manufacturing Development (EMD)					
<b>FY 2018 Plans:</b> Design maturation of a modernized PGK and key subsystems.					
<b>FY 2019 Base Plans:</b> Will support sources selection activities to award the Engineering and Manufacturing Development (EMD) contract initiating system design including a Preliminary Design Review (PDR) and prototype development including building and testing prototype hardware for a modernized PGK					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase due to effort transitioning into EMD.					
<b>Title:</b> Government and Engineering Support	3.599	3.705	3.296	-	3.296
<b>Description:</b> Engineering Support					
<b>FY 2018 Plans:</b> Engineering Support of a modernized PGK.					
<b>FY 2019 Base Plans:</b>					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> S36 / Precision Guidance Kit
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Source selection activities to award EMD contract providing engineering support and analysis for the modernization effort. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease due to PM Core Labor Support moving to OMA account in FY 2019.					
<b>Title:</b> Continue Development/Operational Testing <b>Description:</b> Development/Operational Test. <b>FY 2018 Plans:</b> Execute PGK modernization concept and subsystem maturation. Perform System Design Review as an entry point into Prototype development and testing. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Effort complete in FY 2018.	-	0.840	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	15.343	14.809	28.223	-	28.223

<b>C. Other Program Funding Summary (\$ in Millions)</b>										
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>
• E99250: Procurement of Ammunition Army: Precision Guidance Kit (PGK)	118.278	68.363	184.033	63.900	247.933	27.265	57.085	62.120	58.607	Continuing

**Remarks**

**D. Acquisition Strategy**  
The Precision Guidance Kit (PGK) is a Global Positioning System (GPS) guidance kit with fuzing functions for 155mm High Explosive (HE) artillery projectiles. PGK provides near precision accuracy and effectiveness for 155mm HE projectiles. The PGK corrects the inherent errors associated with ballistic firing solutions and reduces the number of artillery projectiles required to execute the mission. The current PGK Increment has been qualified for the M795 and M549A1 HE projectiles. This increment of PGK entered Low Rate Initial Production (LRIP) at Milestone C in March 2013. Initial Operational Test and Evaluation (IOT&E) was completed 3Q FY 2015, Full Material Release (FMR) was approved 1Q FY 2016, Full Rate Production (FRP) decision and Initial Operational Capability (IOC) occurred 2Q FY 2016. On going PGK Modernization efforts are focused on addressing performance in a GPS degraded environment as well as compatibility with the Army's new long range 155mm cannon and projectile which are scheduled to be fielded in the same timeframe as the next increment of PGK. The strategy includes competitive DoD Ordnance

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> S36 / <i>Precision Guidance Kit</i>
Technology Consortium (DOTC) Other Transaction Agreement (OTA) concept development efforts with multiple contractors in FY 2017, followed by a DOTC Risk Reduction concept maturation phase in FY 2018. This will be followed by a competitive FAR Based EMD effort beginning in FY 2019.		
<b>E. Performance Metrics</b> N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions Engineering Development				Project (Number/Name) S36 / Precision Guidance Kit							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PGK TD Contract	C/CPAF	Alliant Techsystems (ATK) : Plymouth, MN	5.279	-		-		-		-		-	0.000	5.279	5.279
PGK TD Contract	C/CPAF	BAE Systems : Minneapolis, MN	3.103	-		-		-		-		-	0.000	3.103	3.103
Soft Recovery Modules	MIPR	SubSystems Technology : Rosslyn, VA	0.116	-		-		-		-		-	0.000	0.116	0.116
PGK EMD & Phase 1-2 (Reliability Failure/Root Cause Analysis)	C/CPAF	Orbital-Alliant Techsystems (O-ATK) : Plymouth, MN	59.953	-		-		-		-		-	0.000	59.953	53.947
PGK EMD - Phase 3a to 5	C/FFP	Orbital-Alliant Techsystems (O-ATK) : Plymouth, MN	32.443	-		-		-		-		-	0.000	32.443	25.117
High Angle Software Configuration	C/CPFF	Raytheon : Ft Wayne, IN	0.105	-		-		-		-		-	0.000	0.105	0.105
Engineering & Technology Assessment. Low Cost Roll Control Solutions	C/CPFF	DoD Ordnance Technology Consortium (DOTC) - General Dynamics Ordnance & Tactical Systems : Bothell, WA	4.774	-		-		-		-		-	0.000	4.774	2.093
Engineering & Technology Assessment. Low Cost Course Correction solutions.	C/CPFF	BAE Systems/ Rokar : Minneapolis, MN	1.778	-		-		-		-		-	0.000	1.778	0.500
DOTC - PGK GPS Anti-Jam Development - Raytheon	MIPR	DoD Ordnance Technology Consortium (DOTC) - Raytheon : Ft Wayne, IN	1.278	2.018	Jul 2017	-		-		-		-	0.000	3.296	-
DOTC - PGK GPS Anti-Jam Development - O-ATK	MIPR	DoD Ordnance Technology Consortium (DOTC)	6.755	1.462	Jul 2017	-		-		-		-	0.000	8.217	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> S36 / Precision Guidance Kit
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<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		- Orbital-Alliant Techsystems (O-ATK) : Plymouth, MN													
DOTC - PGK GPS Anti-Jam Development - Rockwell Collins	MIPR	DoD Ordnance Technology Consortium (DOTC) - Rockwell Collins : Cedar Rapids, IA	0.778	0.783	Mar 2017	-		-		-		-	0.000	1.561	-
DOTC - PGK GPS Anti-Jam Development - L3 IEC	MIPR	DOD Ordnance Consortium (DOTC) - L3 - IEC : Various	-	3.341	Apr 2017	-		-		-		-	0.000	3.341	40.025
DOTC - PGK GPS Anti-Jam Development - GD-OTS	MIPR	DoD Ordnance Technology (DOTC) - General Dynamics Ordnance & Tactical Systems : Bothell, WA	-	2.017	Feb 2017	-		-		-		-	0.000	2.017	-
DOTC - PGK GPS Anti-Jam Development - BAE	MIPR	DoD Ordnance Technology (DOTC) - BAE Systems / Rokar : Minneapolis, MN	-	2.017	Feb 2017	-		-		-		-	0.000	2.017	-
DOTC - PGK GPS Anti-Jam Development - BAE / GD-OTS	MIPR	TBD : TBD	-	-		10.264		-		-		-	0.000	10.264	-
EMD Development Contract	MIPR	TBD : TBD	-	-		-		25.689	Mar 2019	-		25.689	0.000	25.689	-
<b>Subtotal</b>			116.362	11.638		10.264		25.689		-		25.689	0.000	163.953	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> S36 / Precision Guidance Kit
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Office	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	12.797	0.867	Jan 2017	0.867		-		-		-	0.000	14.531	12.764
Government Engineering Support	MIPR	Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	30.727	2.733	Jan 2017	2.733		2.534	Jan 2019	-		2.534	0.000	38.727	31.798
Management Support	MIPR	Camber : Mt Arlington, NJ	1.936	0.105	Jun 2017	0.105		-		-		-	0.000	2.146	1.936
Miscellaneous Support Contract	MIPR	MITRE Corporation : Fort Monmouth, NJ	0.600	-		-		-		-		-	0.000	0.600	-
Jammer Support	MIPR	Electronic Proving Ground (EPG) : Ft Huachuca, AZ	0.316	-		-		-		-		-	0.000	0.316	0.476
PGK Parallel Studies and Analysis Support	MIPR	Command and Control Directorate : Ft Monmouth, NJ	0.300	-		-		-		-		-	0.000	0.300	-
LNO Support - Ft. Sill	MIPR	US ARMY Field Artillery Center : Ft. Sill, OK	0.201	-		-		-		-		-	0.000	0.201	0.180
ATEC Support	MIPR	Army Test and Evaluation Command (ATEC) : Aberdeen, MD	0.041	-		-		-		-		-	0.000	0.041	0.025
<b>Subtotal</b>			46.918	3.705		3.705		2.534		-		2.534	0.000	56.862	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions Engineering Development	<b>Project (Number/Name)</b> S36 / Precision Guidance Kit
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Development Testing Increment 1	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	10.442	-		-		-		-		-	0.000	10.442	10.442
Other Development Testing	MIPR	Various : Various	1.769	-		-		-		-		-	0.000	1.769	1.769
Limited User Test	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	1.631	-		-		-		-		-	0.000	1.631	1.631
Initial Operational Test & Evaluation - Increment 1	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	1.000	-		-		-		-		-	0.000	1.000	1.000
Initial Operational Test & Evaluation - Troop Support	MIPR	Lab Test Center : Ft. Sill, OK	0.731	-		-		-		-		-	0.000	0.731	0.731
Component Air Gun/ Railgun Testing	MIPR	Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	0.337	-		-		-		-		-	0.000	0.337	0.337
Cold Region Testing	MIPR	Cold Region Test Center : Yuma, AZ	0.300	-		-		-		-		-	0.000	0.300	0.300
Airdrop Testing	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	0.200	-		-		-		-		-	0.000	0.200	0.200



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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604802A / Weapons and Munitions Engineering Development				S36 / Precision Guidance Kit								
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete			
Development Testing for GPS Anti-Jam	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	0.590	-		0.840		-		-		-	0.000	1.430	1.840	
<b>Subtotal</b>			17.000	-		0.840		-		-		-	0.000	17.840	N/A	
<b>Project Cost Totals</b>			180.280	15.343		14.809		28.223		-		28.223	0.000	238.655	N/A	
<b>Remarks</b>																

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> S36 / <i>Precision Guidance Kit</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Modernization / Concept Development	[Bar: Concept Development]																											
Modernization / System Functional Review (SFR)					1 SFR																							
Modernization / Concept Maturation					[Bar: Concept Maturation]																							
Modernization / System Design Review (SDR)					2 SDR																							
Modernization / EMD Source Selection									[Bar: EMD Source Selection]																			
Modernization / EMD Award									3 EMD Award																			
Modernization / Prototype Development and Testing									[Bar: Prototype Development and Testing]																			
Modernization / Preliminary Design Review (PDR)									4 PDR																			
Modernization / Critical Design Review (CDR)													5 CDR															
Modernization / Contractor Verification Testing																	[Bar: Contractor Verification Testing]											
Modernization / Qualification Testing																					[Bar: Qualification Testing]							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions Engineering Development</i>	<b>Project (Number/Name)</b> S36 / <i>Precision Guidance Kit</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Modernization / Concept Development	1	2017	4	2017
Modernization / System Functional Review (SFR)	4	2017	4	2017
Modernization / Concept Maturation	4	2017	4	2018
Modernization / System Design Review (SDR)	4	2018	4	2018
Modernization / EMD Source Selection	1	2019	2	2019
Modernization / EMD Award	2	2019	2	2019
Modernization / Prototype Development and Testing	3	2019	4	2020
Modernization / Preliminary Design Review (PDR)	4	2019	4	2019
Modernization / Critical Design Review (CDR)	1	2021	1	2021
Modernization / Contractor Verification Testing	1	2021	4	2021
Modernization / Qualification Testing	1	2022	1	2024
Initial Operation Test and Evaluation (IOT&E) - Modernization	4	2024	4	2024

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army										Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)					PE 0604804A / Logistics and Engineer Equipment - Eng Dev							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	76.374	90.965	79.706	-	79.706	107.608	70.530	71.922	58.062	0.000	555.167
194: Engine Driven Gen Ed	-	6.599	12.890	1.803	-	1.803	5.095	15.485	14.475	14.163	0.000	70.510
EC9: Contingency Basing Infrastructure	-	3.470	3.946	3.061	-	3.061	3.054	3.088	3.013	3.251	0.000	22.883
EJ9: Manuever Support Vessel - Light (MSV-L)	-	14.748	28.906	34.245	-	34.245	20.318	7.030	0.000	0.000	0.000	105.247
FG4: Ultra-Lightweight Camouflage Net System (ULCANS)	-	13.600	2.972	3.392	-	3.392	2.992	1.604	1.501	1.778	0.000	27.839
H01: Combat Engineer Eq Ed	-	2.192	3.889	2.745	-	2.745	2.796	4.769	5.929	3.691	0.000	26.011
H02: Tactical Bridging - Engineering Development	-	15.197	14.923	12.504	-	12.504	49.454	13.783	23.057	8.343	0.000	137.261
H14: Materials Handling Equipment - Ed	-	0.924	0.745	0.333	-	0.333	0.629	0.634	0.509	0.666	0.000	4.440
L39: Field Sustainment Support Ed	-	3.569	3.147	2.223	-	2.223	2.974	3.052	3.146	3.247	0.000	21.358
L41: Water And Petroleum Distribution - Ed	-	6.541	8.005	10.774	-	10.774	8.885	8.944	9.046	9.404	0.000	61.599
L43: ENGINEER SUPPORT EQUIPMENT - ED	-	2.352	3.795	0.341	-	0.341	1.230	3.169	0.198	1.422	0.000	12.507
L46: Maintenance Support Equipment	-	1.813	2.053	1.412	-	1.412	1.897	1.947	1.829	2.044	0.000	12.995
L47: Improved Environmental Control Units Ed	-	1.210	1.951	2.340	-	2.340	2.152	2.206	3.948	6.989	0.000	20.796
VR7: Combat Service Support Systems	-	4.159	3.743	4.533	-	4.533	6.132	4.819	5.271	3.064	0.000	31.721

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>
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**A. Mission Description and Budget Item Justification**

This Program Element (PE) provides system development and demonstration for various projects. This PE includes the development of water craft, military tactical bridging, material handling equipment, construction equipment, engineer support equipment, soldier support equipment (to include shelter systems, environmental control, field service equipment, camouflage systems and aerial delivery equipment), water purification equipment, petroleum distribution equipment, and mobile electric power.

The FY 2019 funding request was reduced by \$11.657 million to account for the availability of prior year execution balances.

<b><u>B. Program Change Summary (\$ in Millions)</u></b>	<b><u>FY 2017</u></b>	<b><u>FY 2018</u></b>	<b><u>FY 2019 Base</u></b>	<b><u>FY 2019 OCO</u></b>	<b><u>FY 2019 Total</u></b>
Previous President's Budget	75.098	90.965	109.672	-	109.672
Current President's Budget	76.374	90.965	79.706	-	79.706
Total Adjustments	1.276	0.000	-29.966	-	-29.966
• Congressional General Reductions	-0.031	-			
• Congressional Directed Reductions	-9.838	-			
• Congressional Rescissions	-	-			
• Congressional Adds	13.600	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.455	-			
• Adjustments to Budget Years	-	-	-29.966	-	-29.966

**Change Summary Explanation**

The FY 2019 decrease is due to schedule adjustment in the Large Advanced Mobile Power Sources EMD phase and a re-phasing of Project L43.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>				<b>Project (Number/Name)</b> 194 / <i>Engine Driven Gen Ed</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
194: <i>Engine Driven Gen Ed</i>	-	6.599	12.890	1.803	-	1.803	5.095	15.485	14.475	14.163	0.000	70.510
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

The FY 2019 decrease is due to the Large Advanced Mobile Power Sources EMD phase contract termination .

**A. Mission Description and Budget Item Justification**

This project supports the Tactical Electric Power (TEP) program which is established to develop a Modernized, Standard Family of Mobile Electric Power (MEP) systems to include MEP Generating Sources (MEPGS) and MEP Distribution Systems (MEPDS) for all Services throughout the Department of Defense. Building on the device/component evaluations conducted in PE 0603804A project G11, this project supports the system development and demonstration of a series of innovative mobile electric power systems that are essential to the development and eventual fielding of modernized MEPGS and MEPDS. This project also ensures Army Expeditionary Forces are capable of rapid deployment through aerial delivery initiatives and reduces sustainment requirements, related Combat Support/Combat Service Support (CS/CSS) demands in lift, combat zone footprint, and costs for logistical support. FY19 funds will continue to develop the Management and Distribution Control (MDC) Phase 1: Prime Power Connection Kit (PPCK) and the large Power Distribution Unit (PDU) performance specification to include developmental testing.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Management and Distribution Control (MDC) Engineering & Manufacturing Development (EMD) Phase.	6.599	12.890	1.803	-	1.803
<b>Description:</b> Prepare MDC/Microgrids performance specification and begin EMD Phase.					
<b>FY 2018 Plans:</b> Begin EMD phase for PPCK and continue EMD Phase of MDC PDU (microgrid).					
<b>FY 2019 Base Plans:</b> FY19 funds will continue to develop the Management and Distribution Control (MDC) Large Power Distribution Unit (PDU) and the Prime Power Connection Kit (PPCK) performance specification to include developmental testing.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> The FY 2019 decrease is due to the Large Advanced Mobile Power Sources EMD phase contract termination .					
<b>Accomplishments/Planned Programs Subtotals</b>	6.599	12.890	1.803	-	1.803

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 194 / <i>Engine Driven Gen Ed</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• G11: <i>Adv Elec Energy Con Ad</i>	5.051	6.524	3.335	-	3.335	3.372	7.201	7.405	17.413	0.000	50.301
• MA9800: <i>Generators and Associated Equipment</i>	132.391	116.204	133.772	0.569	134.341	113.476	88.765	115.703	101.957	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

The Management and Distribution Control (MDC) program effort will use a multi-phase acquisition strategy, continue to consolidate requirements and provide solutions to known capability gaps. The MDC product line will include the current power distribution equipment (Army PDISE), the PDU being developed for use with large tactical electric power generators and the Prime Power Connection Kit (PPCK) and other products to provide the full range of power distribution equipment to support present and future Joint power system requirements.

**E. Performance Metrics**

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604804A / Logistics and Engineer Equipment - Eng Dev				194 / Engine Driven Gen Ed								
<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Management and Distribution Control (MDC)/ Microgrids	Various	PM E2S2 : Ft. Belvoir	-	1.275		1.332		1.803		-		1.803	Continuing	Continuing	Continuing	
Large Advanced Mobile Power Sources (LAMPS) (100-200kW)	Various	PM E2S2 Ft. Belvior : Ft. Belvior	-	1.132		-		-		-		-	0.000	1.132	-	
<b>Subtotal</b>			-	2.407		1.332		1.803		-		1.803	Continuing	Continuing	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Management and Distribution Control (MDC)	C/CPFF	TBD : TBD	-	1.750		6.260		-		-		-	Continuing	Continuing	Continuing	
Large Advanced Mobile Power Sources (LAMPS) (100-200kW)	C/FPIF	L-3 Communications, Westwood Corporation, Tulsa, OK : Various	36.224	-		-		-		-		-	Continuing	Continuing	Continuing	
<b>Subtotal</b>			36.224	1.750		6.260		-		-		-	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Large Advanced Mobile Power Sources (LAMPS) (100-200kW)	MIPR	CECOM LCMC : Aberdeen Proving Ground (APG), MD	3.485	1.132	Feb 2017	-		-		-		-	Continuing	Continuing	Continuing	
Management and Distribution Control (MDC)	Various	Various : Various	-	-		2.168		-		-		-	0.000	2.168	-	
<b>Subtotal</b>			3.485	1.132		2.168		-		-		-	Continuing	Continuing	N/A	





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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 194 / <i>Engine Driven Gen Ed</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>LAMPS (Large Advanced Mobile Power Sources)</b>																												
EMD - LAMPS																												
MS C-LAMPS																												
<b>MDC (Management and Distribution Control)</b>																												
Phase 1 (PPCK) ADM																												
PPCK EMD																												
PPCK Milestone C																												
MDC Phase 2 Milestone B																												
Phase 2 M20 (3kW Power Distribution) EMD																												
Phase 2 M20 (3kW Power Distribution) Milestone C																												
Phase 3 Milestone B																												
Phase 3 (Joint Power Distribution System (JPDS)) EMD																												
<b>Small Tactical Electric Power (STEP)</b>																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 194 / <i>Engine Driven Gen Ed</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Milestone B - STEP																																
EMD Award - STEP																																
EMD - STEP																																

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 194 / <i>Engine Driven Gen Ed</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
LAMPS (Large Advanced Mobile Power Sources)	4	2020	4	2024
EMD - LAMPS	4	2020	2	2023
MS C-LAMPS	2	2023	2	2023
MDC (Management and Distribution Control)	3	2017	4	2024
Phase 1 (PPCK) ADM	2	2018	2	2018
PPCK EMD	3	2019	1	2020
PPCK Milestone C	4	2020	4	2020
MDC Phase 2 Milestone B	3	2020	3	2020
Phase 2 M20 (3kW Power Distribution) EMD	1	2021	4	2021
Phase 2 M20 (3kW Power Distribution) Milestone C	4	2022	4	2022
Phase 3 (Joint Power Distribution System (JPDS)) EMD	3	2023	2	2024
Small Tactical Electric Power (STEP)	3	2021	4	2025
Milestone B - STEP	3	2021	3	2021
EMD Award - STEP	3	2021	3	2021
EMD - STEP	3	2021	4	2025

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>				<b>Project (Number/Name)</b> EC9 / <i>Contingency Basing Infrastructure</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EC9: <i>Contingency Basing Infrastructure</i>	-	3.470	3.946	3.061	-	3.061	3.054	3.088	3.013	3.251	0.000	22.883
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project develops the tools and processes that will optimize recommendations for the materiel used to establish, operate, and maintain contingency bases. The project will increase the available knowledge at the base level and provide an analytical foundation for sound investment decision making. The continuous improvement modeling and simulation analysis tools will match the evolution of threats and technologies. Using a system of systems engineering approach, the Contingency Base Infrastructure Product Directorate's focus ensures optimum integration of materiel across the base camp to facilitate the maximizing of Warfighter effectiveness. CBI's analytical results will allow leadership to make data driven, informed decisions on the acquisition and employment/deployment of equipment. This enables contingency bases to be established, operated and managed as a system (system of systems) and the equipment acquired for the base to be compatible and efficient while providing the maximum overall support to the Warfighter. This approach supports Program(s) of Record (PORs) to maximize improvements in Operational Energy and ensures efficiencies across all Areas of Responsibility (AOR).

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Toolset Development	0.735	0.738	0.551	-	0.551
<p><b>Description:</b> CBI employs Systems Engineers and System Architects to continue the maturation of tools by applying analytical rigor and a systems of systems methodology in toolset development. The toolset provides the backbone for the analysis support to the field allowing operational users to make informed decisions for the design of base camps. The Systems Database is a repository for Contingency Base (CB) information and is available as a single source of information to the CB community. Funding is provided for the following efforts in FY18 and 19.</p> <p><b>FY 2018 Plans:</b> Continue model based systems engineering tool maturation of multiple analytical tools, Base Camp Master Planning Tool ? Contingency Base Interface to the Warfighter (CBIWar), an initial transfer of systems data to the Joint Construction Management System (JCMS), and perform an Initial Operational Capability (IOC) review.</p> <p><b>FY 2019 Base Plans:</b> Funding is planned to continue model based systems engineering tool maturation of multiple analytical tools, Base Camp Master Planning Tool, Contingency Basing Interface to the Warfighter (CBIWar), update systems data to the Joint Construction Management System (JCMS), and perform Design Charrettes in support of</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EC9 / <i>Contingency Basing Infrastructure</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
finalizing the Core Set Development of the Armor Brigade Combat Team (ABCT) Base Camp and beginning the Stryker Brigade Combat Team (SBCT) Base Camp layout.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease from FY18 to FY19 are due to transfer of RDTE to OMA for PEO Core Salaries.					
<b>Title:</b> Integrated Analysis and Design	1.208	1.652	1.595	-	1.595
<b>Description:</b> CBI employs Systems Engineers, Operational Research System Analysts and collaborates with Sandia National Laboratories to provide the methodologies, modeling and analysis engines, and the analysis required to recommend and mature the optimized equipment sets that comprise a base camp. Optimized sets range from Platoon to Brigade sized camps in Armor, Infantry, Stryker, Medical, and Logistic camps that optimize the usage of fuel, water, waste and manpower. Funding is provided for the following efforts in FY 18 and 19.					
<b>FY 2018 Plans:</b> Funding is planned to support Initial Operational Capability of our toolset that will support portfolio maturation, integration and analytical evaluation. Additionally, providing analysis to the FY22 contingency basing infrastructure enhanced equipment set to support PD CBI's Annual Report which will inform Army Project Managers and other decision makers the resource implications of their respective product lines and provide investment recommendations for POM 21-25.					
<b>FY 2019 Base Plans:</b> Funding is planned to support an Integrated Design Review in support of the Core Set Development of the Armor Brigade Combat Team (ABCT) Base Camp layout. Funding is also planned to begin the Core Set Development of the Stryker Brigade Combat Team Base Camp Layout. Additionally, providing analysis to the FY23 contingency basing infrastructure enhanced equipment set to support PD CBI's Annual Report which will inform Army Project Managers and other decision makers the resource implications of their respective product lines and provide investment recommendations for the next POM (FY22-26).					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease from FY18 to FY19 are due to transfer of RDTE to OMA for PEO Core Salaries.					
<b>Title:</b> Capabilities Implementation and Materiel Requirements	0.659	0.673	0.686	-	0.686

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EC9 / <i>Contingency Basing Infrastructure</i>

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p><b>Description:</b> CBI employs System Integrators and Engineering Technicians to develop, update and refine system data set strategies of equipment using the developed optimized base camp designs. Funding is provided for the following efforts in FY18 and 19.</p> <p><b>FY 2018 Plans:</b> Funding is planned to continue supporting the development of the design of different sized contingency base camps, capability sets specifically focusing on enhancement sets, and establishment of a configuration management plan to manage the base camp capability sets.</p> <p><b>FY 2019 Base Plans:</b> Funding is planned to continue supporting the development of the design of different sized contingency base camps, capability sets specifically focusing on expansion sets, and the planning to manage the base camp capability sets.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease from FY18 to FY19 are due to transfer of RDTE to OMA for PEO Core Salaries.</p>					
<p><b>Title:</b> Program Management</p> <p><b>Description:</b> Programmatic support and oversight of cost schedule, performance, risk and operational activities in managing the product office. Funding is provided for the following efforts in FY18 and 19.</p> <p><b>FY 2018 Plans:</b> Oversight and management of integrated analysis and design, capabilities implementation and materiel requirements, and toolset development. Funding to support managing cost, schedule, performance, risk, personnel, and operational activities. Also oversight, analysis and management of operational energy related impacts and technology gaps. Funding will continue to support the review and staffing of the Joint Publication for Contingency Basing.</p> <p><b>FY 2019 Base Plans:</b> Oversight and management of integrated analysis and design, capabilities implementation and materiel requirements, and toolset development. Funding to support managing cost, schedule, performance, risk, personnel, and operational activities. Also oversight, analysis and management of operational energy related</p>	0.868	0.883	0.229	-	0.229

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EC9 / <i>Contingency Basing Infrastructure</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
impacts and technology gaps. Funding will continue to support the review the Facilities Capability Development Document (CDD) which will include master planning capability of base camps.					
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> Decrease from FY18 to FY19 are due to transfer of RDTE to OMA for PEO Core Salaries.					
<b>Accomplishments/Planned Programs Subtotals</b>	3.470	3.946	3.061	-	3.061

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Not applicable for this item.

**E. Performance Metrics**

N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EC9 / <i>Contingency Basing Infrastructure</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	Various	PM E2S2 / PEO CS&CSS : Fort Belvoir, VA / Warren, MI	1.180	0.868		0.883		0.229		-		0.229	0.000	3.160	-
<b>Subtotal</b>			1.180	0.868		0.883		0.229		-		0.229	0.000	3.160	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Toolset Development	Various	Various : Various	1.558	0.735		0.738		0.551		-		0.551	0.000	3.582	Continuing
Integrated Analysis and Design	Various	Various : Various	2.603	1.208		1.652		1.595		-		1.595	0.000	7.058	Continuing
Capabilities Implementation and Materiel Requirements	Various	Various : Various	0.901	0.659		0.673		0.686		-		0.686	0.000	2.919	Continuing
<b>Subtotal</b>			5.062	2.602		3.063		2.832		-		2.832	0.000	13.559	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	6.242	3.470	3.946	3.061	-	3.061	0.000	16.719	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EC9 / <i>Contingency Basing Infrastructure</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023																														
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																											
Toolset Development	[Redacted]																																																						
Integrated Design Review #2 (IDR2)	▲ 1 IDR2																																																						
Integrated Analysis and Design	[Redacted]																																																						
Demo 3, Developmental Toolset Demonstration (DTD)																												▲ 2 DTD																											
Demo 4, Operational Toolset Demonstration (OTD)																												▲ 3 OTD																											
Initial Data Transition to JCMS, Initial Operational Capability (IOC)																												▲ 4 IOC																											
Armor Brigade Combat Team Core, Expansion/Enhancement Sets (ABCT)																												[Redacted]																											
Striker Brigade Combat Team Core, Expansion/Enhancement Sets (SBCT)																												[Redacted]																											
Logistics/Air Base Expansion/Enhancement Sets (LB/AB)																												[Redacted]																											
Medical, Expansion/Enhancement Sets (MED)																												[Redacted]																											
Final Data Transition to JCMS, Full Operational Capability (FOC)																												[Redacted]																											
Capabilities Implementation and Materiel Requirements	[Redacted]																																																						
Program Management	[Redacted]																																																						

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EC9 / <i>Contingency Basing Infrastructure</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Infantry Brigade Combat Team, Core, Expansion/Enhancements Sets (IBCT)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EC9 / <i>Contingency Basing Infrastructure</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Toolset Development	1	2016	4	2023
Integrated Design Review #2 (IDR2)	2	2017	2	2017
Integrated Analysis and Design	1	2016	4	2023
Demo 3, Developmental Toolset Demonstration (DTD)	3	2017	3	2017
Demo 4, Operational Toolset Demonstration (OTD)	4	2017	4	2017
Initial Data Transition to JCMS, Initial Operational Capability (IOC)	4	2018	4	2018
Armor Brigade Combat Team Core, Expansion/Enhancement Sets (ABCT)	2	2018	1	2019
Striker Brigade Combat Team Core, Expansion/Enhancement Sets (SBCT)	2	2019	1	2020
Logistics/Air Base Expansion/Enhancement Sets (LB/AB)	2	2020	1	2021
Medical, Expansion/Enhancement Sets (MED)	2	2021	1	2022
Final Data Transition to JCMS, Full Operational Capability (FOC)	2	2023	2	2023
Capabilities Implementation and Materiel Requirements	1	2016	4	2023
Program Management	1	2016	4	2023
Infantry Brigade Combat Team, Core, Expansion/Enhancements Sets (IBCT)	2	2017	1	2018

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>					<b>Project (Number/Name)</b> EJ9 / <i>Maneuver Support Vessel -Light (MSV-L)</i>		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EJ9: <i>Maneuver Support Vessel - Light (MSV-L)</i>	-	14.748	28.906	34.245	-	34.245	20.318	7.030	0.000	0.000	0.000	105.247
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Maneuver Support Vessel (Light) (MSV(L)) program element supports the Engineering and Manufacturing Development (EMD) phase of the program. The MSV(L) is a multifunctional waterborne mobility platform, which displaces the current Landing Craft Mechanized-8 (LCM-8). The LCM-8 does not have the speed, functional draft (shallow water capability), and maneuver capability to move today's Army; cannot transport an Abrams tank. The MSV(L) provides a waterborne corridor for movement and maneuver; expeditionary delivery of combat configured equipment, troops, and logistics, in austere anti-access/area denial environments; and operational capability from ship to shore and along coastal waters, narrow inland water ways, and rivers. This vessel's capability supports transporting multiple combat configured ready-to-fight payloads with crew (i.e. an Abrams tank; or two Strykers with bar armor; or four Joint Light Tactical Vehicles (JLTVs); or two 20 ft. or one 40 ft. ISO container (Intermodal container); or a Heavy Expandable Mobility Tactical Truck (HEMTT); or a Load Handling System (LHS), and trailer). The MSV(L) will incorporate new roll-through capability via stern access and bow ramps. The MSV(L) provides the capability to operate fully loaded at a speed of 15 knots in Beaufort Sea Scale 3 conditions, while being survivable (seaworthy) in Beaufort Sea Scale 7 conditions. The vessel's force protection attributes includes a subsurface surveillance device for obstacle detection and avoidance, protection from small arms fire, and two Common Remotely Operated Weapon Stations (CROWS II) for vessel defense, and the capacity to mitigate detection through reduction of thermal and acoustic signature. The MSV(L) provides increased capability that moves combat configured forces and supplies more efficiently than the LCM-8.

Army Watercraft funding supports initiatives to enhance the seaworthiness, safety, and survivability while increasing the lethality, tactical mobility, and operational capability of the Army Mariner. Vessel lethality/Escalation of Force measures have increasingly become an area of vital concern to the Combatant Commanders (CCDR) given the requirement to preserve "freedom of the seas" access in all areas of the world, particularly the littorals, to support maneuver operations in all Areas of Responsibility.

FY19 funding will support completion of the contractor's design, full scale prototype build, testing and evaluation activities, and initial logistics assessments.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Engineering and Manufacturing Development (EMD) Contract	9.126	22.039	30.525	-	30.525
<b>Description:</b> The EMD phase of the contract includes system engineering and analysis to support execution of the Preliminary Design Review (PDR), Critical Design Review (CDR), Contract Systems Integration Laboratory (CSIL) fabrication, model basin testing, production of full-scale prototype vessel and required testing. In					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EJ9 / <i>Manuever Support Vessel -Light (MSV-L)</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>addition, deliverables include development of Integrated Product Support (IPS) analysis and products, as well as, development of Technical Data Package (TDP).</p> <p><b>FY 2018 Plans:</b> FY18 will include system engineering analysis to support execution of the Critical Design Review (CDR), completion and testing of CSIL, model basin testing, and authorization for the production of full-scale prototype vessel. The funding increase in FY18 is a result of cost associated with the build of the MSV(L) full-scale prototype. The current schedule is an estimate. Schedule revisions will occur after contract award which may include acceleration in the program if FY17 and FY18 funding remains intact.</p> <p><b>FY 2019 Base Plans:</b> FY19 will include building of the full scale prototype vessel, testing and evaluation activities, and initial logistics assessments.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase is due to the cost of the activities that will occur in FY19.</p>					
<p><b>Title:</b> Government Test and Evaluation Support</p> <p><b>Description:</b> Government test support.</p> <p><b>FY 2018 Plans:</b> Government oversight of model basin and CSIL testing.</p> <p><b>FY 2019 Base Plans:</b> Contract Systems Integration Laboratory (CSIL) testing and evaluation activities.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease is due to costs of the activities that will occur in FY19.</p>	-	0.490	0.300	-	0.300
<p><b>Title:</b> Government Furnished Equipment (GFE)</p> <p><b>Description:</b> GFE for prototype vessel consists of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR).</p> <p><b>FY 2018 Plans:</b></p>	1.243	1.000	0.125	-	0.125

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EJ9 / <i>Manuever Support Vessel -Light (MSV-L)</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
GFE is required to support the full size prototype vessel. <b>FY 2019 Base Plans:</b> GFE is required to support the full size prototype vessel. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> no change					
<b>Title:</b> Program Management / Systems Engineering <b>Description:</b> PM/Matrix Support includes PM and systems engineering oversight required to manage the program and provide contractor oversight. Salaries for support through the EMD phase. <b>FY 2018 Plans:</b> Funds will cover salaries for Core and Matrix support, contract execution, program management and contractor oversight. <b>FY 2019 Base Plans:</b> Funds will cover matrix salaries for program management and engineering support to include contract execution and contractor oversight. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease is due to staffing changes to coordinate with EMD phase activities and support only includes matrix employees and Naval Architects.	3.872	3.977	3.008	-	3.008
<b>Title:</b> Program Management Support Contract <b>Description:</b> Program Management and Contract Support for MSV(L). <b>FY 2018 Plans:</b> Program Management Support to support MSV(L) contract execution. <b>FY 2019 Base Plans:</b> Program Management Support to support MSV(L) for Cyber Security, Contract Data Requirement List (CDRL) management, IMS support, and program documentation. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> No change	0.507	0.750	0.287	-	0.287
<b>Title:</b> Naval Architecture Support	-	0.650	-	-	-

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EJ9 / <i>Maneuver Support Vessel -Light (MSV-L)</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p><b>Description:</b> Naval architecture support and travel expenses - now included in PM Systems engineering support.</p> <p><b>FY 2018 Plans:</b> Naval Architecture to support MSV(L) contract execution.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Accounted for in Program Management Systems Engineering.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	14.748	28.906	34.245	-	34.245

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• R03050: <i>Maneuver Support Vessel (Light) (MSV-L)</i>	-	-	0.000	-	0.000	6.939	77.081	82.000	92.184	0.000	258.204

**Remarks**  
 The MSV(L) was a new start program beginning in FY16. APE 0603804, Project 526 provided resourcing for research and development support to this program prior to the receipt of funding in Feb 16.  
 Significant Achievements:  
 - The Contract was awarded on 28 Sep 17 to Vigor Works, LLC.  
 - On 22 Sep 17, obtained MDA approval for Milestone B and entry into the EMD phase.  
 - The RFP was released on 27 Oct 16 and closed on 30 Jan 17. The SSEB commenced 30 Jan 17.

**D. Acquisition Strategy**  
 The MSV(L) will enter at MS B with an EMD Phase, followed by Low Rate Initial Production (LRIP) and Full Rate Production (FRP). The acquisition strategy is to have a full and open competition with a down select from paper designs to one contractor at MS B. The contract will award one 10 year contract to a single vendor comprised of EMD followed by the production and development phase. Model basin testing will occur after successful execution of PDR. This sequence of events mitigate risks prior to the authorization of building the full size prototype. The full size prototype will undergo testing which will inform the Capability Production Document (CPD). Following successful prototype testing, at Knowledge Point (KP) 6, the program will transition to the Other Procurement Army (OPA) funding, and initiate LRIP. Upon MS C approval, the Government will authorize the Production and Deployment phase.



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Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / Logistics and Engineer Equipment - Eng Dev	Project (Number/Name) EJ9 / Maneuver Support Vessel -Light (MSV-L)

**E. Performance Metrics**

At MS B, The Acquisition Program Baseline (APB) established cost, schedule, and performance metrics. Per the contract, the contractor will provide monthly cost and performance deliverables.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> EJ9 / Maneuver Support Vessel -Light (MSV-L)
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<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering and Manufacturing Development (EMD)	C/FP	Vigor Works, LLC : Clackamas, OR	-	9.126	Sep 2017	22.039	Feb 2018	30.525	Feb 2019	-		30.525	53.073	114.763	88.820
Government Furnished Equipment (GFE)	Reqn	Various : Various	1.029	1.243	Aug 2017	1.000	Jul 2018	0.125	Jan 2019	-		0.125	0.000	3.397	-
Information Support Plan (ISP)	SS/CPFF	ACC Warren, MI : Warren, MI	1.637	-		-		-		-		-	0.000	1.637	2.278
<b>Subtotal</b>			2.666	10.369		23.039		30.650		-		30.650	53.073	119.797	N/A

**Remarks**  
Contract was awarded on 28 Sep 2017 to Vigor Works, LLC. GFE is required to support a full size prototype build.

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Salaries for Matrix Personnel Army Watercraft, TARDEC, ILSC PSID.	MIPR	Detroit Arsenal : Warren, MI 48397-5000	5.470	3.872	Oct 2016	3.977	Oct 2017	3.008	Oct 2018	-		3.008	Continuing	Continuing	-
Salaries/Travel for Naval Architecture Support	C/CPFF	Picatinny Arsenal, New Jersey 07806-5000 : Warren, MI 48397-5000	0.110	-		0.650		-		-		-	0.000	0.760	-
Salaries / Travel for Program Management Support	C/CPFF	Picatinny Arsenal, New Jersey 07806-5000 : Warren, MI 48397-5000	1.421	0.507	Jul 2017	0.750	Oct 2017	0.287	Oct 2018	-		0.287	Continuing	Continuing	-
<b>Subtotal</b>			7.001	4.379		5.377		3.295		-		3.295	Continuing	Continuing	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EJ9 / <i>Maneuver Support Vessel -Light (MSV-L)</i>
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation - Government	MIPR	ATEC: APG : APG, MD	-	-		0.490	Oct 2017	0.300	Oct 2018	-		0.300	Continuing	Continuing	-
<b>Subtotal</b>			-	-		0.490		0.300		-		0.300	Continuing	Continuing	N/A

**Remarks**  
No Government test and evaluation took place in FY17.

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	9.667	14.748	28.906	34.245	-	34.245	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EJ9 / <i>Maneuver Support Vessel -Light (MSV-L)</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
Salaries for Core, Matrix Support	[Blue bar spanning all quarters from FY 2017 to FY 2021]																																			
Milestone B				▲ 1																																
Contract Award - Knowledge Point 2				▲ 2																																
Preliminary Design Review (PDR) - Knowledge Point 3								▲ 3																												
Modeling and Simulation								▲ 4																												
Contractor System Integration Laboratory (CSIL)									[Blue bar spanning all quarters from FY 2018 to FY 2021]																											
Model Basin Testing - Knowledge Point 4																																				
Critical Design Review (CDR) - Knowledge Point 5																																				
Prototype Build																																				
Prototype Test and Evaluation (includes Subsystem tests)																																				
Knowledge Point 6 (KP6) - Transition to OPA Funding																																				
Milestone C																																				

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EJ9 / <i>Maneuver Support Vessel -Light (MSV-L)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Salaries for Core, Matrix Support	4	2016	4	2021
Milestone B	4	2017	4	2017
Contract Award - Knowledge Point 2	4	2017	4	2017
Preliminary Design Review (PDR) - Knowledge Point 3	2	2018	2	2018
Modeling and Simulation	2	2018	2	2018
Contractor System Integration Laboratory (CSIL)	2	2018	4	2021
Model Basin Testing - Knowledge Point 4	3	2018	4	2018
Critical Design Review (CDR) - Knowledge Point 5	4	2018	4	2018
Prototype Build	1	2019	2	2020
Prototype Test and Evaluation (includes Subsystem tests)	3	2019	2	2021
Knowledge Point 6 (KP6) - Transition to OPA Funding	4	2020	4	2020
Milestone C	4	2021	4	2021

**Note**

As long as program funding remains in place, PD AWS will assess designated Knowledge Points to determine opportunities for program acceleration. KP6: Successful completion of Prototype Testing with Contractor - Transition to OPA funding.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>				<b>Project (Number/Name)</b> FG4 / <i>Ultra-Lightweight Camouflage Net System (ULCANS)</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
FG4: <i>Ultra-Lightweight Camouflage Net System (ULCANS)</i>	-	13.600	2.972	3.392	-	3.392	2.992	1.604	1.501	1.778	0.000	27.839
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

ULCANS provides increased survivability against multi-spectral visual, infrared and radar threats, thermal signature suppression and significant thermal/solar reduction capability. ULCANS is capable of use in all types of weather and climatic conditions except in heavy snow and winds. ULCANS variants are integrated systems that are very lightweight, easily deployable, versatile, user friendly and tailored to the equipment meeting the requirements of operations for combat systems, command and control equipment, logistic support sites, tactical facilities, and fixed facilities. RDT&E funding for ULCANS Increment I program supports formal development for necessary technology/signature enhancements of three ULCANS Increment I variants (Woodland, Arctic, Desert/Urban) to replace current legacy ULCANS variants (Woodland and Desert).

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Ultra-lightweight Camouflage Net System (ULCANS)	13.600	2.972	3.392	-	3.392
<b>Description:</b> ULCANS is durable, robust, snag resistant state of the art camouflage system that provides increased survivability against multi-spectral visual, infrared and radar threats, thermal signature suppression and significant thermal/solar reduction capability. ULCANS utilizes a snag-free design and is capable of use in all types of weather and climatic conditions except in heavy snow and winds. ULCANS variants are integrated systems that are very lightweight, easily deployable, versatile, user friendly and tailored to the equipment meeting the requirements of operations for combat systems, command and control equipment, logistic support sites, tactical facilities, and fixed facilities. RDT&E funding for ULCANS Increment I program supports formal development for necessary technology/signature enhancements of three ULCANS Increment I variants (Woodland, Arctic, Desert/Urban) to replace current legacy ULCANS variants (Woodland and Desert).					
<b>FY 2018 Plans:</b> Obtain Milestone B decision authorizing ULCANS Increment I to enter Engineering and Manufacturing Development (EMD). Award development contract, procure/build test items for Woodland, Arctic, and Desert/Urban Variants and conduct competitive down-select testing to one vendor. Initiate build of Woodland variant test items for Developmental Testing/ Operational Testing (DT/OT).					
<b>FY 2019 Base Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> FG4 / <i>Ultra-Lightweight Camouflage Net System (ULCANS)</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Complete DT/OT and logistics requirements, prepare documentation and obtain Milestone C decision and initiate full production for Woodland variant.  <b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> FY18 to FY19 fund increase required to support extensive EMD testing and logistics effort for transition to production.					
<b>Accomplishments/Planned Programs Subtotals</b>	13.600	2.972	3.392	-	3.392

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• VR7: <i>Combat Service Support Systems</i>	4.159	3.743	4.533	-	4.533	6.132	4.819	5.271	3.064	0.000	31.721
• VR8: <i>Combat Service Support Systems - Ad</i>	4.004	5.062	3.222	-	3.222	3.447	3.116	2.587	2.637	0.000	24.075

**Remarks**

**D. Acquisition Strategy**  
Accelerate product development and testing to transition into production.

**E. Performance Metrics**  
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604804A / Logistics and Engineer Equipment - Eng Dev				FG4 / Ultra-Lightweight Camouflage Net System (ULCANS)								
<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
ULCANS	Various	PMFSS : Natick, MA	-	1.000		0.872		0.990		-		0.990	0.000	2.862	-	
<b>Subtotal</b>			-	1.000		0.872		0.990		-		0.990	0.000	2.862	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
ULCANS Increment I Woodland Variant	C/FFP	PMFSS : Natick, MA	-	4.000		0.750		0.857		-		0.857	0.000	5.607	-	
ULCANS Increment I Arctic Variant	C/FFP	PMFSS : Natick, MA	-	4.000		0.750		0.857		-		0.857	0.000	5.607	-	
<b>Subtotal</b>			-	8.000		1.500		1.714		-		1.714	0.000	11.214	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
ULCANS Increment I Woodland Variant	Various	Various : Various	-	2.300		0.300		0.325		-		0.325	0.000	2.925	-	
ULCANS Increment I Arctic Variant	Various	Various : Various	-	2.300		0.300		0.363		-		0.363	0.000	2.963	-	
<b>Subtotal</b>			-	4.600		0.600		0.688		-		0.688	0.000	5.888	N/A	
<b>Project Cost Totals</b>			-	13.600		2.972		3.392		-		3.392	0.000	19.964	N/A	
<b>Remarks</b>																



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> FG4 / <i>Ultra-Lightweight Camouflage Net System (ULCANS)</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Prepare development contract for ULCANS Increment I	█																											
Conduct contract source selection for development contract					█																							
Prepare documentation to support MS B decision for ULCANS Increment I	█																											
Obtain MS B decision for ULCANS Increment I Program					▲ 1																							
Award development contract and procure test items for all Increment I Variants					▲ 2																							
Build test items for ULCANS variants, conduct competitive down-select to vendor					█																							
EMD testing for Woodland Variant									█																			
Complete logistics requirements to support MS C production decision for Woodland									█																			
Obtain MS C production decision for Woodland Variant									▲ 3																			
Prepare documentation for development decision for Arctic/Alpine variant									█																			
Obtain development decision for Arctic/Alpine Variant													▲ 4															
EMD testing for Arctic/Alpine Variant													█															
Complete logistic requirement to support MS C decision for Arctic/Alpine Variant													█															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> FG4 / <i>Ultra-Lightweight Camouflage Net System (ULCANS)</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Obtain production decision for Arctic/Alpine Variant																▲6												
Prepare documentation for tailored development decision for Desert/Urban Variant													■	■	■	■												
Obtain development decision for Desert/Urban Variant															▲5													
EMD testing for Desert/Urban Variant													■	■	■	■	■	■	■	■								
Complete logistics requirement to support MS C decision for Desert/Urban Variant													■	■	■	■	■	■	■	■								
Obtain production decision for Desert/Urban Variant																			▲7									
EMD for Emerging Sensor Threat Requirements																	■	■	■	■	■	■	■	■	■	■	■	■

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> FG4 / <i>Ultra-Lightweight Camouflage Net System (ULCANS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Prepare development contract for ULCANS Increment I	1	2017	4	2017
Conduct contract source selection for development contract	4	2017	2	2018
Prepare documentation to support MS B decision for ULCANS Increment I	3	2017	2	2018
Obtain MS B decision for ULCANS Increment I Program	2	2018	2	2018
Award development contract and procure test items for all Increment I Variants	2	2018	2	2018
Build test items for ULCANS variants, conduct competitive down-select to vendor	3	2018	4	2018
EMD testing for Woodland Variant	1	2019	2	2019
Complete logistics requirements to support MS C production decision for Woodland	1	2019	3	2019
Obtain MS C production decision for Woodland Variant	3	2019	3	2019
Prepare documentation for development decision for Arctic/Alpine variant	2	2019	4	2019
Obtain development decision for Arctic/Alpine Variant	1	2020	1	2020
EMD testing for Arctic/Alpine Variant	1	2020	3	2020
Complete logistic requirement to support MS C decision for Arctic/Alpine Variant	1	2020	4	2020
Obtain production decision for Arctic/Alpine Variant	4	2020	4	2020
Prepare documentation for tailored development decision for Desert/Urban Variant	1	2020	3	2020
Obtain development decision for Desert/Urban Variant	3	2020	3	2020
EMD testing for Desert/Urban Variant	3	2020	1	2022
Complete logistics requirement to support MS C decision for Desert/Urban Variant	3	2020	3	2021
Obtain production decision for Desert/Urban Variant	3	2021	3	2021
EMD for Emerging Sensor Threat Requirements	1	2021	4	2023

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>				<b>Project (Number/Name)</b> H01 / <i>Combat Engineer Eq Ed</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
H01: <i>Combat Engineer Eq Ed</i>	-	2.192	3.889	2.745	-	2.745	2.796	4.769	5.929	3.691	0.000	26.011
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project supports the engineering, manufacturing, and development of combat engineer equipment used in support of horizontal and vertical engineer construction tasks, and to develop a variety of enabling systems that will support and improve mobility for Engineers in the Brigade Combat Teams (BCT), Combat Support Brigade (CSB), and Multi-Roll Bridge Company (MRBC) forces. This project also supports the development of enabling systems to meet critical capabilities of joint interdependence through Air and Ground Line of Communication and Rapid Tactical Earthmoving repair and construction which increase the operational reach of modular forces. Systems that support BCT and CSB forces include: High Mobility Engineer Excavators, Scrapers, Scoop Loaders, Skid Steer Loaders, Dozers, Cranes, Graders, and emerging armor solutions. Systems that support the MRBC forces include Hydraulic Excavators (HYEX) and Enhanced Rapid Airfield Construction Capability (ERACC).

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Driver Assist	1.265	0.453	0.324	-	0.324
<b>Description:</b> Research and demonstrate technologies that will enhance operations such as the inclusion of cameras, collision sensors, and lifting aids.					
<b>FY 2018 Plans:</b> Integrate Commercial-off-the-Shelf (COTS) cameras, similar to backup cameras, and collision warning sensors to increase situational awareness of CE operator. Will result in the production representative prototype on vehicle by end of Fiscal Year 2021. Test and validate additional fork carriages for fielded loaders.					
<b>FY 2019 Base Plans:</b> Drive Assist - Continue integration of Commercial-off-the-Shelf (COTS) cameras, similar to backup cameras, and collision warning sensors to increase situational awareness of CE operator. Will result in the production representative prototype on vehicle by end of Fiscal Year 2021.					
Drive Assist Machine Control - Development of additional technology to allow the machine to autonomously control and prevent unsafe operating conditions such as braking to avoid objects or to prevent roll overs.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H01 / <i>Combat Engineer Eq Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Funding increase from FY2018 to FY2019 to addition of Drive Assist Machine Control efforts.					
<p><b>Title:</b> Operational Efficiency</p> <p><b>Description:</b> Evaluate emerging technologies that can improve machine productivity and efficiency such as baseline fuel efficiency, engine management, efficient lubricants, and hydraulic technologies.</p> <p><b>FY 2018 Plans:</b> Work with TARDEC Force Projection Technology group to test and qualify additional lubricants/hydraulic fluids which increase efficiency and decrease chance intervals. Research additional hydraulic control systems which have the potential to increase efficiency of systems. Continue to develop duty cycles for improved efficiencies. Conduct basic research into the possibility of having a hybrid solution developed to integrate into systems already fielded.</p> <p><b>FY 2019 Base Plans:</b> Work with TARDEC Force Projection Technology group to test and qualify additional lubricants/hydraulic fluids which increase efficiency and decrease chance intervals. Research additional hydraulic control systems which have the potential to increase efficiency of systems. Continue to develop duty cycles for improved efficiencies. Conduct basic research into the possibility of having a hybrid solution developed to integrate into systems already fielded.</p>	-	0.100	0.100	-	0.100
<p><b>Title:</b> System Engineering/Program Management</p> <p><b>Description:</b> Provide funding for System Engineering and Program Management support costs.</p> <p><b>FY 2018 Plans:</b> Provide funding for System Engineering and Program Management support costs.</p> <p><b>FY 2019 Base Plans:</b> Provide funding for System Engineering and Program Management support costs.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding increase from FY2018 to FY2019 is due to additional Man-Years required to support research, development, and testing efforts of the Hydraulic Excavators (HYEX) vehicles.</p>	0.450	0.450	1.037	-	1.037
<p><b>Title:</b> Technology Insertion/System Improvement</p> <p><b>Description:</b> Work with Maneuver Support Center of Excellence (MSCoE) to test and integrate hardware to increase platform capability and performance. Develop prototype systems to provide additional machine</p>	0.477	0.575	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H01 / <i>Combat Engineer Eq Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>capability. This may include sweepers, buckets, lift devices, sand-bag filler auger, expandable tines for +48" center load pallets, and fork enhancements.</p> <p><b>FY 2018 Plans:</b> Survey Combat Engineer Equipment fleet to determine what systems have obsolete technology which will not be procurable as spares for the remaining Life Cycles of the systems. Research additional technologies to improve the maintenance and operating efficiencies. Procure and evaluate the commercially available technology to replace aging components which include new engine/hydraulic controllers, joystick controls, lighting, etc. Maintenance improvements can include self-lubrication systems. Integrate and evaluate the improvement in the military environment and assess the benefits to the Soldier. Work with Maneuver Support Center of Excellence (MSCoE) and maintenance personnel to identify systems and what areas of machine maintenance are critical for increasing operational availability.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding decrease from FY2018 to FY2019 is due to completion of efforts in FY2018.</p>					
<p><b>Title:</b> Mine Clearing Armor Protection (MCAP)</p> <p><b>Description:</b> Evaluate and integrate technologies to increase operator protection and safety during mine clearing missions. Mine Clearing Armor Protection (MCAP) Dozers were built on legacy D7G. These systems are being replaced by the D7R and will require additional equipment to allow for use in completing the MCAP mission. This includes providing greater operator protection as well as additional tools for conducting the mine clearing operation.</p> <p><b>FY 2018 Plans:</b> Review the requirements for crew protection and conduct a cost/performance trade off to determine if the best way to protect the operator is to increase the armor protection or remove the operator from the cab. Research blade design to ensure the mine clearing capability is sufficient for meeting the requirement of the MCAP mission.</p> <p><b>FY 2019 Base Plans:</b> Complete analysis of alternatives (AOA) of solutions to increase the armor protection or remove the operator from the cab, and research of blade design to ensure the mine clearing capability is sufficient for meeting the requirement of the MCAP mission. Integrate mine clearing capabilities into Dozer vehicles.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b></p>	-	1.512	0.499	-	0.499

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H01 / <i>Combat Engineer Eq Ed</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Funding decrease from FY2018 to FY2019 is due to reduced Man-Year requirements to support the MCAP efforts, which will be completed in FY2019.					
<p><b>Title:</b> Forced Entry (Airborne/Air Assault) Study/Development</p> <p><b>Description:</b> Explore options of using Program of Record systems to meet Forced Entry requirements.</p> <p><b>FY 2018 Plans:</b> Conduct feasibility study for an Air Assault version of the 120M Grader which will be capable of being transported by helicopter. This will include provisions for splitting the 120M into multiple parts and reassembly in the field.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Reduced funding from FY2018 to FY2019 is due to completion of the efforts in FY2018.</p>	-	0.200	-	-	-
<p><b>Title:</b> Weight Reduction in Transparent Armor (TA)</p> <p><b>Description:</b> Investigate technologies that will reduce the weight in TA while maintaining current protection levels or technologies that will increase protection levels with no or minimal increase in weight.</p> <p><b>FY 2018 Plans:</b> Work under the TARDEC TA Small Business Innovative Research (SBIR) program which has already shown positive result to quality TA at the protection level and continue to develop one level higher.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Reduced funding from FY2018 to FY2019 is due to completion of effort in FY2018.</p>	-	0.200	-	-	-
<p><b>Title:</b> D9 Dozer Armor Cab Reverse Engineering</p> <p><b>Description:</b> The Armored D9 dozer is a low density/specialized equipment used for shaping the battlefield while providing protection for the operator. When originally procured, the Army did not purchase technical data related to the Crew Protection Kit (CPK) and relied on the CPK Original Equipment Manufacturer (OEM) to supply parts and support. The CPK OEM is no longer able to provide support and the technical data is unavailable. Reverse engineering of the CPK is required to provide the technical knowledge allowing continued support for the system.</p> <p><b>FY 2018 Plans:</b></p>	-	0.399	0.785	-	0.785

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H01 / <i>Combat Engineer Eq Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Ship an existing D9 Armored cab to TARDEC for use and planning purposes. Cab will be assessed to determine the best method for Reverse Engineering.  <b>FY 2019 Base Plans:</b> Execute the reverse engineering effort to include the develop of Level 3 Technical Data Packages (TDP) and fabrication/test of an armored cab.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding increase from FY2018 to FY2019 is due to increased Man-Year support costs needed for the development of Level 3 TDP, in addition to fabrication and testing of the armored cab.					
<b>Accomplishments/Planned Programs Subtotals</b>	2.192	3.889	2.745	-	2.745

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• R05901: <i>High Mobility Engineer Excavator</i>	20.563	66.271	46.048	25.700	71.748	27.188	8.351	3.199	16.422	Continuing	Continuing
• R03801: <i>Grader, Mtzd, Hvy</i>	4.789	0.989	0.000	-	0.000	-	-	-	-	0.000	5.778
• X01500: <i>Hydraulic Excavator</i>	1.123	3.850	1.355	-	1.355	-	-	2.400	20.185	Continuing	Continuing
• M06100: <i>Tractor Full Tracked, Med T-9</i>	5.311	-	0.000	-	0.000	2.685	-	-	-	0.000	7.996
• R06701: <i>All Terrain Cranes</i>	67.790	8.935	13.031	-	13.031	17.057	31.445	38.061	35.566	Continuing	Continuing
• R02800: <i>Scraper, Earthmoving</i>	26.233	11.180	7.961	-	7.961	-	-	11.960	11.960	0.000	69.294
• R07001: <i>Enhanced Rapid Airfield Construction Capap</i>	2.779	2.563	0.980	-	0.980	0.979	3.557	9.819	18.037	0.000	38.714
• R07003: <i>ERACC II Enhanced Earthmoving</i>	2.779	2.563	0.980	-	0.980	0.979	1.483	6.775	6.966	Continuing	Continuing
• M05500: <i>Const Equip ESP</i>	15.338	19.032	37.017	-	37.017	35.790	22.249	24.950	23.382	Continuing	Continuing
• ML5350: <i>Items Less Than \$5.0M (Const Equip)</i>	8.075	6.899	6.103	-	6.103	4.381	-	1.410	1.410	0.000	28.278

**Remarks**



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Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / Logistics and Engineer Equipment - Eng Dev	Project (Number/Name) H01 / Combat Engineer Eq Ed

**D. Acquisition Strategy**

Conduct research, development, and investigations on future Construction Equipment (CE) and identify the path forward for programs of record (POR) to be transitioned for Program Executive Officer Program Management. Identify technical advancements that can improve safety, reliability, survivability, transportability, availability, maintainability and reduce the logistical footprints for current and future CE equipment.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H01 / <i>Combat Engineer Eq Ed</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
SBIR+STIR	TBD	TACOM : Warren, Michigan	0.167	-		-		-		-		-	0.000	0.167	-
<b>Subtotal</b>			0.167	-		-		-		-		-	0.000	0.167	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Pre-Award requirements, KPP, selection criteria development, Testing of systems	Various	TACOM & TARDEC : Warren, MI	1.675	-		-		-		-		-	0.000	1.675	-
Driver Assist	TBD	TBD : TBD	2.183	1.265	Dec 2017	0.453	Apr 2018	0.324	Apr 2019	-		0.324	Continuing	Continuing	-
Design Armor Kits for Combat Engineer	Various	TARDEC : Warren, MI	5.995	-		0.399	Dec 2017	0.785	Dec 2018	-		0.785	0.000	7.179	-
Development of Simulator	Various	PEO Stricom : PEO, Stricom, Orlando, FL	8.983	-		-		-		-		-	0.000	8.983	-
Hazard Clearance at Speed	TBD	TARDEC : Warren, Michigan	0.001	-		-		-		-		-	0.000	0.001	-
Forced Entry: (Airborne/ Air Assault) Study/ Development	C/FFP	TBD : TBD	9.288	-		0.200		-		-		-	Continuing	Continuing	-
Market Research	TBD	TARDEC : Warren, Michigan	0.189	-		0.100	Apr 2018	0.100	Apr 2019	-		0.100	Continuing	Continuing	-
Machine Diagnostics	MIPR	Various : Various	0.123	0.477	Mar 2017	-		-		-		-	Continuing	Continuing	-
Technology Insertion/ System Improvement	TBD	TBD : TBD	0.462	-		0.575		-		-		-	Continuing	Continuing	-
Weight Reduction in Transparent Armor (TA)	C/TBD	TBD : TBD	-	-		0.200	Apr 2018	-		-		-	Continuing	Continuing	-
<b>Subtotal</b>			28.899	1.742		1.927		1.209		-		1.209	Continuing	Continuing	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H01 / <i>Combat Engineer Eq Ed</i>
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Engineering/ Program Management	MIPR	TARDEC/TACOM : Warren, Michigan	1.791	0.450	Jan 2017	0.450	Oct 2017	1.037	Oct 2018	-		1.037	Continuing	Continuing	-
<b>Subtotal</b>			1.791	0.450		0.450		1.037		-		1.037	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Operational Efficiency	MIPR	TARDEC, Warren, Michigan : TARDEC, Warren, Michigan	0.319	-		-		-		-		-	0.000	0.319	-
Operational Energy/Duty Cycle Monitoring	TBD	TBD : TBD	0.987	-		-		-		-		-	0.000	0.987	-
Non Nuclear Soil Density Set Testing	TBD	TARDEC : Warren, MI	0.050	-		-		-		-		-	0.000	0.050	-
Mine Clearing Armor Protection (MCAP)	TBD	TBD : TBD	-	-		1.512	Dec 2017	0.499	Dec 2018	-		0.499	Continuing	Continuing	-
<b>Subtotal</b>			1.356	-		1.512		0.499		-		0.499	Continuing	Continuing	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		32.213	2.192	3.889	2.745	2.745	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H01 / <i>Combat Engineer Eq Ed</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Driver Assist																												
System Engineer/Program Support																												
Operational Efficiency																												
Mine Clearing Armor Protection (MCAP)																												
Technology Insertion/System Improvement																												
Market Research																												
Weight Reduction in Transparent Armor (TA)																												
Forced Entry (Airborne/Air Assault) Study/Development																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Driver Assist	1	2018	4	2021
System Engineer/Program Support	1	2018	4	2023
Operational Efficiency	1	2018	4	2023
Mine Clearing Armor Protection (MCAP)	1	2018	4	2022
Technology Insertion/System Improvement	1	2017	4	2019
Market Research	1	2018	4	2023
Weight Reduction in Transparent Armor (TA)	2	2018	4	2019
Forced Entry (Airborne/Air Assault) Study/Development	1	2018	4	2019

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev				<b>Project (Number/Name)</b> H02 / Tactical Bridging - Engineering Development			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
H02: Tactical Bridging - Engineering Development	-	15.197	14.923	12.504	-	12.504	49.454	13.783	23.057	8.343	0.000	137.261
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

The Joint Assault Bridge (JAB) will be funded in PE 643804/EW8 for FY18

**A. Mission Description and Budget Item Justification**

This project supports the engineering and manufacturing development and transition to procurement of Future Force Bridge Systems and support equipment. Funding supports development and testing of the Bridge Supplemental Set (BSS), tests associated with the Low Rate Initial Production (LRIP) phase of the Line of Communication Bridge (LOCB) and Joint Assault Bridge (JAB). This project also funds efforts to upgrade and modernize the Bridging Product Management portfolio through the development of new systems such as the Structural Health Monitoring System, and the Family of Higher Military Load Classification Bridges (FoHMLC-B).

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Joint Assault Bridge (JAB) Development and Testing <b>Description:</b> Funding provided for Joint Assault Bridge (JAB) development and testing.	8.760	-	-	-	-
<b>Title:</b> Line of Communication Bridge (LOCB) Development and Testing <b>Description:</b> Funding for prototype development, commercial bridge analysis, commercial bridge performance assessment, developmental testing and operational testing of the Line of Communication Bridge (LOCB) system. <b>FY 2018 Plans:</b> Funding supports structural strength testing and AATC durability testing. <b>FY 2019 Base Plans:</b> Funding supports operational testing for the Line of Communication Bridge (LOCB) <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding decrease in FY19 is due to completion of RIA bridge development effort in FY18.	2.387	3.698	2.903	-	2.903
<b>Title:</b> Bridge Supplemental Set (BSS) <b>Description:</b> Funding provided to develop a multi-functional, consolidated engineering set consisting of an anchorage system, access/egress traction improvement matting, power generation, tools, and a float bridge	4.050	4.775	4.553	-	4.553

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army			<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>protection device. The BSS is targeted for use with multiple tactical bridging systems to include the Line of Communication Bridge (LOCB), Improved Ribbon Bridge (IRB), and the Dry Support Bridge (DSB). It will also increase the capability of the Multi-Role Bridge Company (MRBC).</p> <p><b>FY 2018 Plans:</b> FY18 RDTE will fund development of contract documents from User requirements, preparing Request(s) for Proposals, source selection evaluation, and award of development contracts for BSS subsystems.</p> <p><b>FY 2019 Base Plans:</b> FY19 RDTE will fund development efforts at Engineering Research and Development Center (ERDC) for the Analytical Hydrodynamics/Structural testing, Anchorage and Bridge Protection Device</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding decrease in FY19 is due to completion of site stability-product qualification testing, anchorage and anchorage developmental testing in FY18.</p>					
<p><b>Title:</b> Family of Higher Military Load Capacity Bridges</p> <p><b>Description:</b> Funding provided to develop the Family of Higher Military Load Classification Bridges (FoHMLC-B). FoHMLC-B will replace Joint Assault Bridge and Dry Support Bridge sections, components and systems to support the heavier weights of next generation combat vehicles.</p> <p><b>FY 2018 Plans:</b> FY18 funds will support developing an analysis of alternatives (AoA) for the Family of Higher MLC Bridges (FoHMLC-B), modeling/simulation, Bridge Lab upgrades, market research and to support MDD approval.</p> <p><b>FY 2019 Base Plans:</b> FY19 funds will support the Family of Higher MLC Bridges (FoHMLC-B) Industry Day, Assault Vehicle Launched Bridge/Dry Support Bridge requirement analysis, and the development for the Requests for Proposals (RFP).</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY18 is the first year of funding for the Family of Higher MLC Bridges (FoHMLC-B)</p>	-	6.450	5.048	-	5.048
<b>Accomplishments/Planned Programs Subtotals</b>	15.197	14.923	12.504	-	12.504

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**Exhibit R-2A, RDT&E Project Justification:** PB 2019 Army **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• G06520: <i>BRIDGE SUPPLEMENTAL SET</i>	-	-	0.000	-	0.000	17.966	33.027	36.029	34.247	0.000	121.269
• GZ3001: <i>Joint Assault Bridge</i>	64.752	128.350	142.255	-	142.255	205.772	226.964	290.954	248.729	Continuing	Continuing
• G82404: <i>LINE OF COMMUNICATION BRIDGE LOCB</i>	11.500	16.610	98.229	-	98.229	60.574	10.559	10.547	10.533	0.000	218.552

**Remarks**

**D. Acquisition Strategy**

Research Development Test & Evaluation efforts to support testing and follow-on production.

**E. Performance Metrics**

N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> H02 / Tactical Bridging - Engineering Development
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<b>Management Services (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
System Engineering and Program Management	MIPR	Various : Various	5.233	1.822	Oct 2016	1.326	Oct 2017	1.100	Oct 2018	-		1.100	Continuing	Continuing	-
<b>Subtotal</b>			5.233	1.822		1.326		1.100		-		1.100	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Joint Assault Bridge Development	C/FFP	DRS/GDLS : Saint Louis, MO/Sterling Hts, MI	51.429	-		-		-		-		-	0.000	51.429	-
Line of Communication Bridge Development	MIPR	Rock Island Arsenal (RIA) : Rock Island, IL	17.495	0.230	Feb 2017	0.800		-		-		-	Continuing	Continuing	Continuing
Bridge Supplemental Set - Anchorage	MIPR	Engineer Research and Development Center : Vicksburg, MS	0.096	1.000	Nov 2016	0.750	Nov 2017	0.250		-		0.250	0.000	2.096	-
Bridge Supplemental Set - Bridge Protection Device	MIPR	Engineer Research and Development Center : Vicksburg, MS	-	0.700	Nov 2016	0.450	Nov 2017	0.150		-		0.150	0.000	1.300	-
Bridge Supplemental Set - Site Stability	MIPR	Engineer Research and Development Center : Vicksburg, MS	-	1.200	Nov 2016	1.350	Nov 2017	0.350		-		0.350	0.000	2.900	-
Bridge Supplemental Set - Power Generation/Tools	MIPR	PM SKOT : Warren, MI	-	0.500	Nov 2016	0.350	Nov 2017	0.150		-		0.150	0.000	1.000	-
Family of High Military Load Capacity Bridges	MIPR	TBS : TBD	-	-		5.574		4.654		-		4.654	Continuing	Continuing	Continuing
Line of Communication Bridge Development Connector Redesign	MIPR	TARDEC : WARREN MI	-	0.500	Mar 2017	-		-		-		-	0.000	0.500	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604804A / Logistics and Engineer Equipment - Eng Dev				H02 / Tactical Bridging - Engineering Development							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
<b>Subtotal</b>			69.020	4.130		9.274		5.554		-		5.554	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Bridge Lab Spt	MIPR	TARDEC - Bridge Lab : Warren, MI	-	0.675	Oct 2016	1.300	Oct 2017	0.800	Oct 2018	-		0.800	0.000	2.775	-
<b>Subtotal</b>			-	0.675		1.300		0.800		-		0.800	0.000	2.775	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Joint Assault Bridge Testing	MIPR	Aberdeen Proving Grounds (APG) : APG, Maryland	17.463	8.000	Mar 2017	-		-		-		-	0.000	25.463	-
Line of Communication Bridge Testing	MIPR	ERDC : Vicksburg, MS	13.853	0.570		2.023		2.150		-		2.150	Continuing	Continuing	Continuing
Bridge Supplemental Set - Anchorage	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		0.250	Nov 2017	1.100	Nov 2018	-		1.100	Continuing	Continuing	Continuing
Bridge Supplemental Set - Bridge Protection Device	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		0.350	Nov 2017	0.750	Nov 2018	-		0.750	Continuing	Continuing	Continuing
Bridge Supplemental Set - Power Generation/Tools	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		0.150	Nov 2017	0.250	Nov 2018	-		0.250	Continuing	Continuing	Continuing
Bridge Supplemental Set - Site Stability	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		0.250	Nov 2017	0.800	Nov 2018	-		0.800	Continuing	Continuing	Continuing
<b>Subtotal</b>			31.316	8.570		3.023		5.050		-		5.050	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>							<b>Date:</b> February 2018				
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>				<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>				
	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>		
<b>Project Cost Totals</b>	105.569	15.197	14.923	12.504	-	12.504	Continuing	Continuing	N/A		

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Joint Assault Bridge Development and Testing</b>																												
Joint Assault Bridge Life Fire Test & Eval																												
Joint Assault Bridge Production Qualification Test																												
Joint Assault Bridge Developmental Test / Operational Test																												
Joint Assault Bridge Initial Operational Test & Eval																												
Joint Assault Bridge Full Rate Production Decision																												
<b>Line Of Communication Bridge Development and Testing</b>																												
Line Of Communication Bridge Durability																												
Line Of Communication Bridge Milestone "C"																												
Line Of Communication Bridge Log Demo																												
Line Of Communication Bridge IOT&E																												
Line Of Communication Bridge FRPDR																												
<b>Bridge Supplemental Set - Milestone "B"</b>																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Bridge Supplemental Set - Anchorage - Make or Buy Decision									6 ▲ MBD - Anchor																				
Bridge Supplemental Set - Anchorage - Award																									10 ▲ Award - Anchor				
Bridge Supplemental Set - Anchorage - Development Testing																									DT - Anchor				
Bridge Supplemental Set - Anchorage - Milestone "C"																									13 ▲ MSC - Anchor				
Bridge Supplemental Set - Site Stability - Contract Award																									8 ▲ Award - SS				
Bridge Supplemental Set - Site Stability - Development Testing																									DT - SS				
Bridge Supplemental Set - Site Stability - Milestone "C"																									14 ▲ MSC - SS				
Bridge Supplemental Set - Bridge Protection Device - Make or Buy Decision																									9 ▲ MBD - BPD				
Bridge Supplemental Set - Bridge Protection Device - Award																									11 ▲ Award - BPD				
Bridge Supplemental Set - Bridge Protection Device - Developmental Testing																									DT - BPD				
Bridge Supplemental Set - Bridge Protection Device - Milestone "C"																									15 ▲ MSC - BPD				
<b>Family of High Military Load Capacity Bridging</b>																													
Family of High Military Load Capacity Bridging Abbreviated Capability Dev Document									1 ▲ FoHMLC CDD																				

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Family of High Military Load Capacity Bridging Material Dev Decision					2 FoHMLC MDD																											
Family of High Military Load Capacity Bridging Analysis of Alternatives																																
Family of High Military Load Capacity Bridging Milestone "B"													7 FoHMLC MSB																			
Family of High Military Load Capacity Bridging Low Rate Initial Production																									18 FoHMLC							
Family of High Military Load Capacity Bridging AVLB/DSB Requirement Analysis																																
Family of High Military Load Capacity Bridging Prototype Development																																
Family of High Military Load Capacity Bridging Prototype Testing																																
Family of High Military Load Capacity Bridging OTA Award																									17 FoHMLC OTA Award							
Family of High Military Load Capacity Bridging Milestone "C"																													19 FoHMLC			
Family of High Military Load Capacity Bridging Log Development																																
Family of High Military Load Capacity Bridging Capabilities Production Doc																									16 FoHMLC CPD							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Joint Assault Bridge Development and Testing	1	2016	1	2019
Joint Assault Bridge Live Fire Test & Eval Armor Development	1	2016	4	2016
Joint Assault Bridge Life Fire Test & Eval	4	2016	4	2018
Joint Assault Bridge Production Qualification Test	4	2017	2	2018
Joint Assault Bridge Developmental Test / Operational Test	2	2018	2	2018
Joint Assault Bridge Initial Operational Test & Eval	3	2018	3	2018
Joint Assault Bridge Full Rate Production Decision	1	2019	1	2019
Line Of Communication Bridge Development and Testing	2	2012	4	2018
Line Of Communication Bridge DT&E	1	2016	4	2016
Line Of Communication Bridge Durability	1	2016	2	2018
Line Of Communication Bridge Milestone "C"	3	2018	3	2018
Line Of Communication Bridge Log Demo	1	2019	2	2019
Line Of Communication Bridge IOT&E	4	2019	1	2020
Line Of Communication Bridge FRPDR	2	2020	2	2020
Bridge Supplemental Set - Milestone "B"	4	2018	4	2018
Bridge Supplemental Set - Anchorage - Make or Buy Decision	1	2019	1	2019
Bridge Supplemental Set - Anchorage - Award	3	2019	3	2019
Bridge Supplemental Set - Anchorage - Development Testing	1	2020	2	2020
Bridge Supplemental Set - Anchorage - Milestone "C"	3	2020	3	2020
Bridge Supplemental Set - Site Stability - Contract Award	3	2019	3	2019
Bridge Supplemental Set - Site Stability - Development Testing	2	2020	3	2020
Bridge Supplemental Set - Site Stability - Milestone "C"	4	2020	4	2020

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**Exhibit R-4A, RDT&E Schedule Details: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
Bridge Supplemental Set - Bridge Protection Device - Make or Buy Decision	3	2019	3	2019
Bridge Supplemental Set - Bridge Protection Device - Award	1	2020	1	2020
Bridge Supplemental Set - Bridge Protection Device - Developmental Testing	3	2020	4	2020
Bridge Supplemental Set - Bridge Protection Device - Milestone "C"	1	2021	1	2021
Family of High Military Load Capacity Bridging	1	2018	2	2022
Family of High Military Load Capacity Bridging Abbreviated Capability Dev Document	4	2017	4	2017
Family of High Military Load Capacity Bridging Material Dev Decision	3	2018	3	2018
Family of High Military Load Capacity Bridging Analysis of Alternatives	1	2019	1	2020
Family of High Military Load Capacity Bridging Milestone "B"	2	2019	2	2019
Family of High Military Load Capacity Bridging Low Rate Initial Production	4	2023	4	2023
Family of High Military Load Capacity Bridging AVLB/DSB Requirement Analysis	4	2018	3	2019
Family of High Military Load Capacity Bridging Prototype Development	2	2020	2	2021
Family of High Military Load Capacity Bridging Prototype Testing	1	2021	3	2022
Family of High Military Load Capacity Bridging OTA Award	4	2022	4	2022
Family of High Military Load Capacity Bridging Milestone "C"	4	2023	4	2023
Family of High Military Load Capacity Bridging Log Development	1	2024	2	2025
Family of High Military Load Capacity Bridging Capabilities Production Doc	2	2022	2	2022



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>					<b>Project (Number/Name)</b> H14 / <i>Materials Handling Equipment - Ed</i>		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
H14: <i>Materials Handling Equipment - Ed</i>	-	0.924	0.745	0.333	-	0.333	0.629	0.634	0.509	0.666	0.000	4.440
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project supports engineering, manufacturing, and development of Material Handling Equipment (MHE) including the 5K Light Capability Rough Terrain Forklifts (LCRTF), Rough Terrain Container Handler (RTCH) equipment, and other cargo handling related items to enable Combat Service Support units to rapidly and efficiently move and deliver critical supplies worldwide to the Soldier. Efforts performed under this project include conducting market research, supporting operational requirements identification and validation, conducting trade studies, generating life cycle cost estimates, performing system engineering, developing performance specifications, conducting pre-production test and evaluation, and preparing program management and acquisition documents.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Platform Safety and Driver Assist	0.382	0.050	0.033	-	0.033
<b>Description:</b> Research and demonstrate technologies which would enhance and improve the safe operation of Material Handling Equipment to include sensors and cameras.					
<b>FY 2018 Plans:</b> Transition identified technologies onto additional MHE platforms such as the RTCH, ALTAS, and LCRTF. Continue integration of Commercial-off-the-Shelf (COTS) cameras, similar to backup cameras, and collision warning sensors to increase situational awareness of CE operator. Will result in the production representative prototype on vehicle by end of Fiscal Year 2021.					
<b>FY 2019 Base Plans:</b> Continue integration of Commercial-off-the-Shelf (COTS) cameras, similar to backup cameras, and collision warning sensors to increase situational awareness of CE operator. Will result in the production representative prototype on vehicle by end of Fiscal Year 2021. Development of additional technology to allow the machine to autonomously control and prevent unsafe operating conditions such as braking to avoid objects or to prevent roll overs.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H14 / <i>Materials Handling Equipment - Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Funding increase from FY2018 to FY2019 is due to the addition of project to develop technology for autonomous control.					
<p><b>Title:</b> Material Handling Equipment System Improvement</p> <p><b>Description:</b> Develop Work Tool Enhancement prototype systems to provide additional machine capability. This may include sweepers, buckets, lift devices, fork enhancements, etc. Investigate commercial solutions for MHE replacement and possible attachments to increase capabilities and versatility.</p> <p><b>FY 2018 Plans:</b> Integrate commercial solutions for MHE replacements and possible attachments to increase capabilities and versatility.</p> <p><b>FY 2019 Base Plans:</b> Conduct market research for emerging commercial solutions for MHE replacements and possible attachments to increase capabilities and versatility.</p>	0.242	0.050	0.050	-	0.050
<p><b>Title:</b> System Engineering/Program Management</p> <p><b>Description:</b> System Engineering and Program Management support for Material Handling Equipment.</p> <p><b>FY 2018 Plans:</b> Provide funds for System Engineering and Program Management support for Material Handling Equipment operations.</p> <p><b>FY 2019 Base Plans:</b> Provide funds for System Engineering and Program Management support for Material Handling Equipment operations.</p>	0.200	0.250	0.250	-	0.250
<p><b>Title:</b> Weight Reduction in Transparent Armor (TA)</p> <p><b>Description:</b> Investigate technologies that will reduce the weight of TA while maintaining current protection levels or that will increase protection levels with no or minimal increase in weight.</p> <p><b>FY 2018 Plans:</b></p>	-	0.195	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H14 / <i>Materials Handling Equipment - Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Continue the work under the TARDEC Transparent Armor (TA) Small Business Innovative Research (SBIR) program which has already shown positive results to quality TA at the current protection level and continue to develop higher level of protection.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding decrease from FY2018 to FY2019 is due to completion of effort in FY2018.					
<b>Title:</b> Rough Terrain Container Handler Component Modernization  <b>Description:</b> Research, investigate, and develop solutions to mitigate obsolescence on Rough Terrain Container Handler (RTCH) vehicles. This effort includes reverse engineering the Electronic Control Unit (ECU) component to develop a replacement to obsolete ECUs. Develop Engineering Change Proposals (ECPs) to modernize fleet of RTCH vehicles which includes replacing wiring harness, cab, and ECUs.  <b>FY 2018 Plans:</b> Develop and integrate Engineering Change Proposals (ECPs) to modernize fleet of RTCH vehicles which includes replacing wiring harness, cab, and ECUs.  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding decrease from FY2018 to FY2019 is due to completion of efforts in FY2018.	0.100	0.200	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	0.924	0.745	0.333	-	0.333

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• G41002: 5K Light Capacity Rough Terrain (LCRT) Forklift	3.153	9.000	12.901	-	12.901	16.869	15.887	21.772	22.973	Continuing	Continuing
• MA4500: Modification Of In-Svc Equipment (OPA-3)	80.438	60.192	49.797	19.200	68.997	81.874	76.875	66.379	55.485	0.000	490.240

**Remarks**

**D. Acquisition Strategy**  
Develop specifications for 5K Light Capability Rough Terrain Forklifts (LCRTF) improvements, and award contracts to produce test items for production verification testing. Testing LCRTF improvements to be performed using Army test facilities. Design lightweight armor solution for All Terrain Lift Army System (ATLAS) using U.S. Army TARDEC's Center for Ground Vehicle Development and Integration. Test armored ATLAS at Aberdeen Proving Ground, MD. Develop additional capabilities for

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Army Date: February 2018

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
2040 / 5	PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	H14 / <i>Materials Handling Equipment - Ed</i>

existing systems such as the LCRFT, RTCH and ATLAS. Award contracts with vehicle or attachment technology Original Equipment Manufacturers to integrate existing commercial attachment technologies onto the platforms to improve operator functions and system usefulness. Testing will be conducted at Aberdeen Proving Grounds, MD.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> H14 / Materials Handling Equipment - Ed
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
SBIR + STTR	TBD	TBD : TBD	0.032	-		-		-		-		-	0.000	0.032	-
<b>Subtotal</b>			0.032	-		-		-		-		-	0.000	0.032	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MHE Training Aids	SS/FFP	Kalmar Rt : Cibolo, TX	2.555	-		-		-		-		-	0.000	2.555	-
RTCH Component Modernization	SS/Various	Various : Various	1.006	-		0.200		-		-		-	0.000	1.206	-
Lightweight Armor for ATLAS II	MIPR	TARDEC : Warren, MI	0.350	-		-		-		-		-	0.000	0.350	-
Sling Load Attachment for RTCH	C/FFP	Kalmar RT Center : Cibolo, TX	0.100	-		-		-		-		-	0.000	0.100	-
Platform Safety/Driver Assist	TBD	TBD : TBD	-	0.430	Sep 2017	0.050	Dec 2017	0.033	Jan 2019	-		0.033	Continuing	Continuing	Continuing
MHE System Improvement	SS/FFP	Automation Alley : Troy, MI	-	0.294	Aug 2017	0.050	Mar 2018	0.050	Mar 2019	-		0.050	Continuing	Continuing	Continuing
Weight Reduction in Transparent Armor	TBD	TBD : TBD	-	-		0.195		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			4.011	0.724		0.495		0.083		-		0.083	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Improvements for LCRTF for Tactical Operations	MIPR	TARDEC : Warren, MI	0.055	-		-		-		-		-	0.000	0.055	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> H14 / Materials Handling Equipment - Ed
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Lightweight Armor for ATLAS II	MIPR	TARDEC : Warren, MI	0.110	-		-		-		-		-	0.000	0.110	-
System Engineering/ Program Management	MIPR	TARDEC : Warren, MI	-	0.200	Dec 2016	0.250	Dec 2017	0.250	Dec 2018	-		0.250	Continuing	Continuing	-
<b>Subtotal</b>			0.165	0.200		0.250		0.250		-		0.250	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Lightweight Armor for ATLAS II	TBD	TBD : TBD	0.133	-		-		-		-		-	0.000	0.133	-
System Improvements for LCRTF for Tactical Operations	TBD	TBD : TBD	0.405	-		-		-		-		-	0.000	0.405	-
Investigate high speed towing for LCRTF	TBD	TBD : TBD	0.047	-		-		-		-		-	0.000	0.047	-
Testing of ATLAS II Wider Forklift	MIPR	Various : Various	0.023	-		-		-		-		-	0.000	0.023	-
<b>Subtotal</b>			0.608	-		-		-		-		-	0.000	0.608	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract		
<b>Project Cost Totals</b>		4.816	0.924	0.745	0.333	-	-	0.333	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H14 / <i>Materials Handling Equipment - Ed</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Platform Safety/Driver Assist																												
MHE System Improvement																												
System Engineering/Program Management																												
RTCH Component Modernization																												
Weight Reduction Transparent Armor																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H14 / <i>Materials Handling Equipment - Ed</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Platform Safety/Driver Assist	4	2017	4	2023
MHE System Improvement	1	2018	4	2023
System Engineering/Program Management	1	2017	4	2023
RTCH Component Modernization	2	2017	4	2019
Weight Reduction Transparent Armor	2	2017	4	2019



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>				<b>Project (Number/Name)</b> L39 / <i>Field Sustainment Support Ed</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L39: <i>Field Sustainment Support Ed</i>	-	3.569	3.147	2.223	-	2.223	2.974	3.052	3.146	3.247	0.000	21.358
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project supports the Engineering and Manufacturing Development (EMD) of critical capabilities for cargo aerial delivery for identified theater distribution and services capability gaps, improve unit sustainability, and increase combat effectiveness. Project supports the demonstration of engineering development models and Type Classification of cargo parachutes, airdrop containers and other aerial delivery equipment to improve safety, effectiveness, and efficiency of airborne operations. This project develops critical enablers that support the Army in executing future movement and maneuver operations and distributed sustainment support and the Army's Modular Force Capabilities by maintaining readiness through fielding and integrating new equipment. This project also ensures Army Expeditionary Forces are capable of rapid deployment by providing aerial delivery initiatives. This project also ensures Army Expeditionary Forces are capable of rapid deployment through aerial delivery initiatives and reduces sustainment requirements, related Combat Support/Combat Service Support (CS/CSS) demands in lift, combat zone footprint, and costs for logistical support.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Advanced Low Velocity Airdrop System (ALVADS) - Light and Heavy	2.301	0.119	-	-	-
<b>Description:</b> ALVADS - Light and Heavy are capable of airdrop operations at an altitude down to 750-ft Above Ground Level (AGL) for ALVADS-L and 975-ft AGL for ALVADS-H, while retaining the objective altitude of 500-ft AGL for both with increased aircraft survivability, and improved accuracy. Light-Gross rigged weight of 2,520-22,000 lbs and Heavy-Gross rigged weight of 22,001-42,000 lbs.					
<b>FY 2018 Plans:</b> Complete logistics deliverables. Obtain Milestone C decision and transition ALVADS into production.					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> ALVADS will reach Milestone C decision in FY 2018 and program will transition to TACOM ILSC for production and fielding.					
<b>Title:</b> Extracted High and Low High Speed Container Delivery System (EHLSCDS)	1.268	1.228	0.248	-	0.248
<b>Description:</b> Provides a high speed (230 knot) low altitude (375 A AGL) capability for up to eight Container Delivery Systems (CDS) to enhance aircraft and aircrew safety while improving accuracy and reducing dispersion for receiving ground units.					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L39 / <i>Field Sustainment Support Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p><b>FY 2018 Plans:</b> Conduct and complete Operational Testing (OT). Begin preparation for Milestone C documentation and work logistics deliverables.</p> <p><b>FY 2019 Base Plans:</b> Complete logistics deliverables. Obtain Milestone C decision and transition ALVADS into production.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> EHLSCDS will complete testing in FY 2018 and will reach Milestone C decision in FY 2019 and program will transition to TACOM ILSC for production and fielding.</p>					
<p><b>Title:</b> Joint Precision Airdrop System-2K Block 1 upgrade (JPADS-BLK1)</p> <p><b>Description:</b> Supports increasing the technological and design maturity, testing, and integration of several key initiatives focused on: maintaining system accuracy and reliability in Global Positioning System (GPS) denied environments; collision avoidance; more precise position determination software; and improved Guidance Navigation and Control (GN&amp;C) hardware.</p> <p><b>FY 2018 Plans:</b> Begin system level qualification flight testing of JPADS 2K Block 1 integrated improvements in support of an updated Army Test and Evaluation Command (ATEC) safety confirmation for the JPADS 2K enhancements.</p> <p><b>FY 2019 Base Plans:</b> Complete system level testing and documentation updates to incorporate Engineering Change Proposal (ECP) changes into production.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> JPADS-BLK1 upgrade enhancement is being completed in FY 2019</p>	-	1.800	0.989	-	0.989
<p><b>Title:</b> Rapid Rigging and DeRigging Airdrop System (RRDAS)</p> <p><b>Description:</b> Reduces rigging times while also providing the capability to rapidly de-rig loads on the drop zone. This will reduce the lead time to prepare Low Velocity Airdrop Load (LVADS) loads while also increasing the survivability of receiving ground forces by ensuring the airdrop loads (to include weapon systems, prime movers, trailers, etc.) are quickly de-rigged and made operational.</p> <p><b>FY 2019 Base Plans:</b></p>	-	-	0.986	-	0.986

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L39 / <i>Field Sustainment Support Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Obtain Milestone B decision and award RRDAS prototype development contract. Fabricate RRDAS prototypes.					
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> Funds are increasing from FY 18 to FY 19 as program is moving from Logistics and Engineering Equipment Advanced Development phase into Logistics and Engineering Equipment Engineering Development phase.					
<b>Accomplishments/Planned Programs Subtotals</b>	3.569	3.147	2.223	-	2.223

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• K39: <i>Field Sustainment Support Ad</i>	2.528	2.429	2.311	-	2.311	1.675	1.720	1.773	1.807	0.000	14.243
• MA7806: <i>Precision Airdrop</i>	4.298	4.147	3.751	1.980	5.731	3.788	2.079	2.140	2.184	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**  
Accelerate product development and testing to transition into production.

**E. Performance Metrics**  
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604804A / Logistics and Engineer Equipment - Eng Dev				L39 / Field Sustainment Support Ed							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Management Support	Various	PM FSS : Natick, MA	4.285	0.569	Nov 2016	0.600		0.403		-		0.403	0.000	5.857	Continuing
SBIR+STTR	TBD	Various : Various	0.129	-		-		-		-		-	0.000	0.129	-
<b>Subtotal</b>			4.414	0.569		0.600		0.403		-		0.403	0.000	5.986	N/A
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
ALVADS-L&H	Various	Various : Various	15.710	0.450	Oct 2016	0.128		-		-		-	0.000	16.288	Continuing
EHLSCDS	Various	Various : Various	0.100	0.350	Jan 2017	-		0.150		-		0.150	0.000	0.600	-
JPADS	Various	Various : Various	-	-		0.600		0.250		-		0.250	0.000	0.850	-
RRDAS	Various	Various : Various	-	-		-		0.847		-		0.847	0.000	0.847	-
<b>Subtotal</b>			15.810	0.800		0.728		1.247		-		1.247	0.000	18.585	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
EHLSCDS	Various	Various : Various	-	0.050	Oct 2016	0.400		-		-		-	0.000	0.450	-
ALVADS	Various	Various : Various	-	0.050	Jan 2017	-		-		-		-	0.000	0.050	-
JPADS	Various	Various : Various	-	-		0.200		-		-		-	0.000	0.200	-
<b>Subtotal</b>			-	0.100		0.600		-		-		-	0.000	0.700	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L39 / <i>Field Sustainment Support Ed</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Conduct Developmental Testing/Operational Testing DT/OT on ALVADS	██████████				██████████																							
Milestone C ALVADS									▲ 1																			
Conduct OT for EHLSCDS					██████████																							
Complete Milestone C/TC STD deliverables on EHLSCDS									██████████																			
Complete Milestone C/TC-STD EHLSCDS									▲ 2																			
JPADS Block I upgrade PQT and OT					██████████				██████████																			
JPADS Block I Milestone C													▲ 4															
Conduct PQT for EHLSCDS	██████████																											
Complete Milestone B on RRDAS									▲ 3																			
Develop ALVADS extra heavy prototypes																	██████████				██████████							
Conduct Milestone B for ALVADS Extra Heavy																	▲ 7											
Develop and fabricate RRDAS prototypes									██████████																			
Conduct DT for Rapid Rigging De Rigging Airdrop System (RRDAS)													██████████															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L39 / <i>Field Sustainment Support Ed</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023																																																																																																																																															
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																																																																																																																																												
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Complete DT and OT for JPADS 10K Block I Upgrade																																																																																																																																																																								
Conduct DT and OT for ALVADS DRAS capability																																																																																																																																																																								

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L39 / <i>Field Sustainment Support Ed</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Conduct Developmental Testing/Operational Testing DT/OT on ALVADS-L&H	1	2016	1	2018
Milestone C ALVADS	4	2018	4	2018
Conduct OT for EHLSCDS	1	2018	3	2018
Complete Milestone C/TC STD deliverables on EHLSCDS	4	2018	2	2019
Complete Milestone C/TC-STD EHLSCDS	2	2019	2	2019
JPADS Block I upgrade PQT and OT	1	2018	3	2019
JPADS Block I Milestone C	1	2020	1	2020
Conduct PQT for EHLSCDS	1	2017	2	2017
Complete Milestone B on RRDAS	2	2019	2	2019
Develop ALVADS extra heavy prototypes	2	2022	4	2023
Conduct Milestone B for ALVADS Extra Heavy	2	2022	2	2022
Develop and fabricate RRDAS protoypes	3	2019	1	2020
Conduct DT for Rapid Rigging De Rigging Airdrop System (RRDAS)	2	2020	4	2020
Conduct OT for RRDAS	3	2020	1	2021
Complete Milestone C for RRDAS	4	2021	4	2021
Conduct DT and OT for Low Cost HSL components	4	2020	2	2021
Complete Milestone C for Low Cost HSL components	4	2021	4	2021
Conduct DT and OT for JPADS 10K Block I upgrade	3	2021	2	2022
Complete DT and OT for JPADS 10K Block I Upgrade	4	2022	4	2022
Conduct DT and OT for ALVADS DRAS capablity	1	2020	2	2021



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>				<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L41: <i>Water And Petroleum Distribution - Ed</i>	-	6.541	8.005	10.774	-	10.774	8.885	8.944	9.046	9.404	0.000	61.599
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project provides all services with ample supply of clean fuel and water. The Army has the mission to supply fuel for all land-based forces, including the Marines and the Air Force, and must supply bulk drinking water to the Soldiers. These Engineering and Manufacturing Development programs enable the Army to improve maneuver sustainment operations to meet the demands of the Stryker Brigade Combat Teams and the Future Force. The mission includes receiving and transferring petroleum from trucks, ships, pipelines and permanent and temporary storage facilities; moving petroleum from storage to and within corps and division areas; fuel quality surveillance testing; and dispensing in support of tactical operations, including rapid refueling of aircraft. The mission covers water purification and waste water treatment, reutilization, storage, distribution, alternative water source acquisition, disposal, and quality control of water. The Army cannot fight without clean fuel and water. These Research and Development (R&D) missions support the development and enhancement of rapidly deployed Petroleum and Water equipment which enables the Army to achieve its vision by providing a highly mobile and self-sustaining system in hostile joint operations areas.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> 3K Tactical Water Purification System (TWPS).	0.672	2.621	2.179	-	2.179
<b>Description:</b> The 3,000 (3k) Gallons per Hour (GPH) Tactical Water Purification System (TWPS) replaces the legacy 3,000 (3k) GPH Reverse Osmosis Water Purification Unit (ROWPU), which is currently the largest water purification capability in the Army's inventory and is nearing the end of its useful life. The 3k TWPS shall be the sole bulk water capability supporting Echelons Above Brigade (EAB) and will be the primary water purification capability for laundry and shower facilities. Purifies up to 3,000 GPH from any water source, including 60,000 mg/L Total Dissolved Solids (TDS) salt water and CBRN contaminated sources. Consists of feed water pumps, hoses, media and cartridge filters, high pressure pump, reverse osmosis elements, 3,000 gallon water storage and distribution system, and control panel. Supports all tactical water missions LH S/PLS compatible via C HU/ E-CHU					
<b>FY 2018 Plans:</b> Conduct Milestone B in 4QFY18. Conduct Critical Design Review (CDR) and complete detail design and begin prototype build.					
<b>FY 2019 Base Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Complete prototype build. Begin Technical Data Package (TDP) development and conduct internal testing. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> 3K TWPS increase in funding from FY18 to FY19 is due to increase in work year costs to complete prototype build and begin Technical Data Package (TDP) development.					
<b>Title:</b> Modular Tactical Retail Refueling System (MTRRS) <b>Description:</b> The Mobile Tactical Retail Refueling System (MTRRS) has 1,050 gallon capacity fuel tank, 17 gallons per minute electric fuel motor/pump, a filter separator, and a flow meter. MTRRS allows for different configurations and transport platforms including cargo trucks, trailers, and LHS flat-racks. The system can be removed from transport platform and operated on the ground. The MTRRS will replace the Tank Pump Unit (TPU) and Tank Unit Liquid Dispensing (TLUD) systems. MTRRS is a Family of Medium Tactical Vehicles (FMTV) transportable system that provides 1,050 gallons of filtered fuel to Echelons Above Brigade (EAB). <b>FY 2018 Plans:</b> Release Request for Proposal (RFP), conduct Source Selection Evaluation Board (SSEB), contract award. Achieve Milestone B/C <b>FY 2019 Base Plans:</b> Test Readiness Review. Project Request For Proposal (RFP) release and prepare. Development Testing (DT). <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> MTRRS decrease in funding from FY18 to FY19 is due to a competitive award in 3QFY18. FY19 only preparation for Developmental Testing (DT) and Preliminary Design Review (PDR).	0.243	3.460	1.000	-	1.000
<b>Title:</b> Water Bison <b>Description:</b> The Unit Water Trailer (Water Bison) is a replacement for the 400 gallon Water Buffalo. A second variant, the Water Bison Lite, is also required. The Water Bison consists of a 500 gallon baffled capacity tank and the Water Bison Lite consists of a 250 gallon baffled capacity tank. They provide the modular force an efficient method of transporting a full day supply (DOS) of bulk potable water. Both systems include freeze protection that are mounted on a trailer and include all hoses and fittings necessary to dispense water by means of gravity flow. The Water Bison and Water Bison Lite will be used by units at all echelons. The Family of Medium Tactical Vehicles (FMTV) shall be capable of towing this system. <b>FY 2018 Plans:</b>	-	0.045	0.045	-	0.045

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Release Request for Proposal (RFP). Continue working Milestone B/C documentation. Develop Scope of Work. <b>FY 2019 Base Plans:</b> Milestone B documentation.					
<b>Title:</b> Early Entry Fluid Distribution System (E2FDS). <b>Description:</b> The Early Entry Fluid Distribution System (E2FDS) is a high throughput flexible conduit system for the transport of bulk petroleum or water on the modular battlefield. It is a rapidly-emplaced conduit system capable of the throughput of 850,000 gallons of fuel or 650,000 gallons of raw non-potable water, per a 20 hour operational day through a trace up to 50 miles long. It is a new materiel system that enhances the Inland Petroleum Distribution System (IPDS) pipeline and rapidly establishes new or extends existing pipeline traces. E2FDS requires little to no engineer support to emplace the conduit or pump stations. Pump stations are fully automated and centrally controlled. <b>FY 2018 Plans:</b> Perform Developmental Testing (DT) on the E2FDS non-developmental components including the pump stations, employment and retrieval system, and hose segments. <b>FY 2019 Base Plans:</b> Complete system design and development, Test Readiness Review (TRR), test assets delivered. Release Production Request For Proposal (RFP). <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> E2FDS increase in funding from FY18 to FY19 is due to additional work years required to complete system design and development and preparation/release of the Request for Proposal (RFP) for production contract.	5.626	0.747	4.885	-	4.885
<b>Title:</b> Petroleum Expeditionary Analysis Kit (PEAK) <b>Description:</b> The Petroleum Expeditionary Analysis Kit (PEAK) is a stand alone system that at point of consumption will rapidly verify petroleum products' suitability for use. The PEAK will at point of consumption evaluate kerosene-based and diesel fuels used in ground systems and aircraft. The PEAK replaces Aviation Fuels Contamination Test Kit (AFCTK). It will provide the field with the capability to determine fuel grade and additives at the point of consumption. The PEAK will enable fuel quality surveillance within Brigade Combat Teams and Support Brigades. <b>FY 2018 Plans:</b>	-	0.712	0.847	-	0.847

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>Prepare and release developmental Request For Proposal (RFP). Prepare documents and achieve Milestone B. Award Developmental Contract.</p> <p><b>FY 2019 Base Plans:</b> Developmental Testing. Achieve Milestone C.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> PEAK increase in funding from FY18 to FY19 is due to increase in Work Year efforts for developmental test.</p>					
<p><b>Title:</b> Bulk Fuel Distribution System (BFDS)</p> <p><b>Description:</b> The Bulk Fuel Distribution System (BFDS) is a 7,500 gallon mobile petroleum distribution system; pulled primarily by the M915A3 or later versions. The BFDS provides bulk distribution between large fuel storage areas and will include a radar level gauge sensor for mission command reporting; providing asset and in-transit visibility. The BFDS is not capable of off-road or retail operations. The BFDS provides theater bulk petroleum distribution to maximize throughput to support early entry buildup and onward movement of forces.</p> <p><b>FY 2018 Plans:</b> Materiel Development Decision (MDD). Market Research.</p> <p><b>FY 2019 Base Plans:</b> Develop purchase description and MS C documentation.</p>	-	0.045	0.045	-	0.045
<p><b>Title:</b> Petroleum Water Trace Tool (PAWTL)</p> <p><b>Description:</b> Petroleum and Water Trace Locator (PAWTL) supports all Army petroleum and water pipeline systems. It is a geospatial based software application that allows planners to develop pipeline traces based on any mission scenario. The software identifies roadways and uses terrain elevation data to recommend pipeline routes and pump station placement.</p> <p><b>FY 2018 Plans:</b> Fund Army Research laboratory. Assume contract management and complete Small Business Innovative Research (SBIR) effort. Refinement of source code for pipeline trace tool.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> PAWTL decrease in funding from FY18 to FY19 due to completion of (SBIR) efforts in FY18.</p>	-	0.375	-	-	-
<p><b>Title:</b> Black Water Treatment (BWT)</p>	-	-	0.045	-	0.045

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p><b>Description:</b> Black Water Treatment (BWT) treats waste water to discharge standards.</p> <p><b>FY 2019 Base Plans:</b> Support Materiel Development Decision (MDD). Conduct Market Research.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Black Water Treatment (BWT) FY19 program begins to support Materiel Development Decision (MDD) and market research.</p>					
<p><b>Title:</b> Tactical Fuel Distribution System (TFDS)</p> <p><b>Description:</b> The Tactical Fuel Distribution System (TFDS) provides theater bulk petroleum distribution to maximize throughput in order to support early entry, buildup, and onward movement of forces. The TFDS, with retail petroleum capability, will improve operational and sustainment support from the Theater Army to Echelons Above Brigade (EAB). The TFDS has a 5,000 gallon fuel capacity and will replace the current M967 and M969 tanker trailers. The M1088 tractor and its variants are the primary mover for the TFDS.</p> <p><b>FY 2019 Base Plans:</b> Supports Materiel Development Decision (MDD) and market research.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Program begins in FY2019.</p>	-	-	0.045	-	0.045
<p><b>Title:</b> PM Support</p> <p><b>Description:</b> Program Management (PM) Support is matrix support that includes PM travel expenses and systems engineering oversight required to manage Research, Development, Technology and Engineering (RDT&amp;E) projects. Includes salaries and travel for the support of programs within this Project.</p> <p><b>FY 2019 Base Plans:</b> Funds support, travel, and general oversight efforts.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Program support consolidated into a separate item in FY 2019. In FY 2018, Program Support costs were distributed amongst the separate programs.</p>	-	-	1.683	-	1.683
<b>Accomplishments/Planned Programs Subtotals</b>	6.541	8.005	10.774	-	10.774

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Cost To	Total Cost
			Base	OCO	Total					Complete	
• K41: <i>RDTE, Logistics and Engineer Equipment - Advanced Development</i>	2.237	4.773	0.000	-	0.000	-	-	-	-	Continuing	Continuing
• MA6000: <i>Distribution Systems, Petroleum &amp; Water</i>	113.896	47.597	39.730	-	39.730	44.631	42.570	34.655	29.374	0.000	352.453
• R67500: <i>PETROLEUM QUALITY ANALYSIS SYSTEM</i>	8.207	6.903	1.770	-	1.770	-	-	-	-	0.000	16.880

**Remarks**

**D. Acquisition Strategy**

Develop engineering prototypes for the 3K Tactical Water Purification System (3K TWPS), Petroleum Tankers, Early Entry Fluid Distribution System (E2FDS) and select Non-Development Item (NDI) based on market surveys and proposals from industry. Based on market research will award either competitive or sole source contracts. Initiate IPT's and develop acquisition strategies for Water Bison, Petroleum Expeditionary Analysis Kit (PEAK) and Small Unit Water Purifier (SUWP); Black Water, Gray Water, Mobile Tactical Retail Refueling System (MTRRS). Conduct developmental and operational testing where applicable for 3K TWPS, Bison, E2FDS, Petroleum Tankers, MTRRS, PEAK, SUWP, Black water. Conduct Source Selection Evaluation Boards (SSEBs) within the Petroleum and Water Systems portfolio. Develop documentation in support of Milestone Decisions.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L41 / Water And Petroleum Distribution - Ed
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PM Support	MIPR	TACOM : Warren, MI	-	-		-		1.683	Nov 2018	-		1.683	0.000	1.683	-
<b>Subtotal</b>			-	-		-		1.683		-		1.683	0.000	1.683	N/A

**Remarks**  
not applicable

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Petroleum Expeditionary Analysis Kit (PEAK)	C/FFP	TACOM ACC : Warren, MI	-	-		0.500	Jan 2018	0.300	Feb 2019	-		0.300	0.000	0.800	Continuing
3K Tactical Water Purification System (3K TWPS)	MIPR	TARDEC : Warren, MI	0.667	0.202	Jun 2017	2.489	Jan 2018	1.023	Jan 2019	-		1.023	0.000	4.381	Continuing
Early Entry Fluid Distribution System (E2FDS)	C/FFP	DRS Systems : TBD	2.762	0.424		0.131	Mar 2018	0.014	Feb 2019	-		0.014	0.000	3.331	Continuing
Modular Tactical Retail Refueling System (MTRRS)	C/FFP	TACOM : Warren, MI	2.647	-		3.250		-		-		-	0.000	5.897	Continuing
Petroleum Water Trace Tool (PAWTL)	MIPR	TARDEC : Warren, MI	-	-		0.015		-		-		-	0.000	0.015	-
<b>Subtotal</b>			6.076	0.626		6.385		1.337		-		1.337	0.000	14.424	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
3K Tactical Water Purification System (3K TWPS)	MIPR	NFESC : Port Hueneme, CA	-	0.470		0.132	Nov 2017	1.156	Oct 2018	-		1.156	Continuing	Continuing	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L41 / Water And Petroleum Distribution - Ed
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Water Bison	MIPR	TARDEC : Warren, MI	-	-		0.045	Oct 2017	0.045	Oct 2018	-		0.045	0.000	0.090	-
Early Entry Fluid Distribution System (E2FDS)	MIPR	TARDEC : Warren, MI	1.280	5.202	Jun 2017	0.215	Dec 2017	1.024	Oct 2018	-		1.024	0.000	7.721	Continuing
Mobile Tactical Retail Refueling System (MTRRS)	MIPR	TARDEC : Warren, MI	-	0.243	Jun 2017	0.210	Dec 2017	0.500	Oct 2018	-		0.500	0.000	0.953	-
Bulk Fuel Distribution System (BFDS)	MIPR	TARDEC : Warren, MI	-	-		0.045	Oct 2017	0.045	Nov 2018	-		0.045	0.000	0.090	-
PEAK	MIPR	TARDEC Warren, MI : Warren, MI	-	-		0.180	Jan 2017	0.300	Oct 2018	-		0.300	0.000	0.480	-
Petroleum Water Trace Tool (PAWTL)	MIPR	TARDEC : Warren, MI	-	-		0.360	Feb 2017	-		-		-	0.000	0.360	-
Black Water	MIPR	TARDEC : Warren, MI	-	-		-		0.045	Nov 2018	-		0.045	0.000	0.045	-
Retail	MIPR	TARDEC : Warren, MI	-	-		-		0.045	Nov 2018	-		0.045	0.000	0.045	-
<b>Subtotal</b>			1.280	5.915		1.187		3.160		-		3.160	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Early Entry Fluid Distribution System (E2FDS)	MIPR	Aberdeen Proving Ground : APG, MD	-	-		0.401	Aug 2018	3.847	Jan 2019	-		3.847	0.000	4.248	-
3K Tactical Water	MIPR	TARDEC : Warren, MI	0.200	-		-		-		-		-	0.000	0.200	-
Modular Tactical Retail Refueling System (MTRRS)	MIPR	Yuma : Yuma Proving Ground, AZ	0.317	-		-		0.500	Apr 2019	-		0.500	0.000	0.817	-



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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Army</b>												<b>Date: February 2018</b>			
<b>Appropriation/Budget Activity</b> 2040 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>						<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>			
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Petroleum Expeditionary Analysis Kit (PEAK)	MIPR	TARDEC : Warren, MI	-	-		0.032	Sep 2018	0.247	Jan 2019	-		0.247	0.000	0.279	-
<b>Subtotal</b>			0.517	-		0.433		4.594		-		4.594	0.000	5.544	N/A
			<b>Prior Years</b>	<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>			7.873	6.541		8.005		10.774		-		10.774	Continuing	Continuing	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
<b>3K Tactical Water Purification System (3K TWPS)</b>																													
3K TWPS Milestone B																													1 MS B
3K TWPS PDR																													9 PDR
3K TWPS CDR																													5 CDR
3K TWPS Developmental Testing																													DT
3K TWPS Milestone C																													19 MS C
3K TWPS Production Qualification Testing/ Operational Testing																													PQT/OT
<b>Water Bison</b>																													
Water Bison MDD																													15 MDD
Water Bison Milestone C																													23 MS B/C
<b>Black Water Treatment (BWT)</b>	Black Water Treatment (BWT)																												
Black Water Treatment Materiel Development Decision (MDD)	14 MDD																												
Black Water Treatment Milestone B	20 MS B																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
<b>Early Entry Fluid Distribution System (E2FDS)</b>																													
E2FDS Preliminary Design Review																													2 PDR
E2FDS Critical Design Review																													6 CDR
E2FDS Developmental Testing																													DT
E2FDS Milestone C																													12 MS C
E2FDS First Article Test / Initial Operational Test																													FAT/IOT
<b>Modular Tactical Retail Refueling System (MTRRS)</b>																													
MTRRS Milestone B/C																													3 MS B/C
MTRRS Developmental Testing																													DT
MTRRS PVT																													PVT
MTRRS Full Materiel Release																													21 FMR
<b>Bulk Petroleum Tankers</b>																													
Bulk Petroleum Tankers Materiel Development Decision (MDD)																													7 MDD

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023																										
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																							
<b>Modular Fuel System (MFS)</b>																																																			
MFS Operational Test (OT)	█																																																		
<b>Tactical Petroleum Tankers</b>																																																			
Tactical Petroleum Tankers Milestone B																									24																										
Petroleum Expeditionary Analysis Kit (PEAK)	█ Petroleum Expeditionary Analysis Kit (PEAK)																																																		
<b>PEAK Reqts. Refinement &amp; Tech. Dev.</b>																																																			
PEAK Materiel Development Decision (MDD)					4																																														
PEAK Mileston B									8																																										
PEAK Milestone C																	17																																		
PEAK Full Materiel Release (FMR)																					18																														
<b>Small Unit Water Purifier (SUWP)</b>																																																			
SUWP Materiel Development Decision (MDD)													10																																						
<b>Gray Water Recycling</b>																																																			

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
Gray Water Recycling Material Development Decision (MDD)													13																							
Gray Water Recycling Milestone B																					16															
Gray Water Recycling Milestone C																																				
Tactical Petroleum Tankers Material Development Decision (MDD)																	11																			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
3K Tactical Water Purification System (3K TWPS)	2	2016	2	2023
3K TWPS Milestone B	2	2018	2	2018
3K TWPS PDR	1	2019	1	2019
3K TWPS CDR	4	2018	4	2018
3K TWPS Developmental Testing	1	2021	3	2021
3K TWPS Milestone C	1	2022	1	2022
3K TWPS Production Qualification Testing/ Operational Testing	2	2022	1	2024
Water Bison	1	2021	4	2024
Water Bison MDD	4	2020	4	2020
Water Bison Milestone C	2	2023	2	2023
Black Water Treatment (BWT)	1	2021	1	2024
Black Water Treatment Materiel Development Decision (MDD)	4	2020	4	2020
Black Water Treatment Milestone B	4	2022	4	2022
Early Entry Fluid Distribution System (E2FDS)	1	2017	4	2020
E2FDS Preliminary Design Review	2	2018	2	2018
E2FDS Critical Design Review	4	2018	4	2018
E2FDS Developmental Testing	1	2019	3	2019
E2FDS Milestone C	4	2019	4	2019
E2FDS First Article Test / Initial Operational Test	4	2020	3	2021
Modular Tactical Retail Refueling System (MTRRS)	1	2017	4	2022
MTRRS Milestone B/C	3	2018	3	2018
MTRRS Developmental Testing	3	2019	4	2019

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

Events	Start		End	
	Quarter	Year	Quarter	Year
MTRRS PVT	3	2020	3	2021
MTRRS Full Materiel Release	4	2022	4	2022
Bulk Petroleum Tankers	1	2017	2	2020
Bulk Petroleum Tankers Materiel Development Decision (MDD)	4	2018	4	2018
Modular Fuel System (MFS)	1	2017	2	2017
MFS Operational Test (OT)	1	2017	2	2017
Tactical Petroleum Tankers	2	2018	2	2022
Tactical Petroleum Tankers Milestone B	3	2023	3	2023
Petroleum Expeditionary Analysis Kit (PEAK)	1	2017	4	2021
PEAK Reqts. Refinement & Tech. Dev.	1	2017	4	2020
PEAK Materiel Development Decision (MDD)	3	2018	3	2018
PEAK Mileston B	1	2019	1	2019
PEAK Milestone C	3	2021	3	2021
PEAK Full Materiel Release (FMR)	4	2021	4	2021
Small Unit Water Purifier (SUWP)	4	2017	4	2021
SUWP Materiel Development Decision (MDD)	3	2019	3	2019
Gray Water Recycling	1	2020	4	2033
Gray Water Recycling Material Development Decision (MDD)	1	2020	1	2020
Gray Water Recycling Milestone B	4	2020	4	2020
Gray Water Recycling Milestone C	4	2022	4	2022
Tactical Petroleum Tankers Material Development Decision (MDD)	3	2019	3	2019

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>					<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L43: <i>ENGINEER SUPPORT EQUIPMENT - ED</i>	-	2.352	3.795	0.341	-	0.341	1.230	3.169	0.198	1.422	0.000	12.507
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Not applicable for this item.

**A. Mission Description and Budget Item Justification**

This project supports development, demonstration, testing and evaluation within the Combat Engineer and Construction Support Equipment arena. These items include critical life support equipment such as diving, fire fighting, fire suppression, urban operations, breathable air compressors, and emergency and recovery sets along with engineer safety and special unit support equipment and photo support sets. The Combat Engineer and Construction equipment consists of the Surveying, Firefighting Individual Requirements Equipment Support (FIRES), Urban Search and Rescue (USR), Fire Protection Equipment Type I, II and III, Tactical Fire Fighting Truck Tools (TFFT), Family of Electrical Personal Protective Equipment (FoEPPE) Family of Power Utility Kits (FoPUK), Distribution Utility Construction Kits (DUCT) and Soldier Portable Kits, Lineman's Tool Kit, Concrete and Masonry, Electricians, Plumbers, Pipefitters, Family of Light Sets (FoLS), Airfield Damage Repair Kit (ADRK), Diving Equipment, Surface Swimmer Support Sets, Surface Supplied Diving Set, procurement of new Technical/Special Tools, Pioneer Support Set, and the Pioneer Land Clearing and Building Erection Set. Project will explore Additive Manufacturing for Engineer systems. Funding will support the procurement of market samples and testing for Soldier Portable Sets, Kits, and Outfits (SKO), Special Tools initiative, and critical life support equipment such as the Deep Sea Set, Underwater Construction Set, Closed Circuit Scuba Set, Supervisor Propulsion Emergency and Recovery SCUBA (SPEaRS), Divers' Supplemental Issue Set(DSIS), Vertical Skills Engineer Construction Kit (VSECK), and Family of Boats and Motors (FOBAM).

BUDGET ITEM JUSTIFICATION: These systems provide state-of-the-art deployable, critical life support and combat engineer and construction equipment along with engineer safety and special unit support equipment supporting the joint warfighter. These programs minimize transportation requirements and reduce the logistical footprint by eliminating obsolete equipment and reducing the number of programs. Funding shall allow for development of dual use systems that support wartime use by Soldiers to include Special Forces and peacetime operations that include national disaster relief and homeland security operations. Much of this equipment has an inherent short Economic Useful Life (EUL). Investments used to revise, update and obtain equipment within this portfolio has resulted in reductions in footprint, and increases in safety, effectiveness, and readiness.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Family of Power Utility Kits (FoPUK)	0.750	2.341	0.050	-	0.050
<b>Description:</b> Conduct Market Research, Develop, and Initiate procurement activities for Family of Power Utility Kits (FoPUK).					



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p><b>FY 2018 Plans:</b> Procure and test Production Representative System (PRS), Engineering and Quality Assurance, and Program Management.</p> <p><b>FY 2019 Base Plans:</b> TM Development, Validation, Log Demo, Verification, Engineer/QA/PM Support</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease from FY18 to FY19 because program approval was delayed and funds shifted to FY18 to align with program.</p>					
<p><b>Title:</b> Urban Search and Resue (USR)</p> <p><b>Description:</b> Conduct Market Research, prepare documentation, and procure market samples for the Urban Search and Rescue (USR).</p>	1.252	-	-	-	-
<p><b>Title:</b> Supervisory Propulsion, Emergency and Recovery Set (SPEaRS)</p> <p><b>Description:</b> Prepare documentation, conduct market research, procure production representative, and complete required testing.</p> <p><b>FY 2018 Plans:</b> Documentation preparation, production representative system, testing support. Provide Engineer, Quality Assurance, and program management support.</p> <p><b>FY 2019 Base Plans:</b> TM Development, Engineer/QA/PM Support</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease from FY18 to FY19 because funding alignment with POM funding in FY19</p>	0.350	0.430	0.084	-	0.084
<p><b>Title:</b> Engineering and Quality Assurance</p> <p><b>Description:</b> Engineering and Quality Assurance of engineering SKOs</p> <p><b>FY 2018 Plans:</b> Engineering and Quality Assurance of engineering SKOs</p> <p><b>FY 2019 Base Plans:</b></p>	-	0.300	0.124	-	0.124

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Engineering and Quality Assurance of engineering SKOs <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease from FY18 to FY19 because support costs were allocated to specific programs in the R-3.					
<b>Title:</b> Airfield Damage Repair Kit (ADRK) <b>Description:</b> Conduct Market Research and Procure Market Samples for the ADRK. <b>FY 2018 Plans:</b> Documentation preparation, product representative set, Engineer Quality Assurance, and Program management. <b>FY 2019 Base Plans:</b> Engineer/QA/PM Support <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase from FY18 to FY19 due to alignment with anticipated POM funding and cancellation of US&R	-	0.150	0.015	-	0.015
<b>Title:</b> Program Management Support <b>Description:</b> Program support costs associated with emerging program development. <b>FY 2018 Plans:</b> Salary support in the product office for emerging programs. <b>FY 2019 Base Plans:</b> Salary support in the product office for emerging programs. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease from FY18 to FY19 because support costs were allocated to specific programs in the R-3.	-	0.249	0.048	-	0.048
<b>Title:</b> Special Tools <b>Description:</b> Develop Rapid Deployment Sets, Kits, and Outfits (SKOs) - Special Tool and support to Engineer combat and constructions sets along with diving and boats / motors equipment. <b>FY 2018 Plans:</b> Market Research for Special Tools, PRS Hardware, Test, Engineer/QA/PM Support <b>FY 2019 Base Plans:</b>	-	0.325	0.020	-	0.020

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Market Research for Special Tools, PRS Hardware, Test, Engineer/QA/PM Support					
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> Decrease from FY18 to FY19 because of decrease in total requirements.					
<b>Accomplishments/Planned Programs Subtotals</b>	2.352	3.795	0.341	-	0.341

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• R07001: <i>Enhanced Rapid Airfield Construction Capap</i>	2.779	2.563	0.980	-	0.980	0.979	3.557	9.819	18.037	0.000	38.714
• R12001: <i>Family of Boats and Motors</i>	3.567	4.302	5.806	-	5.806	3.916	2.244	0.304	2.584	0.000	22.723

**Remarks**

**D. Acquisition Strategy**

Programs will progress from pre Milestone Decision Document (MDD) activities through market research, market samples, Description for Purchase, development, production representative systems and testing. Modernization and Optimization of existing tools and testing of market samples will progress from Engineering and Manufacturing Development (EMD) and transition into production. All efforts will support the two level maintenance concept utilizing commercial technologies and incorporating them into SKOs to support next generation weapon and support systems.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Support	MIPR	PM SKOT : MI	-	0.159	Dec 2016	0.249	Dec 2017	0.048	Dec 2018	-		0.048	Continuing	Continuing	-
<b>Subtotal</b>			-	0.159		0.249		0.048		-		0.048	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Conduct Market Research for Family of Power Utility Kits (FoPUK)	MIPR	TBS : TBS	-	0.540		1.451		0.040	Oct 2018	-		0.040	Continuing	Continuing	-
Market Samples for Supervisory, Propulsion, Emergency and Recovery Set (SPEARS)	MIPR	TBS : TBS	-	0.263		-		0.040	Oct 2018	-		0.040	Continuing	Continuing	-
Conduct Market Research for Urban Search and Rescue	MIPR	TBS : TBS	-	0.893		-		-		-		-	0.000	0.893	-
Airfield Damage Repair Kit (ADRK)	TBD	TBS : TBS	-	-		0.055		-		-		-	0.000	0.055	-
Special Tools hardware	TBD	TBD : TBD	-	-		0.100		0.005	Jan 2019	-		0.005	0.000	0.105	-
<b>Subtotal</b>			-	1.696		1.606		0.085		-		0.085	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering and Quality Assurance - FoPUK	MIPR	ECBC/ARDEC : Rock Island, IL	-	-		0.590		0.010	Oct 2018	-		0.010	Continuing	Continuing	-
Engineering and Quality Assurance (ES&SUS)	MIPR	ECBC/ARDEC : Rock Island, IL	-	0.110		-		-		-		-	Continuing	Continuing	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L43 / ENGINEER SUPPORT EQUIPMENT - ED
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineer and Quality Assurance Support - SPEARS	MIPR	ECBC/ARDEC : Rock Island, IL	-	0.087		0.080		0.045	Oct 2018	-		0.045	Continuing	Continuing	-
Engineering and Quality Assurance - US&R	MIPR	ECBC/ARDEC : Rock Island, IL	-	0.300		-		-		-		-	Continuing	Continuing	-
General Engineer Support for Engineer Portfolio SKOs	MIPR	ECBC : Rock Island, IL	-	-		0.080		0.083	Oct 2018	-		0.083	Continuing	Continuing	-
Packaging Support for Engineer Portfolio SKOs	MIPR	ECBC : Rock Island, IL	-	-		0.080		0.040	Oct 2018	-		0.040	Continuing	Continuing	-
Technical Manual Support	MIPR	TACOM Publications : Warren, MI	-	-		0.140		-		-		-	Continuing	Continuing	-
Engineer and Quality Assurance Airfield Damage Repair Kit (ADRK)	MIPR	ECBC/ARDEC : Rock Island, IL	-	-		0.095		0.015	Oct 2018	-		0.015	Continuing	Continuing	-
Special Tools	TBD	TBD : TBD	-	-		0.225		0.015	Oct 2018	-		0.015	Continuing	Continuing	-
<b>Subtotal</b>			-	0.497		1.290		0.208		-		0.208	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Family of Power Utility Kits	MIPR	ATEC : Aberdeen	-	-		0.300		-		-		-	0.000	0.300	-
SPEARS testing	MIPR	ATEC : Aberdeen	-	-		0.350		-		-		-	0.000	0.350	-
<b>Subtotal</b>			-	-		0.650		-		-		-	0.000	0.650	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
<b>Project Cost Totals</b>		-	2.352	3.795	0.341	-	0.341	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Army							<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>			<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>				
	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	

<b>Remarks</b>									

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>	

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Market research, develop, build, test Family of Power Utility Kit																												
Market research, develop, build, test Urban Search and Rescue																												
Procurement of test articles and testing of Rigid Inflatable Boat																												
Procure Test Articles and Test Soldier Portable Sets																												
Procurement of test articles and testing of Airfield Damage Repair Kit																												
Procurement of test articles and testing of Special Tools																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Market research, develop, build, test Family of Power Utility Kit	1	2017	4	2020
Market research, develop, build, test Urban Search and Rescue	1	2017	4	2020
Procurement of test articles and testing of Rigid Inflatable Boat	1	2016	2	2018
Procure Test Articles and Test Soldier Portable Sets	1	2018	4	2022
Procurement of test articles and testing of Airfield Damage Repair Kit	2	2018	4	2019
Procurement of test articles and testing of Special Tools	1	2018	4	2023



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev					<b>Project (Number/Name)</b> L46 / Maintenance Support Equipment		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L46: Maintenance Support Equipment	-	1.813	2.053	1.412	-	1.412	1.897	1.947	1.829	2.044	0.000	12.995
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Not applicable for this item.

**A. Mission Description and Budget Item Justification**

Mobile Maintenance Equipment provides state of the art, deployable, vehicle-mounted, Soldier portable and containerized shelter tool systems supporting the Joint warfighter. These systems are equipped with industrial quality tools required for Two Level Maintenance that reduce common tool redundancy, provide tool standardization, minimize transportation requirements, reduces logistical footprint, and are backed by a Lifetime Warranty/Replacement Program which reduces sustainment costs. This is accomplished by employing a system of systems approach to maintenance acquisition. The System of Systems approach builds a maintenance capability upon each system, allowing a logical and natural approach to the Army's overall two level maintenance strategy. These inter-connected systems distributed throughout the Army at multiple levels and echelons provide a holistic repair capability in all scenarios and environments. These systems provide the Maintenance and Combat Commanders an unprecedented capability to repair wheeled, tracked, aviation, ground support and weapons systems on site at one location at one time. This approach to maintenance acquisition increases efficiencies and supports the current force while providing modular configurations designed to meet the specific needs of the Army maintainer in today's complex transforming environment.

**BUDGET ITEM JUSTIFICATION:** The need to develop and maintain a System of System maintenance approach is critical due to the growing complexity of today's military equipment, operational tempo, modularity, and current and evolving Tactics Techniques and Procedures (TTPs). The individual maintenance systems are comprehensive, interconnected and capable of solving and repairing any maintenance problems. The System of Systems approach does not advocate specific tools, methods or practices; instead it seeks to promote a streamlined comprehensive set of systems for solving maintenance challenges where the interactions of doctrine, technology, time and tactics techniques and procedures are the primary drivers. Funding for projects shall include test article procurement and testing of soldier portable maintenance SKOs, load banks and refrigeration tool kit; investigation of new technologies for next generation mobile maintenance equipment shop sets including the Shop Equipment Welding (SEW) and Shop Equipment Contact Maintenance (SECM); development of additional Standard Automotive Tool Set (SATS) maintenance modules, Armament Repair Shop Set 2, Mobile Ammunition Processing Facility (MAPF), Special Tools initiatives, shelter mounted system development; packaging development; and technical support for emerging JCIDS materiel requirements documents. Additive Manufacturing upgrades to the Metal Working and Machining Shop Set (MWMSS) to include a 3-D printing and associated digital library capability. Modernization upgrades increase effectiveness while improving efficiency, reliability and maintainability while supporting emerging Army systems as well as using lower cost set components.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Next Generation Shop Equipment, Welding (SEW)	0.893	0.565	0.256	-	0.256

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p><b>Description:</b> Develop and Test new components of Shop Equipment, Welding</p> <p><b>FY 2018 Plans:</b> Production Representative System (PRS) development, test, log development, Engineering, Quality Assurance, and Program Management.</p> <p><b>FY 2019 Base Plans:</b> Test, Technical Manual Development, Validation, Log Demo, Verification, Engineering, Quality Assurance, and Program Management.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease from FY18 to FY19 because funded testing in FY18 and it will be complete by FY19.</p>					
<p><b>Title:</b> Armament Repair Shop Set (ARSS) 2</p> <p><b>Description:</b> ARSS Shelter Modernization</p> <p><b>FY 2018 Plans:</b> Build the PRS with depot and test the PRS. Provide Engineer, Quality Assurance, and Program Management support.</p> <p><b>FY 2019 Base Plans:</b> Test, Technical Manual Development, Validation, Log Demo, Verification, Engineering, Quality Assurance, and Program Management.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease from FY18 to FY19 because testing and prototype hardware development procured in FY18 and not in FY19.</p>	-	0.537	0.528	-	0.528
<p><b>Title:</b> Special Tools</p> <p><b>Description:</b> Develop Rapid Deployment Sets, Kits, and Outfits (SKOs) - Special Tool and support to Tactical and Combat Vehicles.</p> <p><b>FY 2018 Plans:</b></p>	0.043	0.015	0.010	-	0.010

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>Market Research for Special Tools, PRS Hardware, Test, Engineering, Quality Assurance, and Program Management.</p> <p><b>FY 2019 Base Plans:</b> Market Research for Special Tools, PRS Hardware, Test, Engineering, Quality Assurance, and Program Management.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase from FY18 to FY19 because funded support for additional platform systems.</p>					
<p><b>Title:</b> Refrigeration Tool Kit (RTK)</p> <p><b>Description:</b> Develop RTK Individual and Base equipment, procure test articles and development of log products.</p> <p><b>FY 2018 Plans:</b> TM Development, Validation, Log Demo, Verification, Engineering, Quality Assurance, and Program Management.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease from FY18 to FY19 because RTK will be in production in FY19 and will no longer require RDTE funds.</p>	0.263	0.153	-	-	-
<p><b>Title:</b> MWMSS Additive Manufacturing</p> <p><b>Description:</b> Develop Additive Manufacturing capability for Army systems, Limited User Experiment and Evaluation.</p> <p><b>FY 2019 Base Plans:</b> Market Research, Development and Test of 3-D printing/Additive Manufacturing/Digital Library.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase from FY18 to FY19 because this is a new requirement in FY19.</p>	-	-	0.015	-	0.015
<p><b>Title:</b> Mobile Maintenance Equipment Shop Set</p> <p><b>Description:</b> Modernization / Redesign efforts of maintenance support equipment of the Mobile Maintenance Equipment Systems in support of technological advances, environmental/safety constraints and to support emerging systems</p>	0.454	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p><b>Title:</b> Mobile Ammunition Processing Facility (MAPF)</p> <p><b>Description:</b> Concept and design development for MAPF.</p> <p><b>FY 2018 Plans:</b> Market Research, Engineering, Quality Assurance, and Program Management.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase from FY18 to FY19 because we funded prototype hardware with FY19 and not with FY18.</p>	-	0.209	-	-	-
<p><b>Title:</b> The Fire Suppression Refill System (FSRS)</p> <p><b>Description:</b> Development and Integration efforts for the FSRS.</p> <p><b>FY 2018 Plans:</b> Test Article Build, Test, Log Development, Engineering, Quality Assurance, and Program Management.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease from FY18 to FY19 because FSRS will be in production in FY19 and will no longer require RDTE funds.</p>	-	0.200	-	-	-
<p><b>Title:</b> Next Generation Shop Equipment Contact Maintenance (SECM)</p> <p><b>Description:</b> Modernization upgrades to the SECM, mounted onto a Joint Light Tactical Vehicle (JLTV)</p> <p><b>FY 2019 Base Plans:</b> Market Research, Engineering, Quality Assurance, and Program Management.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase from FY18 to FY19 because this is a new requirement in FY19.</p>	-	-	0.185	-	0.185
<p><b>Title:</b> Program Management Support</p> <p><b>Description:</b> Program support costs associated with emerging program development.</p> <p><b>FY 2018 Plans:</b> Salary support in the product office for emerging programs.</p> <p><b>FY 2019 Base Plans:</b></p>	-	0.153	0.196	-	0.196

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Salary support in the product office for emerging programs. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease from FY18 to FY19 because budget decreased from FY18 to FY19, therefore Program Management support with decrease.					
<b>Title:</b> Packaging Support <b>Description:</b> Full Packaging Program Support and Packaging Data Management <b>FY 2018 Plans:</b> Develop and Maintain Logistics Packaging, Packing and Palletization data <b>FY 2019 Base Plans:</b> Develop and Maintain Logistics Packaging, Packing and Palletization data	0.037	0.083	0.083	-	0.083
<b>Title:</b> Engineering and Quality Assurance Support <b>Description:</b> Engineering Support from the Edgewood Chemical Biological Center (ECBC) and Quality Assurance Support from Armament Research, Development and Engineering Center (ARDEC) <b>FY 2018 Plans:</b> Engineer and Quality Assurance Support for RDTE funded Ordnance Portfolio Sets, Kits, and Outfits (SKOs). <b>FY 2019 Base Plans:</b> Engineer and Quality Assurance Support for RDTE funded Ordnance Portfolio SKOs <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase from FY17 to FY18 because of requirements change.	0.123	0.138	0.139	-	0.139
<b>Accomplishments/Planned Programs Subtotals</b>	1.813	2.053	1.412	-	1.412

<b>C. Other Program Funding Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• ML5345: <i>Items Less Than \$5.0M (Maint Eq)</i>	3.404	2.728	4.985	0.268	5.253	4.521	4.304	4.971	5.121	0.000	30.302
• G05301: <i>Mobile Maintenance Equipment Systems</i>	35.159	34.898	37.722	-	37.722	54.843	49.958	56.638	50.771	0.000	319.989

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

**D. Acquisition Strategy**

Programs will progress from pre Milestone Decision Document (MDD) activities through market research, market samples, Description for Purchase, development, production representative systems and testing. Modernization and Optimization of existing tools and testing of market samples will progress from Engineering and Manufacturing Development (EMD) and transition into production. All efforts will support the two level maintenance concept utilizing commercial technologies and incorporating them into SKOs to support next generation weapon and support systems.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L46 / Maintenance Support Equipment
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<b>Management Services (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	MIPR	PM SKOT : Warren, MI	-	0.159		0.153		0.196	Dec 2017	-		0.196	Continuing	Continuing	-
<b>Subtotal</b>			-	0.159		0.153		0.196		-		0.196	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Armament Repair Shop Set 2 design and development	MIPR	Tobyhanna Army Depot/TBD : Tobyhanna, PA	-	-		0.186		0.053	Mar 2019	-		0.053	Continuing	Continuing	-
Develop Rapid Deployment Sets, Kits, & Outfits - Special Tool Initiative.	MIPR	ECBC : Rock Island, IL	0.300	-		-		-		-		-	Continuing	Continuing	-
Refrigeration Tool Kit (RTK) Logistics Demonstration	MIPR	ECBC : Rock Island, IL	0.131	0.263		-		-		-		-	0.000	0.394	-
Modernization/Redesign efforts of Truck/Trailer transported shelters for next generation systems	MIPR	ECBC : Rock Island, IL	1.730	0.295		-		-		-		-	0.000	2.025	-
Procure Ground Based Special Tools in support of Tactical Vehicles	MIPR	PM SKOT : Harrison, MI	0.300	0.043		-		-		-		-	0.000	0.343	-
Next Generation Shop Equipment Welding (SEW) concept design and development	MIPR	ECBC : Rock Island, IL	1.600	0.893		-		-		-		-	0.000	2.493	-
<b>Subtotal</b>			4.061	1.494		0.186		0.053		-		0.053	Continuing	Continuing	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineer and Quality Assurance in support of SKOs	MIPR	ECBC / ARDEC : (IL, MI)	1.302	0.123		0.138	Dec 2017	0.138	Dec 2018	-		0.138	Continuing	Continuing	-
Packaging Support	MIPR	ARDEC : Rock Island, IL	0.111	0.037		0.083	Dec 2017	0.083	Dec 2018	-		0.083	Continuing	Continuing	-
Next Generation Shop Equipment Welding (SEW) support	MIPR	ECBC / ARDEC / PM SKOT : (IL, MI)	-	-		0.250	Dec 2017	0.256	Dec 2018	-		0.256	Continuing	Continuing	-
Refrigeration Tool Kit (RTK) support	MIPR	ECBC / ARDEC / PM SKOT : (IL, MI)	-	-		0.153	Dec 2017	-		-		-	Continuing	Continuing	-
Armament Repair Shop Set 2 support	MIPR	ECBC / ARDEC / PM SKOT : (IL, MI)	-	-		0.101	Dec 2017	0.167	Dec 2018	-		0.167	Continuing	Continuing	-
Additive Manufacturing support	MIPR	ECBC : IL	-	-		-		0.015	Dec 2018	-		0.015	Continuing	Continuing	-
Mobile Ammunition Processing Facility (MAPF) support	MIPR	ECBC / ARDEC / PM SKOT : (IL, MI)	-	-		0.209	Dec 2017	-		-		-	Continuing	Continuing	-
Fire Suppression Refill System (FSRS) support	MIPR	PM SKOT : MI	-	-		0.040	Dec 2017	-		-		-	Continuing	Continuing	-
Next Generation Shop Equipment Contact Maintenance support	MIPR	ECBC/PM SKOT : (IL, MI)	-	-		-		0.185	Dec 2018	-		0.185	Continuing	Continuing	-
Special Tools support	MIPR	ECBC : IL	-	-		0.015	Dec 2017	0.010	Dec 2018	-		0.010	Continuing	Continuing	-
<b>Subtotal</b>			1.413	0.160		0.989		0.854		-		0.854	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ARSS 2 Testing	MIPR	ATEC : Aberdeen Test Center	-	-		0.250		0.309	Dec 2018	-		0.309	0.000	0.559	-





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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Next Generation SEW Development and Test	█				█				█																			
ARSS 2 - Shelter Modernization Development and Test	█				█				█				█															
Special Tools Development and Test	█				█				█				█				█				█							
RTK Logistics Development	█				█				█																			
Additive Manufacturing Limited User Experiment and Evaluation	█				█				█				█				█				█							
Mobile Maintenance Equipment Shop Set Modernization and Red	█				█				█																			
NG SECM Development and Test	█				█				█				█				█											
FSRS Integration and Logisitcs Development	█				█				█																			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Next Generation SEW Development and Test	1	2016	2	2019
ARSS 2 - Shelter Modernization Development and Test	1	2018	4	2020
Special Tools Development and Test	1	2016	4	2023
RTK Logistics Development	1	2017	4	2018
Additive Manufacturing Limited User Experiment and Evaluation	1	2019	4	2023
Mobile Maintenance Equipment Shop Set Modernization and Redesign Efforts	1	2017	4	2017
NG SECM Development and Test	1	2019	4	2021
FSRS Integration and Logisitcs Development	1	2016	4	2018

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev				<b>Project (Number/Name)</b> L47 / Improved Environmental Control Units Ed			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L47: Improved Environmental Control Units Ed	-	1.210	1.951	2.340	-	2.340	2.152	2.206	3.948	6.989	0.000	20.796
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Not applicable for this item.

**A. Mission Description and Budget Item Justification**

The Improved Environmental Control Units (IECU) program will provide updates that support the new generation of Environmental Control Units (ECUs) that use environmentally approved refrigerants, with zero Ozone-Depleting Chemicals (ODCs) to replace the current Military Standard (MIL-STD) Family of ECUs. The IECUs will provide improved cooling, heating and dehumidification to Soldiers and critical equipment systems in combat, combat support, combat service support units, and combat support hospitals. The IECUs are required to replace currently fielded ECUs in order to comply with statutory and regulatory restrictions on the use of Class II ODCs (such as HCFC-22) and to improve the performance of military ECUs. They are form, fit, and function replacements to the current MIL-STD ECUs. Technical improvements over existing ECUs will yield significant fuel and weight savings, reduction in scheduled maintenance and increased reliability. The new family of IECUs will utilize a new refrigerant which complies with mandated Environmental Protection Agency (EPA) requirements. Funding supports the development of trailer-mounted systems, shelter system integration, as well as supporting the new ECU requirements coming from the Command Post Integrated Infrastructure (CPI2) Army Standard Family of Soft Walled Shelters (ASF-SWS) and Army Standard Family of Rigid Wall Shelters (ASF-RWS) Capabilities Development Documents (CDDs). In addition, the field has identified an emerging requirement for an integrated fuel-fired /cooling system. These variants will further standardize cooling units in the field, enable cooling of larger shelters and structures, offer increased mobility, and may be used to cool multiple tents with one unit. Funding also supports continued evaluation of IECUs and variants at Network Integration Evaluation (NIE) to support new operational concepts.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Technology Development	0.400	0.375	0.950	-	0.950
<b>Description:</b> Concept development for 9/18/36/60K BTUH Improved Environmental Control Unit (IECU), multiple trailer-mounted variants, Rigid Walled variants and integrated heating/cooling systems.					
<b>FY 2018 Plans:</b> Study technologies with variable capacity compressors, applicability of smart electronic controls that vary the capacity and efficiency, which allow for operation at the maximum temperature while being most efficient at lower temperatures. Current ECUs may have variable speed fans and/or compressors but may not have					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L47 / <i>Improved Environmental Control Units Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>the electronic controls necessary that would allow a true reduction in capacity and corresponding increase in efficiency.</p> <p><b>FY 2019 Base Plans:</b> Initiate development for next generation 60K IECU incorporating the latest technological advances to include: Chemical/Biological hardening; improved transportability; and utilization of next generation environmentally friendly refrigerants.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase in funding required to initiate the 60K IECU effort.</p>					
<p><b>Title:</b> Government System Test and Evaluation</p> <p><b>Description:</b> Testing of prototype performance for the trailer mounted and other variants of the IECUs and soft wall shelter ECUs.</p> <p><b>FY 2018 Plans:</b> Support Engineering and Manufacturing Development (EMD) effort on the 9/18/36K IECU family and comply with tightening statutory and regulatory restrictions. Conduct testing on possible product improvements to the existing family of IECUs.</p> <p><b>FY 2019 Base Plans:</b> Conduct performance testing in environmental chambers to measure changes in output and power consumption on 9/18/36/60K BTUH IECUs with new variable capacity compressors and smart controls.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase in funding required to support an extensive series of tests on multiple variants of the IECU family.</p>	0.200	0.300	0.700	-	0.700
<p><b>Title:</b> Engineering Development</p> <p><b>Description:</b> Support engineering, logistics, and testing efforts for multiple trailer-mounted variants, soft wall ECUs, and integrated heating/cooling units. Match and right-size current IECU family to the ASF-RWS and ASF-SWS variants and/or develop and test new variants to provide the most efficient system solution.</p> <p><b>FY 2018 Plans:</b></p>	0.400	0.898	0.307	-	0.307

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L47 / <i>Improved Environmental Control Units Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>Support continuing technology transitions and insertions through prototype demonstrations for follow-on IECU variants that meet the requirements to support the Command Post Integrated Infrastructure (CPI2), and the Army Standard Family of Rigid Wall Shelter (ASF-RWS) program.</p> <p><b>FY 2019 Base Plans:</b> Conduct analysis and testing to match and right-size the current family of IECUs to the ASF-RWS variants that are under development.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease in funding due to reduced scope of effort to right-size IECUs to the ASF-RWS in FY 19.</p>					
<p><b>Title:</b> Government Program Management</p> <p><b>Description:</b> Provide oversight and management of engineering, logistics, contracts, and testing efforts for the 9/18/36/60K IECU family and multiple trailer-mounted variants prepare for IECU variants to transition to production. Provide oversight and management of follow-on ECU variants.</p> <p><b>FY 2018 Plans:</b> Manage continuing technology insertions and demonstrations of prototypes for follow-on variants that meet requirements of the ASF-RWS and comply with tightening statutory and regulatory restrictions.</p> <p><b>FY 2019 Base Plans:</b> Oversee the design and integration of the variable capacity compressors and smart controls into the standard 9/18/36/60K BTUH IECUs in addition to testing. Manage continuing technology improvements to include the development of IECU prototypes that utilize advanced non-ozone depleting referigerants. Coordinate with the ASF-RWS program of record to ensure proper integration of required ECUs.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase in funding required to support required technical oversight and program management over two major development efforts that are underway in FY19.</p>	0.210	0.378	0.383	-	0.383
<b>Accomplishments/Planned Programs Subtotals</b>	1.210	1.951	2.340	-	2.340

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L47 / <i>Improved Environmental Control Units Ed</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• MF9303: OPA 3, <i>Improved Environmental Control Units , MF9303</i>	18.601	7.675	9.852	0.270	10.122	16.775	22.016	27.490	29.499	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

Support technology insertions required to adapt IECUs to support future Integrated Command Post heating and cooling requirements in support of Force 2025 and the Command Post Integrated Infrastructure (CPI2). Evaluate requirements versus existing IECU Fleet and developed/test initial prototypes of ECUs in support of ASF-SWS and ASF-RWS CDDs. This effort will support the development of Purchase Descriptions (PDs) and Technical Data Packages (TDPs) for eventual competitive procurement.

**E. Performance Metrics**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L47 / Improved Environmental Control Units Ed
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<b>Management Services (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
9,18 and 36K Improved Environmental Control Unit (IECU)	Various	PM E2S2 : various	1.174	-		0.160		0.183		-		0.183	0.000	1.517	Continuing
Trailer Variants	Various	PM E2S2 : various	0.516	0.059		0.058		-		-		-	0.000	0.633	Continuing
60K IECU	Various	PM E2S2 : various	0.060	0.081		0.160		0.200		-		0.200	0.000	0.501	-
Integrated heating/cooling units	Various	PM E2S2 : various	0.035	0.070		-		-		-		-	0.000	0.105	-
SBIR/STTR	Various	various : various	0.137	-		-		-		-		-	0.000	0.137	-
<b>Subtotal</b>			1.922	0.210		0.378		0.383		-		0.383	0.000	2.893	N/A

<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
9,18 and 36K Improved Environmental Control Unit (IECU)	C/CPFF	Mainstream Engineering : Vero Beach, FL	2.064	-		-		0.307		-		0.307	0.000	2.371	Continuing
Trailer Mounted variants	MIPR	CERDEC Night Vision Lab : Ft Belvoir, VA	0.425	0.100		0.211		-		-		-	0.000	0.736	-
60K IECU	C/CPFF	TBD : TBD	2.125	0.200		0.337		0.950		-		0.950	0.000	3.612	-
Integrated heating/cooling units	MIPR	CERDEC Night Vision Lab : Ft. Belvoir, VA	0.225	0.100		-		-		-		-	0.000	0.325	-
<b>Subtotal</b>			4.839	0.400		0.548		1.257		-		1.257	0.000	7.044	N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L47 / Improved Environmental Control Units Ed
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<b>Support (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
9, 18 and 36K Improved Environmental Control Unit (IECU)	MIPR	CERDEC : Fort Belvoir, VA	2.117	-		-		-		-		-	0.000	2.117	-
60K IECU	Various	CERDEC : Fort Belvoir, VA	3.982	0.200		0.225		-		-		-	0.000	4.407	-
Trailer variants	MIPR	CERDEC : Fort Belvoir, VA	0.720	0.100		0.500		-		-		-	0.000	1.320	-
Integrated heating/cooling units	MIPR	CERDEC : Fort Belvoir, VA	0.221	0.100		-		-		-		-	0.000	0.321	-
<b>Subtotal</b>			7.040	0.400		0.725		-		-		-	0.000	8.165	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
9,18 and 36K Improved Environmental Control Unit (IECU)	MIPR	A TEC : APG, MD	0.478	-		-		0.450		-		0.450	0.000	0.928	-
Trailer Variants	MIPR	A TEC : APG, MD	0.374	0.050		-		-		-		-	0.000	0.424	Continuing
60K IECU	MIPR	A TEC : APG, MD	0.225	0.100		0.300		0.250		-		0.250	0.000	0.875	-
Integrated heating/cooling units	MIPR	A TEC : APG, MD	0.150	0.050		-		-		-		-	0.000	0.200	-
<b>Subtotal</b>			1.227	0.200		0.300		0.700		-		0.700	0.000	2.427	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
<b>Project Cost Totals</b>		15.028	1.210	1.951	2.340	-	2.340	0.000	20.529	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L47 / <i>Improved Environmental Control Units Ed</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Technology insertions/prototype demo for IECU in support of CP12	[Red shaded area]				[Red shaded area]																							
Study Technologies for ECU compressors and smart controls																												
Procure and test prototypes of ECU compressors and smart controls.									[Blue bar]																			
Design and Testing for potential product improvements to IECU Family									[Blue bar]				[Blue bar]															
Concept Development for High Efficiency ECUs													[Blue bar]				[Blue bar]				[Blue bar]							
Concept Development for Integrated Trailer-Mounted Systems													[Blue bar]				[Blue bar]				[Blue bar]							
Award development contract for Next Generation 60K IECU									▲ 1																			
Develop prototype 60K IECU's									[Blue bar]																			
Conduct Development Test on 60K IECU													[Blue bar]															
Conduct Operational Testing on 60K IECU																	[Blue bar]											
Transition 60K IECU to production																					▲ 2							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L47 / <i>Improved Environmental Control Units Ed</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Technology insertions/prototype demo for IECU in support of CPI2 & ASF-RWS Progr	1	2017	4	2018
Study Technologies for ECU compressors and smart controls	1	2018	4	2018
Procure and test prototypes of ECU compressors and smart controls.	1	2019	4	2020
Design and Testing for potential product improvements to IECU Family	1	2018	4	2021
Concept Development for High Efficiency ECUs	1	2020	4	2023
Concept Development for Integrated Trailer-Mounted Systems	1	2020	4	2023
Award development contract for Next Generation 60K IECU	2	2019	2	2019
Develop prototype 60K IECU's	2	2019	3	2020
Conduct Development Test on 60K IECU	4	2020	2	2021
Conduct Operational Testing on 60K IECU	3	2021	3	2021
Transition 60K IECU to production	1	2022	1	2022

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army										<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>					<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</i>		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
VR7: <i>Combat Service Support Systems</i>	-	4.159	3.743	4.533	-	4.533	6.132	4.819	5.271	3.064	0.000	31.721
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project supports Engineering and Manufacturing Development (EMD) of critical soldier support and sustainment systems that provide more endurance and agility to combat operations enabling success of Army Expeditionary Forces in future multi-domain scenarios. Project includes highly mobile shelter systems (rigid and soft wall), expeditionary base camp subsystems, field service systems, mortuary affairs equipment, field heaters, and other combat service support equipment. These systems will fill identified theater capability gaps, improve safety, improve unit sustainability, improve resource and energy efficiency and increase combat effectiveness. This project supports Engineering and Manufacturing Development (EMD), Prototyping, and testing of critical tactical support systems that support mobile Joint Service command and control, medical, force projection and maintenance platforms. This project develops critical enablers that support the Army Campaign Plan and Army Modernization Strategy by maintaining readiness through fielding and integrating new equipment. This project also ensures Army Expeditionary Forces are capable of rapid deployment while reducing sustainment requirements, related Combat Support/Combat Service Support (CS/CSS) demands in lift, combat zone footprint, and costs for logistical support.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Expeditionary Shelter Protection System (ESPS)	0.994	0.450	0.450	-	0.450
<b>Description:</b> ESPS is a lightweight, rapidly deployable and reusable ballistic protection system that can be integrated with commonly used military shelters in expeditionary and remote base camps and outposts where more robust forms of ballistic protection (i.e. sandbags, concrete barriers) are not readily available or logistically feasible.					
<b>FY 2018 Plans:</b> Award development contract, procure and build test items and initiate Development Testing/Operational Testing (DT/OT) for ESPS. Initiate preparation of logistics and programmatic documentation.					
<b>FY 2019 Base Plans:</b> Complete DT and logistics requirements, prepare documentation and obtain Type Classification Standard pending Army decision on future production.					
<b>Title:</b> Family of Space Heaters	0.271	-	0.150	-	0.150

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p><b>Description:</b> The family of Army Space Heaters support soldiers operating in basic, cold and extreme cold environments with a safe, portable, lightweight, multi-fueled, self-powered space heaters for use in tents and/or expeditionary shelters that do not require an external power source. These heaters provide the much needed capability of providing heated air effectively and efficiently while eliminating the shortcomings of the antiquated, dangerous and inefficient heaters they are replacing in the inventory.</p> <p><b>FY 2019 Base Plans:</b> Conduct evaluations for potential product improvements to the existing Family of Space Heaters. Prepare and coordinate Engineering Change Proposals that incorporate improvements into heater performance specifications.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Increase required to support EMD efforts on transitioning technology.</p>					
<p><b>Title:</b> Resource and Energy Efficiency Enabling Solutions</p> <p><b>Description:</b> Reduces the resource, operational energy and logistics footprint of critical soldier support and sustainment systems while maintaining or improving operational effectiveness. The goal is to significantly reduce fuel, water, and power requirements to sustain multi-domain operations in addition to reducing maintenance and spare parts requirements. Systems such as Command Posts, Expeditionary Operating Bases, and Combat Support Hospitals require a significant amount of logistics and sustainment support which cost valuable resources, require extra human effort (that means a risk in the form of Soldiers on the road), limit endurance, restrict agility, and increase vulnerability.</p> <p><b>FY 2018 Plans:</b> Conduct evaluation on Net-Zero energy efficiency solutions for Force Provider. Initiate DT on alternative energy subsystems and mature expeditionary shelter energy efficiency upgrades that can integrate into the Force Provider module. Transition proven and validated capabilities into full-rate production and/or reset.</p> <p><b>FY 2019 Base Plans:</b> Continue to integrate and evaluate resource and operational energy-saving solutions for Command Posts, Expeditionary Operating Bases, and Combat Support Hospitals. Complete testing on energy-efficient appliances, improved energy-efficient expeditionary lighting systems, and smart base non-intrusive monitoring.</p>	1.600	0.199	0.200	-	0.200

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Collect data to inform and support development of logistics support and the Engineering Change Proposal to transition proven and validated capabilities into full-rate production and/or reset. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding levels stable between FY18 and FY19.					
<b>Title:</b> Laundry and Shower Improvements <b>Description:</b> Provides an enhanced capability for field hygiene with improved hot and cold weather performance, better compatibility with current and future combat clothing, and increased reliability, maintainability and ease of operation. <b>FY 2018 Plans:</b> Complete prototype upgrade kits for Developmental Testing on improvements developed for the Laundry Advanced System (LADS). <b>FY 2019 Base Plans:</b> Conduct Developmental Testing on the Laundry Advanced System (LADS) modification kits. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Slight decrease in funding. Funding needed to complete prototype design, development, and fabrication and transition into Developmental Testing.	0.800	0.897	0.850	-	0.850
<b>Title:</b> Expeditionary Solid Waste Disposal (ESWDS) <b>Description:</b> Provides an integrated waste management (reduction, treatment or disposal process) add-on capability that can safely process 1,000 pounds (lbs) or more of mixed solid waste in a single day on site. Mixed solid waste produced on a single 150 person site must be properly managed through reduction, reuse, recycling, treatment, or disposal. Most of the waste is nonhazardous solid waste. Provides a substantial improvement over the current practice of burn pits that poses a health risk to Soldiers and/or backhaul which poses an additional logistics burden. <b>FY 2018 Plans:</b> Complete procurement of prototype systems. Conduct Developmental and Operational Test (DT & OT) on ESWDS. Complete program documentation for transition to production. <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>	0.244	1.250	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Completed EMD in FY18.					
<p><b>Title:</b> Containerized Ice Making System (CIMS)</p> <p><b>Description:</b> Develops an add-on ice making capability that automatically dispenses and seals 10 pound bags at a rate of a minimum of 3,600 pounds of ice per day. This capability is based upon current Army operational requirements for ice which is four pounds per Soldier per day. This capability enables support for up to 900 personnel. Current operations require external support to provide personnel with ice for cooling drinking water in extremely arid environments. This capability will reduce the sustainment risk and cost associated with transporting this commodity from external sources. The objective requirement enables stockage of ice to assist with surge operations.</p> <p><b>FY 2018 Plans:</b> Initiate developmental and operational testing (DT &amp; OT) on selected prototypes. Develop Programmatic documentation, specification and contract solicitation. Transition into production</p> <p><b>FY 2019 Base Plans:</b> Complete logistics requirements, prepare documentation and obtain Type Classification Standard decision pending Army decision on future production.</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease in funding due to due to fact that required DT/OT will be complete in FY18 and FY19 effort will be focused on preparing for transition to production.</p>	0.250	0.400	0.300	-	0.300
<p><b>Title:</b> Army Standard Family of Rigid Wall Shelters (ASF-RWS)</p> <p><b>Description:</b> The ASF-RWS program will conduct formal development to incorporate the latest technologies into a fully supportable and modernized family. The intent is to eliminate the proliferation of non-standard shelters and their associated logistics burden, thereby reducing the lifecycle cost of RWS across the Services. The program will produce approved Technical Data Packages (TDPs) to support procurements by materiel developers and Program Managers (PMs) requiring RWS. Once developed and formally type-classified, ASF-RWS procurements are customer funded by PMs as a cost under their program(s). The ASF-RWS will consist of three variants: (1) Expandable/Non-Expandable; (2) Vehicle Mounted; and (3) Panelized/Collapsible with a focus on the following features and improvements: reduced cost, reduced weight, improved energy efficiency, improved corrosion resistance, and improved transportability.</p> <p><b>FY 2018 Plans:</b></p>	-	0.547	2.583	-	2.583

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</i>

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Prepare documentation and obtain Milestone B decision authorizing ASF-RWS to enter Engineering Manufacturing Development (EMD). Award ASF - RWS developmental contract for the expandable / non-expandable variants.					
<b><i>FY 2019 Base Plans:</i></b> Continue design and development of the Expandable / Non-Expandable Shelter variants. Initiate development of logistics support documentation. Initiate Developmental Testing.					
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> Effort supports advanced component development of multiple variants of the ASF(RWS). Funding increase due to the transition of the Expandable/ Non-Expandable RWS variant into EMD where significant prototype development efforts will occur.					
<b>Accomplishments/Planned Programs Subtotals</b>	4.159	3.743	4.533	-	4.533

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• VR8: <i>Combat Service Support Systems - Ad</i>	4.004	5.062	3.222	-	3.222	3.447	3.116	2.587	2.637	0.000	24.075

**Remarks**

**D. Acquisition Strategy**

Accelerate product development and testing to transition into production.

**E. Performance Metrics**

N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> VR7 / Combat Service Support Systems
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<b>Management Services (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Project Management Support	Various	PM Force Sustainment Systems : Natick, MA	1.087	0.299	Oct 2016	0.713		0.758	Nov 2018	-		0.758	Continuing	Continuing	-
CBI Support	Various	PD CBI : Warren, MI	3.747	-		-		-		-		-	0.000	3.747	-
SBIR+STTR	TBD	Various : Various	0.077	-		-		-		-		-	0.000	0.077	-
<b>Subtotal</b>			4.911	0.299		0.713		0.758		-		0.758	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Soldier Support Equipment	TBD	Various : Various	6.851	1.570	Nov 2016	2.416		0.175	Nov 2018	-		0.175	Continuing	Continuing	-
Contingency Basing Infrastructure	Various	Various : Various	1.531	-		-		-		-		-	0.000	1.531	-
Laundry Improvements	Various	Various : Various	-	-		-		0.100	Nov 2018	-		0.100	0.000	0.100	-
Army Standard Family of Rigid Wall Shelters (ASF-RWS)	Various	Various : Various	-	-		-		1.750	Dec 2018	-		1.750	0.000	1.750	-
<b>Subtotal</b>			8.382	1.570		2.416		2.025		-		2.025	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Soldier Support Equipment	Various	Various : Various	5.438	2.290	Nov 2016	0.614		0.475	Dec 2018	-		0.475	Continuing	Continuing	-
Contingency Basing Infrastructure	Various	Various : Various	1.206	-		-		-		-		-	0.000	1.206	-
Laundry Improvements	Various	Various : Various	-	-		-		0.695	Dec 2018	-		0.695	0.000	0.695	-
Army Standard Family of Rigid Wall Shelters (ASF-RWS)	Various	Various : Various	-	-		-		0.580	Mar 2019	-		0.580	0.000	0.580	-



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Integrate, evaluate, and transition modernized equipment into FP	[Redacted]																											
Award Development Contract and procure ESPS prototypes for	[Redacted]																											
Conduct DT on ESPS	[Redacted]								[Redacted]																			
Prepare for and execute Type Classification of ESPS	[Redacted]								[Redacted]																			
Obtain TC-STD for ESPS	[Redacted]												1															
Develop Laundry System Improvements	[Redacted]								[Redacted]																			
Conduct DT/OT on Laundry System Improvements	[Redacted]								[Redacted]				[Redacted]															
Conduct DT/OT on ESWDS	[Redacted]								[Redacted]																			
Prepare for and execute Production Decision for ESWDS	[Redacted]								[Redacted]																			
Conduct DT/OT on CIMS	[Redacted]								[Redacted]																			
Prepare for and execute Type Classification of CIMS	[Redacted]								[Redacted]																			
Obtain TC-STD for CIMS	[Redacted]												2															
Award EMD contract and procure prototypes for ASF-RWS (Exp/Non-Exp)	[Redacted]								[Redacted]				[Redacted]															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Army</b>		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</i>

Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Conduct DT/OT on ASF-RWS (Exp/Non-Exp) variants									■	■	■	■																
Prepare for and obtain Milestone C / TC-STD decision for ASF-RWS (Exp/Non-Exp)													■	■	■	■												
Award EMD contract and procure prototypes for ASF-RWS (Veh Mtd)													■	■	■	■												
Conduct DT/OT on ASF-RWS (Veh Mtd) variants																	■	■	■	■								
Prepare for and obtain Milestone C / TC-STD decision for ASF-RWS (Veh Mtd)																					■	■	■	■				
Award EMD contract and procure prototypes for ASF-RWS (Coll/Panel)																	■	■	■	■								
Conduct DT/OT on ASF-RWS (Coll/Panel) variants																									■	■	■	■
Prepare for and obtain Milestone C / TC-STD decision for ASF-RWS (Coll/Panel)																												
Award EMD contract and procure prototypes for ASF-SWS (Mission Cmd)													■	■	■	■												
Conduct DT on ASF-SWS (Mission Cmd) variants																									■	■	■	■
Prepare for and obtain Milestone C / TC-STD decision for ASF-SWS (Mission Cmd)																												
Award EMD contract and procure prototypes for ASF-SWS (General Purpose)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Integrate, evaluate, and transition modernized equipment into FP & Command Posts	1	2016	4	2023
Award Development Contract and procure ESPS prototypes for testing	3	2016	2	2018
Conduct DT on ESPS	2	2018	1	2019
Prepare for and execute Type Classification of ESPS	4	2018	2	2019
Obtain TC-STD for ESPS	2	2019	2	2019
Develop Laundry System Improvements	2	2017	1	2019
Conduct DT/OT on Laundry System Improvements	1	2019	4	2019
Conduct DT/OT on ESWDS	2	2018	4	2018
Prepare for and execute Production Decision for ESWDS	4	2018	4	2018
Conduct DT/OT on CIMS	2	2018	4	2018
Prepare for and execute Type Classification of CIMS	4	2018	1	2019
Obtain TC-STD for CIMS	2	2019	2	2019
Award EMD contract and procure prototypes for ASF-RWS (Exp/Non-Exp)	3	2018	4	2019
Conduct DT/OT on ASF-RWS (Exp/Non-Exp) variants	1	2019	2	2020
Prepare for and obtain Milestone C / TC-STD decision for ASF-RWS (Exp/Non-Exp)	3	2020	4	2020
Award EMD contract and procure prototypes for ASF-RWS (Veh Mtd)	1	2020	4	2020
Conduct DT/OT on ASF-RWS (Veh Mtd) variants	1	2021	4	2021
Prepare for and obtain Milestone C / TC-STD decision for ASF-RWS (Veh Mtd)	4	2021	1	2022
Award EMD contract and procure prototypes for ASF-RWS (Coll/Panel)	2	2021	1	2022
Conduct DT/OT on ASF-RWS (Coll/Panel) variants	2	2022	4	2022
Prepare for and obtain Milestone C / TC-STD decision for ASF-RWS (Coll/Panel)	4	2022	1	2023
Award EMD contract and procure prototypes for ASF-SWS (Mission Cmd)	3	2020	4	2021

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Army		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</i>

Events	Start		End	
	Quarter	Year	Quarter	Year
Conduct DT on ASF-SWS (Mission Cmd) variants	4	2021	3	2022
Prepare for and obtain Milestone C / TC-STD decision for ASF-SWS (Mission Cmd)	3	2022	1	2023
Award EMD contract and procure prototypes for ASF-SWS (General Purpose)	3	2022	4	2023