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**Department of Defense
Fiscal Year (FY) 2018 Budget Estimates**

May 2017



Army

Justification Book of

Research, Development, Test & Evaluation, Army

RDT&E – Volume III, Budget Activity 7

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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, \$9,544,808,000 to remain available for obligation until September 30, 2019.

The following Justification Books were prepared at a cost of \$250,916: 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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FY 2018 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 2018.

2. **Relationship of the FY 2018 Budget Submitted to Congress to the FY 2017 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:

<u>Budget Activity</u>	<u>OSDPE/Project</u>	<u>Project Title</u>
01	0601104A/FF5	Distributed Collaborative Intelligent Systems CTA
01	0601104A/FF7	Internet of Battlefield Things CTA
03	0603001A/FF6	Individual Protection
03	0603009A/FH1	Tractor Hike
04	0603639A/XT5	30mm Anti-Personnel and Counter-Air
04	0603645A/EV7	Combat Vehicle Prototyping
04	0603807A/VS7	MEDEVAC Mission Equipment Package (MEP) - Adv Dev
04	0604017A/FD2	Soldier Robotics Systems
04	0604017A/FD3	Battery Modernization & Interface Standardization
04	0604017A/FD9	Robotics Systems

<u>Budget Activity</u>	<u>OSDPE/Project</u>	<u>Project Title</u>
04	0604117A/FI4	Maneuver – Short Range Air Defense (M-SHORAD)
04	0604120A/EJ3	ANTI-JAM ANTENNA
04	0604121A/FD6	Synthetic Training Environment Refine & Prototype
05	0604601A/FF2	Small Arms Fire Control
05	0604601A/FI2	Lightweight 30mm Cannon
05	0604604A/H07	Family Of Med Tac Veh
05	0604768A/688	ATACMS BLK II
05	0604768A/P01	MULTI - MODE SEEKER DEVELOPMENT AND TEST
05	0604802A/EW1	40mm LV High Explosive Air Burst, XM1166
05	0604802A/FA6	30mm Lethality
05	0604804A/FG4	Ultra-Lightweight Camouflage Net System (ULCANS)
05	0604818A/ER9	Expeditionary Army Command Post
05	0604823A/L87	Hypervelocity Projectile System
05	0604852A/FE8	Vehicle Protection Suite
05	0605013A/VR3	ASMIS-R (REPORTIT)
05	0605037A/EQ6	Evidence Collection and Detainee Processing
05	0605053A/FB2	Man Transportable Robotic System (MTRS) Inc II
05	0605053A/FB3	Robotics Architecture
05	0605053A/FB4	Common Robotic Systems
05	0605053A/FB6	Squad Multipurpose Equipment Transport (SMET)
05	0605053A/FB7	Robotics Enhanced Program (REP)
05	0605053A/FB8	Soldier Borne Sensor (SBS)

<u>Budget Activity</u>	<u>OSDPE/Project</u>	<u>Project Title</u>
05	0605053A/FB9	MTRS Standardization
05	1205117A/FG3	Tractor Bears
06	0606001A/FD4	Military Ground-Based CREW Technology
07	0203735A/280	RECOV VEH IMPROV PROG
07	0203735A/431	M113 IMPROVEMENTS
07	0203743A/FF9	PIM Improvement Program
07	0203802A/788	ATACMS PIP
07	0205412A/EE6	Environmental Information Tech Modernization
07	0303028A/FG2	Counterintelligence & Human Intel Modernization
07	0303140A/FF8	Unit Activity Monitoring (UAM)
07	0305172A/XT9	Combined Advanced Applications

B. Program Element/Project Restructures:

<u>Budget Activity</u>	<u>Old OSDPE/Project: Title</u>	<u>New OSDPE/Project: Title</u>
04	0603308A/990: Space and Missile Defense Integration	1206308A/FE5: Space and Missile Defense Integration
04	0603308A/EB7: Army Space System Enhancement/Integration	1206308A/FE6: Army Space System Enhancement/Integration
04	0305219AMQ1: MQ-1 Gray Eagle – Army UAV (MIP)	0603804A/EW8: Armored Engineer Vehicles
05	0604201A/VU3: Networking and Mission Planning	0604201A/EW7: Degraded Visual Environment
05	0603639A/EB8: OWL for Small Caliber Ammunition	0604802A/EP4: One-Way Luminescence For Small Caliber Ammo
05	0603639A/EU2: Improved Multi-Option Fuze (iMOFA/iMOFM)	0604802A/EU8: Improved Multi-Option Fuze
05	0604827A/S65: Platoon Power Generator	0604827A/EY2: Integrated Soldier Power Data System Core
05	0604827A/S65: Platoon Power Generator	0604827A/EY4: Universal Battery Charger
05	0203735A/EE2: Stryker Improvement	0604852A/XU9: Active Protection System
05	0605013A/738: AcqBiz	0605013A/FE9: ALTESS (P & R Forms)
05	0603627A/E79: Smoke/Obscurant System	0605038A/EQ7: NBC Reconnaissance Vehicle (NBCRV)
05	0605051A/ER8: Common Missile Warning System (CMWS)	0605049A/XT4: Advanced Threat Detection System (ATDS)
05	0303142A/EA3: Transportable Tactical Cmd Comms (T2C2)	0605766A/EX7: Air Vigilance System Development
06	0605898A/M03: Command HQ - MRDC	0605898A/XW7: Command HQ - ARI
06	0605301A/DX2: Army Kwajalein and Mission Support	0606002A/XW9: Reagan Test Site
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/EA3: Transportable Tactical Cmd Comms (T2C2)	1203142A/FE4: Enroute Mission Command
07	0208053A/635: Joint Tact Grd Station P3I (MIP)	1208053A/FE7: Joint Tact Grd Station-P3I(MIP)
07	0305219A/RQ7: RQ-7 Shadow UAV	0607143A/EX1: Unmanned Aircraft Systems Universal Products

C. Program Terminations:

<u>Budget Activity</u>	<u>OSDPE/Project</u>	<u>OSDPE Title/Project Title</u>
01	0601104A/H53	University & Industry Rsch Ctrs / Army High Performance Computing Research Center
01	0601104A/H53	University & Industry Rsch Ctrs / Micro-autonomous Systems Technology (MAST) CTA
05	0604601A/S62	Infantry Support Weapons / Counter-Defilade Target Engagement - SDD

- 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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Department of Defense
 FY 2018 President's Budget Request
 Exhibit R-1 FY 2018 President's Budget Request
 Total Obligational Authority
 (Dollars in Thousands)

26 Apr 2017

Appropriation	FY 2016	FY 2017	FY 2017	FY 2017	FY 2017	FY 2017	FY 2017
	Base + OCO	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj OCO	Total PB Requests* with CR Adj OCO	Less Enacted Div B P.L.114-254** OCO	Remaining Req with CR Adj OCO
Research, Development, Test & Eval, Army	7,861,744	7,547,794	7,897,415	1,500	233,300	-78,700	154,600
Total Research, Development, Test & Evaluation	7,861,744	7,547,794	7,897,415	1,500	233,300	-78,700	154,600

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Appropriation	FY 2017 Total PB Requests** with CR Adj Base+OCO+SAA	FY 2017 Total PB Requests* with CR Adj Base + OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj Base + OCO	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Research, Development, Test & Eval, Army	7,627,994	8,130,715	-78,700	8,052,015	9,425,440	119,368	9,544,808
Total Research, Development, Test & Evaluation	7,627,994	8,130,715	-78,700	8,052,015	9,425,440	119,368	9,544,808

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	FY 2016 Base + OCO	FY 2017 PB Request with CR Adj Base	FY 2017 Total PB Requests* with CR Adj Base	FY 2017 PB Request with CR Adj OCO	FY 2017 Total PB Requests* with CR Adj OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj OCO
<u>Summary Recap of Budget Activities</u>							
Basic Research	450,831	428,943	428,943				
Applied Research	1,070,349	907,574	907,574				
Advanced Technology Development	1,113,746	930,065	943,365				
Advanced Component Development & Prototypes	499,287	550,635	566,835	9,375	25,395		25,395
System Development & Demonstration	2,202,652	2,265,094	2,393,383	84,043	288,443	-78,700	209,743
RDT&E Management Support	1,259,926	1,136,134	1,161,991				
Operational Systems Development	1,264,953	1,296,954	1,462,929	7,104	18,484		18,484
Undistributed		32,395	32,395	-99,022	-99,022		-99,022
Total Research, Development, Test & Evaluation	7,861,744	7,547,794	7,897,415	1,500	233,300	-78,700	154,600
<u>Summary Recap of FYDP Programs</u>							
General Purpose Forces	802,086	618,038	697,138		4,530		4,530
Intelligence and Communications	400,329	238,711	268,755	7,104	8,854		8,854
Research and Development	6,596,225	6,591,738	6,832,215	93,418	318,938	-78,700	240,238
Central Supply and Maintenance	58,503	62,287	62,287				
Administration and Associated Activities	65	32,395	32,395	-99,022	-99,022		-99,022
Space							
Classified Programs	4,536	4,625	4,625				
Total Research, Development, Test & Evaluation	7,861,744	7,547,794	7,897,415	1,500	233,300	-78,700	154,600

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Summary Recap of Budget Activities	FY 2017 Total PB Requests** with CR Adj Base+OCO+SAA	FY 2017 Total PB Requests* with CR Adj Base + OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj Base + OCO	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Basic Research	428,943	428,943		428,943	430,022		430,022
Applied Research	907,574	907,574		907,574	889,182		889,182
Advanced Technology Development	930,065	943,365		943,365	1,070,977		1,070,977
Advanced Component Development & Prototypes	560,010	592,230		592,230	890,889	18,000	908,889
System Development & Demonstration	2,427,837	2,681,826	-78,700	2,603,126	3,012,840	57,840	3,070,680
RDT&E Management Support	1,136,134	1,161,991		1,161,991	1,253,845		1,253,845
Operational Systems Development	1,304,058	1,481,413		1,481,413	1,877,685	43,528	1,921,213
Undistributed	-66,627	-66,627		-66,627			
Total Research, Development, Test & Evaluation	7,627,994	8,130,715	-78,700	8,052,015	9,425,440	119,368	9,544,808
<u>Summary Recap of FYDP Programs</u>							
General Purpose Forces	618,038	701,668		701,668	710,401	15,000	725,401
Intelligence and Communications	245,815	277,609		277,609	370,519	29,728	400,247
Research and Development	6,763,856	7,151,153	-78,700	7,072,453	8,215,942	74,640	8,290,582
Central Supply and Maintenance	62,287	62,287		62,287	60,877		60,877
Administration and Associated Activities	-66,627	-66,627		-66,627			
Space					60,547		60,547
Classified Programs	4,625	4,625		4,625	7,154		7,154
Total Research, Development, Test & Evaluation	7,627,994	8,130,715	-78,700	8,052,015	9,425,440	119,368	9,544,808

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System Development & Demonstration	2,202,652	2,265,094	2,393,383	84,043	288,443	-78,700	209,743
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Undistributed		32,395	32,395	-99,022	-99,022		-99,022
Total Research, Development, Test & Evaluation	7,861,744	7,547,794	7,897,415	1,500	233,300	-78,700	154,600
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Space							
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<u>Summary Recap of Budget Activities</u>							
Basic Research	428,943	428,943		428,943	430,022		430,022
Applied Research	907,574	907,574		907,574	889,182		889,182
Advanced Technology Development	930,065	943,365		943,365	1,070,977		1,070,977
Advanced Component Development & Prototypes	560,010	592,230		592,230	890,889	18,000	908,889
System Development & Demonstration	2,427,837	2,681,826	-78,700	2,603,126	3,012,840	57,840	3,070,680
RDT&E Management Support	1,136,134	1,161,991		1,161,991	1,253,845		1,253,845
Operational Systems Development	1,304,058	1,481,413		1,481,413	1,877,685	43,528	1,921,213
Undistributed	-66,627	-66,627		-66,627			
Total Research, Development, Test & Evaluation	7,627,994	8,130,715	-78,700	8,052,015	9,425,440	119,368	9,544,808
<u>Summary Recap of FYDP Programs</u>							
General Purpose Forces	618,038	701,668		701,668	710,401	15,000	725,401
Intelligence and Communications	245,815	277,609		277,609	370,519	29,728	400,247
Research and Development	6,763,856	7,151,153	-78,700	7,072,453	8,215,942	74,640	8,290,582
Central Supply and Maintenance	62,287	62,287		62,287	60,877		60,877
Administration and Associated Activities	-66,627	-66,627		-66,627			
Space					60,547		60,547
Classified Programs	4,625	4,625		4,625	7,154		7,154
Total Research, Development, Test & Evaluation	7,627,994	8,130,715	-78,700	8,052,015	9,425,440	119,368	9,544,808

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26 Apr 2017

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

Line No	Program Element Number	Item	Act	FY 2016 Base + OCO	FY 2017 PB Request with CR Adj Base	FY 2017 Total PB Requests* with CR Adj Base	FY 2017 PB Request with CR Adj OCO	FY 2017 Total PB Requests* with CR Adj OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj OCO	Se c
1	0601101A	In-House Laboratory Research	01	12,525	12,381	12,381					U
2	0601102A	Defense Research Sciences	01	271,933	253,116	253,116					U
3	0601103A	University Research Initiatives	01	67,225	69,166	69,166					U
4	0601104A	University and Industry Research Centers	01	99,148	94,280	94,280					U
		Basic Research		450,831	428,943	428,943					
5	0602105A	Materials Technology	02	67,806	31,533	31,533					U
6	0602120A	Sensors and Electronic Survivability	02	57,202	36,109	36,109					U
7	0602122A	TRACTOR HIP	02	6,879	6,995	6,995					U
8	0602211A	Aviation Technology	02	58,497	65,914	65,914					U
9	0602270A	Electronic Warfare Technology	02	18,502	25,466	25,466					U
10	0602303A	Missile Technology	02	51,801	44,313	44,313					U
11	0602307A	Advanced Weapons Technology	02	36,906	28,803	28,803					U
12	0602308A	Advanced Concepts and Simulation	02	26,886	27,688	27,688					U
13	0602601A	Combat Vehicle and Automotive Technology	02	95,763	67,959	67,959					U
14	0602618A	Ballistics Technology	02	118,221	85,436	85,436					U
15	0602622A	Chemical, Smoke and Equipment Defeating Technology	02	3,713	3,923	3,923					U
16	0602623A	Joint Service Small Arms Program	02	5,270	5,545	5,545					U
17	0602624A	Weapons and Munitions Technology	02	81,447	53,581	53,581					U

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Line No	Program Element Number	Item	Act	FY 2017 Total PB Requests** with CR Adj Base+OCO+SAA	FY 2017 Total PB Requests* with CR Adj Base + OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj Base + OCO	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Se c
1	0601101A	In-House Laboratory Independent Research	01	12,381	12,381		12,381	12,010		12,010	U
2	0601102A	Defense Research Sciences	01	253,116	253,116		253,116	263,590		263,590	U
3	0601103A	University Research Initiatives	01	69,166	69,166		69,166	67,027		67,027	U
4	0601104A	University and Industry Research Centers	01	94,280	94,280		94,280	87,395		87,395	U
		Basic Research		428,943	428,943		428,943	430,022		430,022	
5	0602105A	Materials Technology	02	31,533	31,533		31,533	29,640		29,640	U
6	0602120A	Sensors and Electronic Survivability	02	36,109	36,109		36,109	35,730		35,730	U
7	0602122A	TRACTOR HIP	02	6,995	6,995		6,995	8,627		8,627	U
8	0602211A	Aviation Technology	02	65,914	65,914		65,914	66,086		66,086	U
9	0602270A	Electronic Warfare Technology	02	25,466	25,466		25,466	27,144		27,144	U
10	0602303A	Missile Technology	02	44,313	44,313		44,313	43,742		43,742	U
11	0602307A	Advanced Weapons Technology	02	28,803	28,803		28,803	22,785		22,785	U
12	0602308A	Advanced Concepts and Simulation	02	27,688	27,688		27,688	28,650		28,650	U
13	0602601A	Combat Vehicle and Automotive Technology	02	67,959	67,959		67,959	67,232		67,232	U
14	0602618A	Ballistics Technology	02	85,436	85,436		85,436	85,309		85,309	U
15	0602622A	Chemical, Smoke and Equipment Defeating Technology	02	3,923	3,923		3,923	4,004		4,004	U
16	0602623A	Joint Service Small Arms Program	02	5,545	5,545		5,545	5,615		5,615	U
17	0602624A	Weapons and Munitions Technology	02	53,581	53,581		53,581	41,455		41,455	U

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18	0602705A	Electronics and Electronic Devices	02	62,654	56,322	56,322					U
19	0602709A	Night Vision Technology	02	37,501	36,079	36,079					U
20	0602712A	Countermine Systems	02	35,586	26,497	26,497					U
21	0602716A	Human Factors Engineering Technology	02	23,220	23,671	23,671					U
22	0602720A	Environmental Quality Technology	02	20,270	22,151	22,151					U
23	0602782A	Command, Control, Communications Technology	02	34,749	37,803	37,803					U
24	0602783A	Computer and Software Technology	02	12,266	13,811	13,811					U
25	0602784A	Military Engineering Technology	02	80,130	67,416	67,416					U
26	0602785A	Manpower/Personnel/Training Technology	02	22,474	26,045	26,045					U
27	0602786A	Warfighter Technology	02	38,420	37,403	37,403					U
28	0602787A	Medical Technology	02	74,186	77,111	77,111					U
		Applied Research		1,070,349	907,574	907,574					
29	0603001A	Warfighter Advanced Technology	03	54,606	38,831	38,831					U
30	0603002A	Medical Advanced Technology	03	103,753	68,365	68,365					U
31	0603003A	Aviation Advanced Technology	03	99,542	94,280	94,280					U
32	0603004A	Weapons and Munitions Advanced Technology	03	95,504	68,714	68,714					U
33	0603005A	Combat Vehicle and Automotive Advanced Technology	03	136,624	122,132	122,132					U
34	0603006A	Space Application Advanced Technology	03	5,384	3,904	3,904					U

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18	0602705A	Electronics and Electronic Devices	02	56,322	56,322		56,322	58,352		58,352	U
19	0602709A	Night Vision Technology	02	36,079	36,079		36,079	34,723		34,723	U
20	0602712A	Countermines Systems	02	26,497	26,497		26,497	26,190		26,190	U
21	0602716A	Human Factors Engineering Technology	02	23,671	23,671		23,671	24,127		24,127	U
22	0602720A	Environmental Quality Technology	02	22,151	22,151		22,151	21,678		21,678	U
23	0602782A	Command, Control, Communications Technology	02	37,803	37,803		37,803	33,123		33,123	U
24	0602783A	Computer and Software Technology	02	13,811	13,811		13,811	14,041		14,041	U
25	0602784A	Military Engineering Technology	02	67,416	67,416		67,416	67,720		67,720	U
26	0602785A	Manpower/Personnel/Training Technology	02	26,045	26,045		26,045	20,216		20,216	U
27	0602786A	Warfighter Technology	02	37,403	37,403		37,403	39,559		39,559	U
28	0602787A	Medical Technology	02	77,111	77,111		77,111	83,434		83,434	U
		Applied Research		907,574	907,574		907,574	889,182		889,182	
29	0603001A	Warfighter Advanced Technology	03	38,831	38,831		38,831	44,863		44,863	U
30	0603002A	Medical Advanced Technology	03	68,365	68,365		68,365	67,780		67,780	U
31	0603003A	Aviation Advanced Technology	03	94,280	94,280		94,280	160,746		160,746	U
32	0603004A	Weapons and Munitions Advanced Technology	03	68,714	68,714		68,714	84,079		84,079	U
33	0603005A	Combat Vehicle and Automotive Advanced Technology	03	122,132	122,132		122,132	125,537		125,537	U
34	0603006A	Space Application Advanced Technology	03	3,904	3,904		3,904	12,231		12,231	U

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35	0603007A	Manpower, Personnel and Training Advanced Technology	03	11,571	14,417	14,417					U
36	0603009A	TRACTOR HIKE	03	9,002	8,074	21,374					U
37	0603015A	Next Generation Training & Simulation Systems	03	16,735	18,969	18,969					U
38	0603020A	TRACTOR ROSE	03	11,912	11,910	11,910					U
39	0603125A	Combating Terrorism - Technology Development	03	32,430	27,686	27,686					U
40	0603130A	TRACTOR NAIL	03	2,381	2,340	2,340					U
41	0603131A	TRACTOR EGGS	03	2,431	2,470	2,470					U
42	0603270A	Electronic Warfare Technology	03	31,810	27,893	27,893					U
43	0603313A	Missile and Rocket Advanced Technology	03	102,490	52,190	52,190					U
44	0603322A	TRACTOR CAGE	03	10,999	11,107	11,107					U
45	0603461A	High Performance Computing Modernization Program	03	215,138	177,190	177,190					U
46	0603606A	Landmine Warfare and Barrier Advanced Technology	03	13,425	17,451	17,451					U
47	0603607A	Joint Service Small Arms Program	03	4,903	5,839	5,839					U
48	0603710A	Night Vision Advanced Technology	03	39,329	44,468	44,468					U
49	0603728A	Environmental Quality Technology Demonstrations	03	14,533	11,137	11,137					U
50	0603734A	Military Engineering Advanced Technology	03	26,247	20,684	20,684					U

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35	0603007A	Manpower, Personnel and Training Advanced Technology	03	14,417	14,417		14,417	6,466		6,466	U
36	0603009A	TRACTOR HIKE	03	8,074	21,374		21,374	28,552		28,552	U
37	0603015A	Next Generation Training & Simulation Systems	03	18,969	18,969		18,969	16,434		16,434	U
38	0603020A	TRACTOR ROSE	03	11,910	11,910		11,910				U
39	0603125A	Combating Terrorism - Technology Development	03	27,686	27,686		27,686	26,903		26,903	U
40	0603130A	TRACTOR NAIL	03	2,340	2,340		2,340	4,880		4,880	U
41	0603131A	TRACTOR EGGS	03	2,470	2,470		2,470	4,326		4,326	U
42	0603270A	Electronic Warfare Technology	03	27,893	27,893		27,893	31,296		31,296	U
43	0603313A	Missile and Rocket Advanced Technology	03	52,190	52,190		52,190	62,850		62,850	U
44	0603322A	TRACTOR CAGE	03	11,107	11,107		11,107	12,323		12,323	U
45	0603461A	High Performance Computing Modernization Program	03	177,190	177,190		177,190	182,331		182,331	U
46	0603606A	Landmine Warfare and Barrier Advanced Technology	03	17,451	17,451		17,451	17,948		17,948	U
47	0603607A	Joint Service Small Arms Program	03	5,839	5,839		5,839	5,796		5,796	U
48	0603710A	Night Vision Advanced Technology	03	44,468	44,468		44,468	47,135		47,135	U
49	0603728A	Environmental Quality Technology Demonstrations	03	11,137	11,137		11,137	10,421		10,421	U
50	0603734A	Military Engineering Advanced Technology	03	20,684	20,684		20,684	32,448		32,448	U

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51	0603772A	Advanced Tactical Computer Science and Sensor Technology	03	36,658	44,239	44,239					U
52	0603794A	C3 Advanced Technology	03	36,339	35,775	35,775					U
		Advanced Technology Development		1,113,746	930,065	943,365					
53	0603305A	Army Missile Defense Systems Integration	04	29,270	9,433	9,433					U
54	0603308A	Army Space Systems Integration	04	29,561	23,056	23,056	9,375	9,375		9,375	U
55	0603327A	Air and Missile Defense Systems Engineering	04			14,200					U
56	0603619A	Landmine Warfare and Barrier - Adv Dev	04	40,943	72,117	72,117					U
57	0603627A	Smoke, Obscurant and Target Defeating Sys-Adv Dev	04	12,894	28,244	28,244		16,020		16,020	U
58	0603639A	Tank and Medium Caliber Ammunition	04	42,272	40,096	42,096					U
59	0603645A	Armored System Modernization - Adv Dev	04								U
60	0603747A	Soldier Support and Survivability	04	5,035	10,506	10,506					U
61	0603766A	Tactical Electronic Surveillance System - Adv Dev	04	17,562	15,730	15,730					U
62	0603774A	Night Vision Systems Advanced Development	04	7,003	10,321	10,321					U
63	0603779A	Environmental Quality Technology - Dem/Val	04	8,464	7,785	7,785					U
64	0603790A	NATO Research and Development	04	5,835	2,300	2,300					U
65	0603801A	Aviation - Adv Dev	04		10,014	10,014					U

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51	0603772A	Advanced Tactical Computer Science and Sensor Technology	03	44,239	44,239		44,239	52,206		52,206	U
52	0603794A	C3 Advanced Technology	03	35,775	35,775		35,775	33,426		33,426	U
		Advanced Technology Development		930,065	943,365		943,365	1,070,977		1,070,977	
53	0603305A	Army Missile Defense Systems Integration	04	9,433	9,433		9,433	9,634		9,634	U
54	0603308A	Army Space Systems Integration	04	32,431	32,431		32,431				U
55	0603327A	Air and Missile Defense Systems Engineering	04		14,200		14,200	33,949	15,000	48,949	U
56	0603619A	Landmine Warfare and Barrier - Adv Dev	04	72,117	72,117		72,117	72,909		72,909	U
57	0603627A	Smoke, Obscurant and Target Defeating Sys-Adv Dev	04	28,244	44,264		44,264	7,135		7,135	U
58	0603639A	Tank and Medium Caliber Ammunition	04	40,096	42,096		42,096	41,452		41,452	U
59	0603645A	Armored System Modernization - Adv Dev	04					32,739		32,739	U
60	0603747A	Soldier Support and Survivability	04	10,506	10,506		10,506	10,157	3,000	13,157	U
61	0603766A	Tactical Electronic Surveillance System - Adv Dev	04	15,730	15,730		15,730	27,733		27,733	U
62	0603774A	Night Vision Systems Advanced Development	04	10,321	10,321		10,321	12,347		12,347	U
63	0603779A	Environmental Quality Technology - Dem/Val	04	7,785	7,785		7,785	10,456		10,456	U
64	0603790A	NATO Research and Development	04	2,300	2,300		2,300	2,588		2,588	U
65	0603801A	Aviation - Adv Dev	04	10,014	10,014		10,014	14,055		14,055	U

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66	0603804A	Logistics and Engineer Equipment - Adv Dev	04	20,271	20,834	20,834					U
67	0603807A	Medical Systems - Adv Dev	04	39,711	33,503	33,503					U
68	0603827A	Soldier Systems - Advanced Development	04	22,251	31,120	31,120					U
69	0604017A	Robotics Development	04								U
70	0604100A	Analysis Of Alternatives	04	7,533	6,608	6,608					U
71	0604114A	Lower Tier Air Missile Defense (LTAMD) Sensor	04		35,132	35,132					U
72	0604115A	Technology Maturation Initiatives	04	34,493	70,047	70,047					U
73	0604117A	Maneuver - Short Range Air Defense (M-SHORAD)	04								U
74	0604118A	TRACTOR BEAM	04								U
75	0604120A	Assured Positioning, Navigation and Timing (PNT)	04	26,967	83,279	83,279					U
76	0604121A	Synthetic Training Environment Refinement & Prototyping	04								U
77	0604319A	Indirect Fire Protection Capability Increment 2-Intercept (IFPC2)	04	149,222							U
78	0305251A	Cyberspace Operations Forces and Force Support	04		40,510	40,510					U
79	1206308A	Army Space Systems Integration	04								U
		Advanced Component Development & Prototypes		499,287	550,635	566,835	9,375	25,395		25,395	
80	0604201A	Aircraft Avionics	05	18,194	83,248	83,248					U

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66	0603804A	Logistics and Engineer Equipment - Adv Dev	04	20,834	20,834		20,834	35,333		35,333	U
67	0603807A	Medical Systems - Adv Dev	04	33,503	33,503		33,503	33,491		33,491	U
68	0603827A	Soldier Systems - Advanced Development	04	31,120	31,120		31,120	20,239		20,239	U
69	0604017A	Robotics Development	04					39,608		39,608	U
70	0604100A	Analysis Of Alternatives	04	6,608	6,608		6,608	9,921		9,921	U
71	0604114A	Lower Tier Air Missile Defense (LTAMD) Sensor	04	35,132	35,132		35,132	76,728		76,728	U
72	0604115A	Technology Maturation Initiatives	04	70,047	70,047		70,047	115,221		115,221	U
73	0604117A	Maneuver - Short Range Air Defense (M-SHORAD)	04					20,000		20,000	U
74	0604118A	TRACTOR BEAM	04					10,400		10,400	U
75	0604120A	Assured Positioning, Navigation and Timing (PNT)	04	83,279	83,279		83,279	164,967		164,967	U
76	0604121A	Synthetic Training Environment Refinement & Prototyping	04					1,600		1,600	U
77	0604319A	Indirect Fire Protection Capability Increment 2-Intercept (IFPC2)	04					11,303		11,303	U
78	0305251A	Cyberspace Operations Forces and Force Support	04	40,510	40,510		40,510	56,492		56,492	U
79	1206308A	Army Space Systems Integration	04					20,432		20,432	U
		Advanced Component Development & Prototypes		560,010	592,230		592,230	890,889	18,000	908,889	
80	0604201A	Aircraft Avionics	05	83,248	83,248		83,248	30,153		30,153	U

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81	0604270A	Electronic Warfare Development	05	20,586	34,642	37,242					U
82	0604280A	Joint Tactical Radio	05	4,415							U
83	0604290A	Mid-tier Networking Vehicular Radio (MNVR)	05	8,416	12,172	12,172					U
84	0604321A	All Source Analysis System	05	4,309	3,958	3,958					U
85	0604328A	TRACTOR CAGE	05	15,138	12,525	12,525					U
86	0604601A	Infantry Support Weapons	05	86,966	66,943	66,943					U
87	0604604A	Medium Tactical Vehicles	05								U
88	0604611A	JAVELIN	05	3,789	20,011	20,011					U
89	0604622A	Family of Heavy Tactical Vehicles	05		11,429	11,429					U
90	0604633A	Air Traffic Control	05	9,714	3,421	3,421					U
91	0604641A	Tactical Unmanned Ground Vehicle (TUGV)	05	13,599	39,282	39,282					U
92	0604642A	Light Tactical Wheeled Vehicles	05		494	494					U
93	0604645A	Armored Systems Modernization (ASM) - Eng Dev	05		9,678	9,678					U
94	0604710A	Night Vision Systems - Eng Dev	05	65,482	84,519	84,519					U
95	0604713A	Combat Feeding, Clothing, and Equipment	05	1,694	2,054	2,054					U
96	0604715A	Non-System Training Devices - Eng Dev	05	26,768	30,774	35,774	33	33		33	U
97	0604741A	Air Defense Command, Control and Intelligence - Eng Dev	05	33,619	53,332	61,532		143,900	-78,700	65,200	U

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81	0604270A	Electronic Warfare Development	05	34,642	37,242		37,242	71,671		71,671	U
82	0604280A	Joint Tactical Radio	05								U
83	0604290A	Mid-tier Networking Vehicular Radio (MNVR)	05	12,172	12,172		12,172	10,589		10,589	U
84	0604321A	All Source Analysis System	05	3,958	3,958		3,958	4,774		4,774	U
85	0604328A	TRACTOR CAGE	05	12,525	12,525		12,525	17,252		17,252	U
86	0604601A	Infantry Support Weapons	05	66,943	66,943		66,943	87,643		87,643	U
87	0604604A	Medium Tactical Vehicles	05					6,039		6,039	U
88	0604611A	JAVELIN	05	20,011	20,011		20,011	21,095		21,095	U
89	0604622A	Family of Heavy Tactical Vehicles	05	11,429	11,429		11,429	10,507		10,507	U
90	0604633A	Air Traffic Control	05	3,421	3,421		3,421	3,536		3,536	U
91	0604641A	Tactical Unmanned Ground Vehicle (TUGV)	05	39,282	39,282		39,282				U
92	0604642A	Light Tactical Wheeled Vehicles	05	494	494		494	7,000		7,000	U
93	0604645A	Armored Systems Modernization (ASM) - Eng Dev	05	9,678	9,678		9,678	36,242		36,242	U
94	0604710A	Night Vision Systems - Eng Dev	05	84,519	84,519		84,519	108,504		108,504	U
95	0604713A	Combat Feeding, Clothing, and Equipment	05	2,054	2,054		2,054	3,702		3,702	U
96	0604715A	Non-System Training Devices - Eng Dev	05	30,807	35,807		35,807	43,575		43,575	U
97	0604741A	Air Defense Command, Control and Intelligence - Eng Dev	05	132,032	205,432	-78,700	126,732	28,726		28,726	U

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98	0604742A	Constructive Simulation Systems Development	05	22,609	17,887	17,887					U
99	0604746A	Automatic Test Equipment Development	05	8,636	8,813	8,813					U
100	0604760A	Distributive Interactive Simulations (DIS) - Eng Dev	05	8,843	10,487	10,487					U
101	0604768A	Brilliant Anti-Armor Submunition (BAT)	05								U
102	0604780A	Combined Arms Tactical Trainer (CATT) Core	05	20,808	15,068	15,068					U
103	0604798A	Brigade Analysis, Integration and Evaluation	05	96,286	89,716	146,655					U
104	0604802A	Weapons and Munitions - Eng Dev	05	18,037	80,365	99,165					U
105	0604804A	Logistics and Engineer Equipment - Eng Dev	05	43,229	75,098	75,098					U
106	0604805A	Command, Control, Communications Systems - Eng Dev	05	2,780	4,245	4,245					U
107	0604807A	Medical Materiel/Medical Biological Defense Equipment - Eng Dev	05	39,295	41,124	41,124					U
108	0604808A	Landmine Warfare/Barrier - Eng Dev	05	63,028	39,630	39,630					U
109	0604818A	Army Tactical Command & Control Hardware & Software	05	125,107	205,590	205,590					U
110	0604820A	Radar Development	05	11,821	15,983	15,983					U
111	0604822A	General Fund Enterprise Business System (GFEBs)	05	20,533	6,805	6,805					U
112	0604823A	Firefinder	05	2,850	9,235	9,235					U

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 Exhibit R-1 FY 2018 President's Budget Request
 Total Obligational Authority
 (Dollars in Thousands)

26 Apr 2017

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

Line No	Program Element Number	Item	Act	FY 2017 Total PB Requests** with CR Adj Base+OCO+SAA	FY 2017 Total PB Requests* with CR Adj Base + OCO	FY 2017 Less Enacted Div B P.L.114-254** OCO	FY 2017 Remaining Req with CR Adj Base + OCO	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Se
98	0604742A	Constructive Simulation Systems Development	05	17,887	17,887		17,887	18,562		18,562	U
99	0604746A	Automatic Test Equipment Development	05	8,813	8,813		8,813	8,344		8,344	U
100	0604760A	Distributive Interactive Simulations (DIS) - Eng Dev	05	10,487	10,487		10,487	11,270		11,270	U
101	0604768A	Brilliant Anti-Armor Submunition (BAT)	05					10,000		10,000	U
102	0604780A	Combined Arms Tactical Trainer (CATT) Core	05	15,068	15,068		15,068	18,566		18,566	U
103	0604798A	Brigade Analysis, Integration and Evaluation	05	89,716	146,655		146,655	145,360		145,360	U
104	0604802A	Weapons and Munitions - Eng Dev	05	80,365	99,165		99,165	145,232		145,232	U
105	0604804A	Logistics and Engineer Equipment - Eng Dev	05	75,098	75,098		75,098	90,965		90,965	U
106	0604805A	Command, Control, Communications Systems - Eng Dev	05	4,245	4,245		4,245	9,910		9,910	U
107	0604807A	Medical Materiel/Medical Biological Defense Equipment - Eng Dev	05	41,124	41,124		41,124	39,238		39,238	U
108	0604808A	Landmine Warfare/Barrier - Eng Dev	05	39,630	39,630		39,630	34,684		34,684	U
109	0604818A	Army Tactical Command & Control Hardware & Software	05	205,590	205,590		205,590	164,409		164,409	U
110	0604820A	Radar Development	05	15,983	15,983		15,983	32,968		32,968	U
111	0604822A	General Fund Enterprise Business System (GFEBs)	05	6,805	6,805		6,805	49,554		49,554	U
112	0604823A	Firefinder	05	9,235	9,235		9,235	45,605		45,605	U

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113	0604827A	Soldier Systems - Warrior Dem/Val	05	15,694	12,393	12,393					U
114	0604852A	Suite of Survivability Enhancement Systems - EMD	05								U
115	0604854A	Artillery Systems - EMD	05	2,251	1,756	4,506					U
116	0605013A	Information Technology Development	05	48,028	74,236	74,236					U
117	0605018A	Integrated Personnel and Pay System-Army (IPPS-A)	05	116,215	155,584	155,584					U
118	0605028A	Armored Multi-Purpose Vehicle (AMPV)	05	213,034	184,221	184,221					U
119	0605029A	Integrated Ground Security Surveillance Response Capability (IGSSR-C)	05		4,980	4,980					U
120	0605030A	Joint Tactical Network Center (JTNC)	05	12,834	15,041	15,041					U
121	0605031A	Joint Tactical Network (JTN)	05	20,790	16,014	16,014					U
122	0605032A	TRACTOR TIRE	05	10,677	27,254	27,254		10,000		10,000	U
123	0605033A	Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E)	05		5,032	5,032					U
124	0605034A	Tactical Security System (TSS)	05		2,904	2,904					U
125	0605035A	Common Infrared Countermeasures (CIRCM)	05	98,496	96,977	96,977	10,900	10,900		10,900	U
126	0605036A	Combating Weapons of Mass Destruction (CWMD)	05		2,089	2,089					U
127	0605037A	Evidence Collection and Detainee Processing	05								U

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113	0604827A	Soldier Systems - Warrior Dem/Val	05	12,393	12,393		12,393	16,127		16,127	U
114	0604852A	Suite of Survivability Enhancement Systems - EMD	05					98,600		98,600	U
115	0604854A	Artillery Systems - EMD	05	1,756	4,506		4,506	1,972		1,972	U
116	0605013A	Information Technology Development	05	74,236	74,236		74,236	81,776		81,776	U
117	0605018A	Integrated Personnel and Pay System-Army (IPPS-A)	05	155,584	155,584		155,584	172,361		172,361	U
118	0605028A	Armored Multi-Purpose Vehicle (AMPV)	05	184,221	184,221		184,221	199,778		199,778	U
119	0605029A	Integrated Ground Security Surveillance Response Capability (IGSSR-C)	05	4,980	4,980		4,980	4,418		4,418	U
120	0605030A	Joint Tactical Network Center (JTNC)	05	15,041	15,041		15,041	15,877		15,877	U
121	0605031A	Joint Tactical Network (JTN)	05	16,014	16,014		16,014	44,150		44,150	U
122	0605032A	TRACTOR TIRE	05	27,254	37,254		37,254	34,670	5,000	39,670	U
123	0605033A	Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E)	05	5,032	5,032		5,032	5,207		5,207	U
124	0605034A	Tactical Security System (TSS)	05	2,904	2,904		2,904	4,727		4,727	U
125	0605035A	Common Infrared Countermeasures (CIRCM)	05	107,877	107,877		107,877	105,778	21,540	127,318	U
126	0605036A	Combating Weapons of Mass Destruction (CWMD)	05	2,089	2,089		2,089	6,927		6,927	U
127	0605037A	Evidence Collection and Detainee Processing	05					214		214	U

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128	0605038A	Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) Sensor Suite	05								U
129	0605041A	Defensive CYBER Tool Development	05		33,836	33,836		50,500		50,500	U
130	0605042A	Tactical Network Radio Systems (Low-Tier)	05		18,824	18,824					U
131	0605047A	Contract Writing System	05		20,663	20,663					U
132	0605049A	Missile Warning System Modernization (MWSM)	05								U
133	0605051A	Aircraft Survivability Development	05	77,395	41,133	51,133	73,110	73,110		73,110	U
134	0605052A	Indirect Fire Protection Capability Inc 2 - Block 1	05		83,995	83,995					U
135	0605053A	Ground Robotics	05								U
136	0605350A	WIN-T Increment 3 - Full Networking	05	32,187							U
137	0605380A	AMF Joint Tactical Radio System (JTRS)	05	10,143	5,028	5,028					U
138	0605450A	Joint Air-to-Ground Missile (JAGM)	05	79,897	42,972	42,972					U
139	0605456A	PAC-3/MSE Missile	05	2,201							U
140	0605457A	Army Integrated Air and Missile Defense (AIAMD)	05	222,074	252,811	272,811					U
141	0605625A	Manned Ground Vehicle	05	37,692							U
142	0605626A	Aerial Common Sensor	05	2							U
143	0605766A	National Capabilities Integration (MIP)	05	10,599	4,955	4,955					U

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128	0605038A	Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) Sensor Suite	05					16,125		16,125	U
129	0605041A	Defensive CYBER Tool Development	05	33,836	84,336		84,336	55,165		55,165	U
130	0605042A	Tactical Network Radio Systems (Low-Tier)	05	18,824	18,824		18,824	20,076		20,076	U
131	0605047A	Contract Writing System	05	20,663	20,663		20,663	20,322		20,322	U
132	0605049A	Missile Warning System Modernization (MWSM)	05					55,810		55,810	U
133	0605051A	Aircraft Survivability Development	05	114,243	124,243		124,243	30,879	30,100	60,979	U
134	0605052A	Indirect Fire Protection Capability Inc 2 - Block 1	05	83,995	83,995		83,995	175,069		175,069	U
135	0605053A	Ground Robotics	05					70,760		70,760	U
136	0605350A	WIN-T Increment 3 - Full Networking	05								U
137	0605380A	AMF Joint Tactical Radio System (JTRS)	05	5,028	5,028		5,028	8,965		8,965	U
138	0605450A	Joint Air-to-Ground Missile (JAGM)	05	42,972	42,972		42,972	34,626		34,626	U
139	0605456A	PAC-3/MSE Missile	05								U
140	0605457A	Army Integrated Air and Missile Defense (AIAMD)	05	252,811	272,811		272,811	336,420		336,420	U
141	0605625A	Manned Ground Vehicle	05								U
142	0605626A	Aerial Common Sensor	05								U
143	0605766A	National Capabilities Integration (MIP)	05	4,955	4,955		4,955	6,882		6,882	U

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144	0605812A	Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph	05	31,197	11,530	11,530					U
145	0605830A	Aviation Ground Support Equipment	05	13,528	2,142	2,142					U
146	0210609A	Paladin Integrated Management (PIM)	05	136,353	41,498	41,498					U
147	0303032A	TROJAN - RH12	05	5,022	4,273	4,273					U
148	0303267A	Auctioned Spectrum Relocation Fund	05	71,823							U
149	0303367A	Spectrum Access Research and Development	05	125,283							U
150	0304270A	Electronic Warfare Development	05	12,686	14,425	18,425					U
151	1205117A	Tractor Bears	05								U
		System Development & Demonstration		2,202,652	2,265,094	2,393,383	84,043	288,443	-78,700	209,743	
152	0604256A	Threat Simulator Development	06	27,157	25,675	25,675					U
153	0604258A	Target Systems Development	06	16,163	19,122	19,122					U
154	0604759A	Major T&E Investment	06	65,059	84,777	84,777					U
155	0605103A	Rand Arroyo Center	06	20,014	20,658	20,658					U
156	0605301A	Army Kwajalein Atoll	06	200,393	236,648	236,648					U
157	0605326A	Concepts Experimentation Program	06	18,705	25,596	25,596					U
158	0605502A	Small Business Innovative Research	06	220,833							U
159	0605601A	Army Test Ranges and Facilities	06	273,275	293,748	307,882					U
160	0605602A	Army Technical Test Instrumentation and Targets	06	52,254	52,404	64,127					U

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144	0605812A	Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph	05	11,530	11,530		11,530	23,467		23,467	U
145	0605830A	Aviation Ground Support Equipment	05	2,142	2,142		2,142	6,930		6,930	U
146	0210609A	Paladin Integrated Management (PIM)	05	41,498	41,498		41,498	6,112		6,112	U
147	0303032A	TROJAN - RH12	05	4,273	4,273		4,273	4,431	1,200	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	14,425	18,425		18,425	14,616		14,616	U
151	1205117A	Tractor Bears	05					17,928		17,928	U
		System Development & Demonstration		2,427,837	2,681,826	-78,700	2,603,126	3,012,840	57,840	3,070,680	
152	0604256A	Threat Simulator Development	06	25,675	25,675		25,675	22,862		22,862	U
153	0604258A	Target Systems Development	06	19,122	19,122		19,122	13,902		13,902	U
154	0604759A	Major T&E Investment	06	84,777	84,777		84,777	102,901		102,901	U
155	0605103A	Rand Arroyo Center	06	20,658	20,658		20,658	20,140		20,140	U
156	0605301A	Army Kwajalein Atoll	06	236,648	236,648		236,648	246,663		246,663	U
157	0605326A	Concepts Experimentation Program	06	25,596	25,596		25,596	29,820		29,820	U
158	0605502A	Small Business Innovative Research	06								U
159	0605601A	Army Test Ranges and Facilities	06	293,748	307,882		307,882	307,588		307,588	U
160	0605602A	Army Technical Test Instrumentation and Targets	06	52,404	64,127		64,127	49,242		49,242	U

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					PB Request with CR Adj Base	PB Requests* with CR Adj Base	PB Request with CR Adj OCO	Total PB Requests* with CR Adj OCO	Less Enacted Div B P.L.114-254** OCO		
161	0605604A	Survivability/Lethality Analysis	06	33,069	38,571	38,571					U
162	0605606A	Aircraft Certification	06	4,571	4,665	4,665					U
163	0605702A	Meteorological Support to RDT&E Activities	06	8,104	6,925	6,925					U
164	0605706A	Materiel Systems Analysis	06	20,203	21,677	21,677					U
165	0605709A	Exploitation of Foreign Items	06	10,396	12,415	12,415					U
166	0605712A	Support of Operational Testing	06	49,128	49,684	49,684					U
167	0605716A	Army Evaluation Center	06	52,265	55,905	55,905					U
168	0605718A	Army Modeling & Sim X-Cmd Collaboration & Integ	06	901	7,959	7,959					U
169	0605801A	Programwide Activities	06	61,060	51,822	51,822					U
170	0605803A	Technical Information Activities	06	25,991	33,323	33,323					U
171	0605805A	Munitions Standardization, Effectiveness and Safety	06	48,335	40,545	40,545					U
172	0605857A	Environmental Quality Technology Mgmt Support	06	3,673	2,130	2,130					U
173	0605898A	Army Direct Report Headquarters - R&D - MHA	06	48,312	49,885	49,885					U
174	0606001A	Military Ground-Based CREW Technology	06								U
175	0606002A	Ronald Reagan Ballistic Missile Defense Test Site	06								U
176	0303260A	Defense Military Deception Initiative	06		2,000	2,000					U

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161	0605604A	Survivability/Lethality Analysis	06	38,571	38,571		38,571	41,843		41,843	U
162	0605606A	Aircraft Certification	06	4,665	4,665		4,665	4,804		4,804	U
163	0605702A	Meteorological Support to RDT&E Activities	06	6,925	6,925		6,925	7,238		7,238	U
164	0605706A	Materiel Systems Analysis	06	21,677	21,677		21,677	21,890		21,890	U
165	0605709A	Exploitation of Foreign Items	06	12,415	12,415		12,415	12,684		12,684	U
166	0605712A	Support of Operational Testing	06	49,684	49,684		49,684	51,040		51,040	U
167	0605716A	Army Evaluation Center	06	55,905	55,905		55,905	56,246		56,246	U
168	0605718A	Army Modeling & Sim X-Cmd Collaboration & Integ	06	7,959	7,959		7,959	1,829		1,829	U
169	0605801A	Programwide Activities	06	51,822	51,822		51,822	55,060		55,060	U
170	0605803A	Technical Information Activities	06	33,323	33,323		33,323	33,934		33,934	U
171	0605805A	Munitions Standardization, Effectiveness and Safety	06	40,545	40,545		40,545	43,444		43,444	U
172	0605857A	Environmental Quality Technology Mgmt Support	06	2,130	2,130		2,130	5,087		5,087	U
173	0605898A	Army Direct Report Headquarters - R&D - MHA	06	49,885	49,885		49,885	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	0303260A	Defense Military Deception Initiative	06	2,000	2,000		2,000	1,779		1,779	U

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177	0909999A	Financing for Cancelled Account Adjustments	06	65							U
		RDT&E Management Support		1,259,926	1,136,134	1,161,991					
178	0603778A	MLRS Product Improvement Program	07	21,202	9,663	34,763					U
179	0603813A	TRACTOR PULL	07	9,461	3,960	3,960					U
180	0605024A	Anti-Tamper Technology Support	07		3,638	3,638					U
181	0607131A	Weapons and Munitions Product Improvement Programs	07	5,678	14,517	14,517		5,100		5,100	U
182	0607133A	TRACTOR SMOKE	07	7,569	4,479	4,479					U
183	0607134A	Long Range Precision Fires (LRPF)	07		39,275	67,006					U
184	0607135A	Apache Product Improvement Program	07	62,964	66,441	66,441					U
185	0607136A	Blackhawk Product Improvement Program	07	64,011	46,765	46,765					U
186	0607137A	Chinook Product Improvement Program	07	31,122	91,848	91,848					U
187	0607138A	Fixed Wing Product Improvement Program	07	1,105	796	796					U
188	0607139A	Improved Turbine Engine Program	07	49,137	126,105	126,105					U
189	0607140A	Emerging Technologies from NIE	07	2,383	2,369	2,369					U
190	0607141A	Logistics Automation	07	1,318	4,563	4,563					U
191	0607142A	Aviation Rocket System Product Improvement and Development	07			8,000					U
192	0607143A	Unmanned Aircraft System Universal Products	07								U

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				Total PB Requests** with CR Adj Base+OCO+SAA	Total PB Requests* with CR Adj Base + OCO	Less Enacted Div B P.L.114-254** OCO	Remaining Req with CR Adj Base + OCO				
177	0909999A	Financing for Cancelled Account Adjustments	06								U
		RDT&E Management Support		1,136,134	1,161,991		1,161,991	1,253,845		1,253,845	
178	0603778A	MLRS Product Improvement Program	07	9,663	34,763		34,763	8,929		8,929	U
179	0603813A	TRACTOR PULL	07	3,960	3,960		3,960	4,014		4,014	U
180	0605024A	Anti-Tamper Technology Support	07	3,638	3,638		3,638	4,094		4,094	U
181	0607131A	Weapons and Munitions Product Improvement Programs	07	14,517	19,617		19,617	15,738		15,738	U
182	0607133A	TRACTOR SMOKE	07	4,479	4,479		4,479	4,513		4,513	U
183	0607134A	Long Range Precision Fires (LRPF)	07	39,275	67,006		67,006	102,014		102,014	U
184	0607135A	Apache Product Improvement Program	07	66,441	66,441		66,441	59,977		59,977	U
185	0607136A	Blackhawk Product Improvement Program	07	46,765	46,765		46,765	34,416		34,416	U
186	0607137A	Chinook Product Improvement Program	07	91,848	91,848		91,848	194,567		194,567	U
187	0607138A	Fixed Wing Product Improvement Program	07	796	796		796	9,981		9,981	U
188	0607139A	Improved Turbine Engine Program	07	126,105	126,105		126,105	204,304		204,304	U
189	0607140A	Emerging Technologies from NIE	07	2,369	2,369		2,369	1,023		1,023	U
190	0607141A	Logistics Automation	07	4,563	4,563		4,563	1,504		1,504	U
191	0607142A	Aviation Rocket System Product Improvement and Development	07		8,000		8,000	10,064		10,064	U
192	0607143A	Unmanned Aircraft System Universal Products	07					38,463		38,463	U

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193	0607665A	Family of Biometrics	07	7,179	12,098	12,098					U
194	0607865A	Patriot Product Improvement	07	87,537	49,482	49,482					U
195	0202429A	Aerostat Joint Project - COCOM Exercise	07	10,171	45,482	45,482					U
196	0203728A	Joint Automated Deep Operation Coordination System (JADOCS)	07	30,669	30,455	30,455					U
197	0203735A	Combat Vehicle Improvement Programs	07	382,176	316,857	327,357					U
198	0203740A	Maneuver Control System	07	14,864	4,031	4,031					U
199	0203743A	155mm Self-Propelled Howitzer Improvements	07								U
200	0203744A	Aircraft Modifications/Product Improvement Programs	07		35,793	35,793					U
201	0203752A	Aircraft Engine Component Improvement Program	07	349	259	259					U
202	0203758A	Digitization	07	4,188	6,483	6,483					U
203	0203801A	Missile/Air Defense Product Improvement Program	07	3,029	5,122	53,722					U
204	0203802A	Other Missile Product Improvement Programs	07	49,191	7,491	7,491		1,080		1,080	U
205	0203808A	TRACTOR CARD	07	34,686	20,333	20,333					U
206	0205402A	Integrated Base Defense - Operational System Dev	07	10,324				3,450		3,450	U
207	0205410A	Materials Handling Equipment	07	386	124	124					U
208	0205412A	Environmental Quality Technology - Operational System Dev	07								U

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193	0607665A	Family of Biometrics	07 12,098	12,098		12,098	6,159		6,159	U
194	0607865A	Patriot Product Improvement	07 49,482	49,482		49,482	90,217		90,217	U
195	0202429A	Aerostat Joint Project - COCOM Exercise	07 45,482	45,482		45,482	6,749		6,749	U
196	0203728A	Joint Automated Deep Operation Coordination System (JADOCS)	07 30,455	30,455		30,455	33,520		33,520	U
197	0203735A	Combat Vehicle Improvement Programs	07 316,857	327,357		327,357	343,175		343,175	U
198	0203740A	Maneuver Control System	07 4,031	4,031		4,031	6,639		6,639	U
199	0203743A	155mm Self-Propelled Howitzer Improvements	07				40,784		40,784	U
200	0203744A	Aircraft Modifications/Product Improvement Programs	07 35,793	35,793		35,793	39,358		39,358	U
201	0203752A	Aircraft Engine Component Improvement Program	07 259	259		259	145		145	U
202	0203758A	Digitization	07 6,483	6,483		6,483	4,803		4,803	U
203	0203801A	Missile/Air Defense Product Improvement Program	07 5,122	53,722		53,722	2,723	15,000	17,723	U
204	0203802A	Other Missile Product Improvement Programs	07 7,491	8,571		8,571	5,000		5,000	U
205	0203808A	TRACTOR CARD	07 20,333	20,333		20,333	37,883		37,883	U
206	0205402A	Integrated Base Defense - Operational System Dev	07	3,450		3,450				U
207	0205410A	Materials Handling Equipment	07 124	124		124	1,582		1,582	U
208	0205412A	Environmental Quality Technology - Operational System Dev	07				195		195	U

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209	0205456A	Lower Tier Air and Missile Defense (AMD) System	07	61,653	69,417	73,417					U
210	0205778A	Guided Multiple-Launch Rocket System (GMLRS)	07	36,032	22,044	38,044					U
211	0208053A	Joint Tactical Ground System	07	28,015	12,649	12,649					U
213	0303028A	Security and Intelligence Activities	07	13,156	11,619	11,619					U
214	0303140A	Information Systems Security Program	07	31,032	38,280	38,280					U
215	0303141A	Global Combat Support System	07	25,304	27,223	28,667					U
216	0303142A	SATCOM Ground Environment (SPACE)	07	9,045	18,815	18,815					U
217	0303150A	WWMCCS/Global Command and Control System	07	6,810	4,718	4,718					U
219	0305127A	Foreign Counterintelligence Activities	07			4,100					U
220	0305172A	Combined Advanced Applications	07								U
221	0305179A	Integrated Broadcast Service (IBS)	07	750							U
222	0305204A	Tactical Unmanned Aerial Vehicles	07	15,370	8,218	8,218					U
223	0305206A	Airborne Reconnaissance Systems	07	20,725	11,799	11,799					U
224	0305208A	Distributed Common Ground/Surface Systems	07	25,592	32,284	32,284					U
225	0305219A	MQ-1C Gray Eagle UAS	07	22,285	13,470	30,970					U
226	0305232A	RQ-11 UAV	07		1,613	1,613					U
227	0305233A	RQ-7 UAV	07	11,797	4,597	7,597					U
228	0307665A	Biometrics Enabled Intelligence	07				7,104	8,854		8,854	U

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209	0205456A	Lower Tier Air and Missile Defense (AMD) System	07	69,417	73,417		73,417	78,926		78,926	U
210	0205778A	Guided Multiple-Launch Rocket System (GMLRS)	07	22,044	38,044		38,044	102,807		102,807	U
211	0208053A	Joint Tactical Ground System	07	12,649	12,649		12,649				U
213	0303028A	Security and Intelligence Activities	07	11,619	11,619		11,619	13,807		13,807	U
214	0303140A	Information Systems Security Program	07	38,280	38,280		38,280	132,438		132,438	U
215	0303141A	Global Combat Support System	07	27,223	28,667		28,667	64,370		64,370	U
216	0303142A	SATCOM Ground Environment (SPACE)	07	18,815	18,815		18,815				U
217	0303150A	WWMCCS/Global Command and Control System	07	4,718	4,718		4,718	10,475		10,475	U
219	0305127A	Foreign Counterintelligence Activities	07		4,100		4,100				U
220	0305172A	Combined Advanced Applications	07					1,100		1,100	U
221	0305179A	Integrated Broadcast Service (IBS)	07								U
222	0305204A	Tactical Unmanned Aerial Vehicles	07	8,218	8,218		8,218	9,433	7,492	16,925	U
223	0305206A	Airborne Reconnaissance Systems	07	11,799	11,799		11,799	5,080	15,000	20,080	U
224	0305208A	Distributed Common Ground/Surface Systems	07	32,284	32,284		32,284	24,700		24,700	U
225	0305219A	MQ-1C Gray Eagle UAS	07	13,470	30,970		30,970	9,574		9,574	U
226	0305232A	RQ-11 UAV	07	1,613	1,613		1,613	2,191		2,191	U
227	0305233A	RQ-7 UAV	07	4,597	7,597		7,597	12,773		12,773	U
228	0307665A	Biometrics Enabled Intelligence	07	7,104	8,854		8,854	2,537	6,036	8,573	U

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229	0310349A	Win-T Increment 2 - Initial Networking	07	3,649	4,867	4,867					U
230	0708045A	End Item Industrial Preparedness Activities	07	58,503	62,287	62,287					U
231	1203142A	SATCOM Ground Environment (SPACE)	07								U
232	1208053A	Joint Tactical Ground System	07								U
9999	9999999999	Classified Programs		4,536	4,625	4,625					U
		Operational Systems Development		1,264,953	1,296,954	1,462,929	7,104	18,484		18,484	
233	0901560A	Continuing Resolution Programs	20		32,395	32,395	-99,022	-99,022		-99,022	U
		Undistributed			32,395	32,395	-99,022	-99,022		-99,022	
Total Research, Development, Test & Eval, Army				7,861,744	7,547,794	7,897,415	1,500	233,300	-78,700	154,600	

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229	0310349A	Win-T Increment 2 - Initial Networking	07	4,867	4,867		4,867	4,723		4,723	U
230	0708045A	End Item Industrial Preparedness Activities	07	62,287	62,287		62,287	60,877		60,877	U
231	1203142A	SATCOM Ground Environment (SPACE)	07					11,959		11,959	U
232	1208053A	Joint Tactical Ground System	07					10,228		10,228	U
9999	9999999999	Classified Programs		4,625	4,625		4,625	7,154		7,154	U
		Operational Systems Development		1,304,058	1,481,413		1,481,413	1,877,685	43,528	1,921,213	
233	0901560A	Continuing Resolution Programs	20	-66,627	-66,627		-66,627				U
		Undistributed		-66,627	-66,627		-66,627				
Total Research, Development, Test & Eval, Army				7,627,994	8,130,715	-78,700	8,052,015	9,425,440	119,368	9,544,808	

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Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0603778A / MLRS Product Improvement Program
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	21.202	34.763	8.929	-	8.929	8.981	8.980	10.286	12.627	Continuing	Continuing
093: Multi-Launch Rocket System (MLRS)	-	0.000	25.100	5.000	-	5.000	5.000	5.000	5.100	5.100	Continuing	Continuing
DX8: HIMARS Product Improvement Program	-	1.301	9.663	3.929	-	3.929	3.981	3.980	5.186	7.527	Continuing	Continuing
DZ8: Long Range Precision Fires	-	19.901	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	19.901

Note

Funding for DZ8 has been realigned to PE 0607134, Proj ES1, beginning FY17.

A. Mission Description and Budget Item Justification

Project DX8. The M142 High Mobility Artillery Rocket System (HIMARS) launcher is a full spectrum, combat proven, all weather, 24/7 lethal and responsive, precision strike weapon system. HIMARS provides critical missile precision strike, operational shaping fires, counterfire, and close support destructive and suppressive fires. HIMARS is a C-130 or C-17 transportable, wheeled, indirect fire, rocket/missile launcher capable of firing one pod of precision rockets/missiles from the Multiple Launch Rocket System (MLRS) Family of Munitions (MFOM), to include the Guided Multiple Launch Rocket System (GMLRS) and the Army Tactical Missile System (ATACMS). These munitions are capable of engaging targets with precision at ranges up to 300 kilometers. This project funds software development for the HIMARS launcher. The government assumed responsibility for software development and maintenance from the prime contractor in FY2016. Organic software is defined as government developed, maintained, and owned software. The long-term end state is a convergence of tactical software across the HIMARS and MLRS launcher platforms into a single product supporting both systems.

Justification:

FY2018 Base funding in the amount of \$3.929 million for project DX8 supports HIMARS-unique Software Build, Version 8.2. This software is projected to be available for fielding to the M142 fleet in FY2019. Software Version 8.2 enables portability to the M270A2 (MLRS) tracked launcher upon receipt of a hardware Fire Control System upgrade.

Project 093. The Multiple Launch Rocket System (MLRS) launcher is a full spectrum, combat proven, all weather, 24/7 lethal and responsive, precision strike weapon system. MLRS provides critical missile precision strike, operational shaping fires, counterfire, and close support destructive and suppressive fires. MLRS is a tracked, indirect fire, rocket/missile launcher capable of firing two pods of precision rockets/missiles from the Multiple Launch Rocket System (MLRS) Family of Munitions (MFOM), to include the Guided Multiple Launch Rocket System (GMLRS) and the Army Tactical Missile System (ATACMS). These munitions are capable of engaging targets with precision at ranges up to 300 kilometers. This project funds software development for the MLRS launcher. The government assumed responsibility for

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0603778A / <i>MLRS Product Improvement Program</i>
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software development and maintenance from the prime contractor in FY2016. Organic software is defined as government developed, maintained, and owned software. The long-term end state is a convergence of tactical software across the HIMARS and MLRS launcher platforms into a single product supporting both systems.

Justification:

FY2018 Base funding in the amount of \$5.000 million for project 093 supports the initiation of software development of an organic tactical software build in support of the interim Fire Control System (FCS) hardware supporting both the current MLRS Fleet (upon upgrade with a modern hardware FCS) and the Army's MLRS Fleet Expansion effort. This software development leverages the program's completed software transition from the prime contractor to the government in FY2016. This interim FCS solution will be ready to field in FY2021 and the long-term FCS solution is expected to be ready to field in FY2024. The tactical software is a critical developmental item required to field additional launchers, maintain backward compatibility for current fleet sustainment, and anticipated to be the first release of organic software common to both the MLRS and HIMARS launcher in FY2021.

Project DZ8: Long Range Precision Fires (LRPF) is being developed as a cluster and insensitive munition compliant system that replaces and improves upon Army Tactical Missile System (ATACMS) capabilities. The mission of the LRPF System will be to attack/neutralize/suppress/destroy targets using missile delivered indirect precision fires. LRPF will provide Joint Force Commanders with a 24/7, all-weather capability to attack critical and time sensitive area and point targets including threat air defense, missile launchers, command and control centers, assembly/staging areas and high payoff targets at all depths of the tactical battlefield. LRPF will counter the enemy's ability to conduct combat maneuver and air defense operations. LRPF requirements include: max range of greater than 300km, specified lethality against the designated target set, a Launch Pod Missile Container (LPMC) that holds a minimum of one missile, and compatibility with the existing launcher platforms (M270A1 Multiple Launch Rocket System (MLRS) and M142 High Mobility Artillery Rocket System (HIMARS)). LRPF is being designed with an open system architecture that provides the capability for future growth to counter new and emerging threats. An Analysis of Alternatives (AoA) was directed in the Material Development Decision (MDD) on 6 November 2013. The AoA was completed on 30 April 2015 and a letter of sufficiency issued by OSD in September 2015. Milestone A; Technology Maturation and Risk Reduction (TMRR) is scheduled for 06 January 2017.

B. Program Change Summary (\$ in Millions)	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>
Previous President's Budget	18.397	9.663	3.778	-	3.778
Current President's Budget	21.202	34.763	8.929	-	8.929
Total Adjustments	2.805	25.100	5.151	-	5.151
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	3.534	-			
• SBIR/STTR Transfer	-0.729	-			
• Adjustments to Budget Years	0.000	0.000	5.151	-	5.151
• FY2017 Amendment	0.000	25.100	0.000	-	0.000

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0603778A / <i>MLRS Product Improvement Program</i>	
<u>Change Summary Explanation</u> FY17: Increased \$25.100 million to enable risk reduction to support the MLRS Launcher Fleet Expansion effort. FY18: Increased \$5.151 million to support initiation of a MLRS launcher tactical software build.		

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0603778A / MLRS Product Improvement Program				Project (Number/Name) 093 / Multi-Launch Rocket System (MLRS)			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
093: Multi-Launch Rocket System (MLRS)	-	0.000	25.100	5.000	-	5.000	5.000	5.000	5.100	5.100	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project 093. The Multiple Launch Rocket System (MLRS) launcher is a full spectrum, combat proven, all weather, 24/7 lethal and responsive, precision strike weapon system. MLRS provides critical missile precision strike, operational shaping fires, counterfire, and close support destructive and suppressive fires. MLRS is a tracked, indirect fire, rocket/missile launcher capable of firing two pods of precision rockets/missiles from the Multiple Launch Rocket System (MLRS) Family of Munitions (MFOM), to include the Guided Multiple Launch Rocket System (GMLRS) and the Army Tactical Missile System (ATACMS). These munitions are capable of engaging targets with precision at ranges up to 300 kilometers. This project funds software development for the MLRS launcher. The government assumed responsibility for software development and maintenance from the prime contractor in FY2016. Organic software is defined as government developed, maintained, and owned software. The long-term end state is a convergence of tactical software across the HIMARS and MLRS launcher platforms into a single product supporting both systems.

Justification:

FY2018 Base funding in the amount of \$5.000 million for project 093 supports the initiation of software development of an organic tactical software build in support of the interim Fire Control System (FCS) hardware supporting both the current MLRS Fleet (upon upgrade with a modern hardware FCS) and the Army's MLRS Fleet Expansion effort. This software development leverages the program's completed software transition from the prime contractor to the government in FY2016. This interim FCS solution will be ready to field in FY2021 and the long-term FCS solution is expected to be ready to field in FY2024. The tactical software is a critical developmental item required to field additional launchers, maintain backward compatibility for current fleet sustainment, and anticipated to be the first release of organic software common to both the MLRS and HIMARS launcher in FY2021.

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

	FY 2016	FY 2017	FY 2018
Title: Accelerate MLRS Fleet Expansion	-	25.100	-
FY 2017 Plans: This increased funding (\$25.100 million , Project 093) will accelerate the MLRS Launcher Fleet expansion. This effort is fourfold, it will: build one M270A1 carrier hull from an excess M270A0 hull, establish tooling and processes to enable efficient execution of the follow-on fleet expansion, redesign of the current fire control system, and identifying, quoting and making first item purchases for parts no longer manufactured for the MLRS fleet expansion.			
Title: MLRS Product Improvement Program	-	-	5.000

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0603778A / MLRS Product Improvement Program	Project (Number/Name) 093 / Multi-Launch Rocket System (MLRS)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
<p>Description: The MLRS Product Improvement Program provides the preservation of platform viability and readiness to accept technology insertion as capability enhancements and obsolescence mitigations are developed. Support efforts include: obsolescence mitigation and enhancements for the M993A1 carrier, Fire Control System, Launcher Loader Module and Enhanced Command and Control (EC2); develop and update the Fire Control System software to keep pace with changes to the munitions; perform Command, Control, Communications, Computers and Intelligence (C4I)/interoperability and Information Assurance compliance certification and network interoperability testing. Perform technical assessments, concept studies for obsolescence mitigation, crew protection, automotive and hardware/software enhancements, improving operational timelines and risk reduction.</p> <p>FY 2018 Plans: Begin tactical launcher software development to support the Fire Control System obsolescence mitigation hardware upgrade required to operate a MLRS launcher.</p>			
Accomplishments/Planned Programs Subtotals	-	25.100	5.000

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• C67500000: MLRS <i>Mods (C67500)</i>	35.970	34.704	36.771	-	36.771	37.312	46.698	46.968	-	Continuing	Continuing
• CA0265000: MLRS Mod <i>Initial Spares (CA0265)</i>	1.067	1.676	1.089	-	1.089	1.105	-	-	-	0	4.937

Remarks

D. Acquisition Strategy
The MLRS Product Improvement Program performs development efforts required to address emerging requirements.

The Army transitioning complete software acquisition from the prime contractor (legacy v7.x) to an organic (government developed, maintained, and owned) approach (v8.x forward) by utilizing the Aviation & Missile Research & Development Engineering Center's (AMRDEC) Software Engineering Directorate (SED) as the software developer. This funding supports the MLRS share of the software development and is funded via Military Interdepartmental Purchase Request (MIPR).

Emerging requirements include updates to address emerging threats of the launcher organic version 8.x software, reacting to system changes driven by policy and emerging requirements, and maintaining architectural compatibility. Communication suite changes, munitions updates, and introduction of new munitions require software and/or hardware updates to ensure full compatibility and maintain operational viability.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0603778A / MLRS Product Improvement Program	Project (Number/Name) 093 / Multi-Launch Rocket System (MLRS)

The enduring organic v8.2 software effort is projected for Materiel Release and fielding to the M270A2 (MLRS) launcher when upgraded with the interim Fire Control System solution. An incremental software release plan will be developed to address emerging SW requirements beyond v8.2 in the future.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0603778A / MLRS Product Improvement Program				Project (Number/Name) DX8 / HIMARS Product Improvement Program			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
DX8: HIMARS Product Improvement Program	-	1.301	9.663	3.929	-	3.929	3.981	3.980	5.186	7.527	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project DX8. The M142 High Mobility Artillery Rocket System (HIMARS) launcher is a full spectrum, combat proven, all weather, 24/7 lethal and responsive, precision strike weapon system. HIMARS provides critical missile precision strike, operational shaping fires, counterfire, and close support destructive and suppressive fires. HIMARS is a C-130 or C-17 transportable, wheeled, indirect fire, rocket/missile launcher capable of firing one pod of precision rockets/missiles from the Multiple Launch Rocket System (MLRS) Family of Munitions (MFOM), to include the Guided Multiple Launch Rocket System (GMLRS) and the Army Tactical Missile System (ATACMS). These munitions are capable of engaging targets with precision at ranges up to 300 kilometers. This project funds software development for the HIMARS launcher. The government assumed responsibility for software development and maintenance from the prime contractor in FY2016. Organic software is defined as government developed, maintained, and owned software. The long-term end state is a convergence of tactical software across the HIMARS and MLRS launcher platforms into a single product supporting both systems.

FY2018 Base funding in the amount of \$3.929 million for project DX8 supports HIMARS-unique Software Build, Version 8.2. This software is projected to be available for fielding to the M142 fleet in FY2019. In addition to addressing software maintenance, Software Version 8.2 enables portability to the M270A2 (MLRS) tracked launcher upon receipt of a hardware Fire Control System upgrade.

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

	FY 2016	FY 2017	FY 2018
Title: MLRS Production Improvement Program (PIP)-HIMARS PIP	1.301	9.663	3.929
Description: Provide enduring tactical software development and maintenance required to address security concerns, implement fixes to newly discovered issues, and address emerging threats.			
FY 2016 Accomplishments: In FY16, a next generation communications device demo was performed to help identify viable candidate radio devices to replace the existing short and long-range communications devices within the system architecture.			
Organic Version 8.0 Software was demonstrated by test through conducting seven live fire events verifying GMLRS-U, ATACMS, and GMLRS-AW munitions.			
FY 2017 Plans: The initial version of government developed software, version 8.0 will achieve Software Materiel Release and be ready for fielding to the 363 Army Acquisition Objective (AAO) HIMARS launcher fleet.			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0603778A / MLRS Product Improvement Program	Project (Number/Name) DX8 / HIMARS Product Improvement Program
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
The first maintenance software build, version 8.1, to address open issues will begin development.			
<i>FY 2018 Plans:</i> Version 8.1 tactical software build for HIMARS launcher will complete and achieve readiness for operational fielding.			
Version 8.2 tactical software build will begin to add support to launcher Insensitive Munitions Propulsion System (IMPS) GMLRS munitions starting production. This software upgrade will be required to launch the newest production munitions.			
Accomplishments/Planned Programs Subtotals	1.301	9.663	3.929

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• C67501: HIMARS Modifications (C67501)	3.148	27.847	9.566	-	9.566	10.456	12.768	6.320	7.546	Continuing	Continuing

Remarks

D. Acquisition Strategy
The HIMARS Product Improvement Program performs development efforts required to address emerging requirements.

The Army is transitioning complete software acquisition from the prime contractor (legacy v7.x) to an organic approach (v8.x forward) by utilizing the Aviation & Missile Research & Development Engineering Center's (AMRDEC) Software Engineering Directorate (SED) as both the software developer and maintainer. These efforts are funded via Military Interdepartmental Purchase Request (MIPR).

Emerging requirements include maintenance and update to address emerging threats of the launcher organic version 8.x software, reacting to system changes driven by policy and emerging requirements, and maintaining architectural compatibility. Communication suite changes, munitions updates, and introduction of new munitions require software and/or hardware updates to ensure full compatibility.

The enduring organic v8.x software effort is projected for Materiel Release and fielding to HIMARS fleet in FY17. Version 8.0 will be the initial roll-out. Version 8.1 will follow in FY18. Version 8.2 will follow in FY19. Version 8.2 will enable portability to the M270A2 (MLRS) launcher when upgraded with the interim Fire Control System solution. An incremental software release plan will be developed to address emerging software requirements beyond v8.2 in the future with the ultimate end-state to achieve a common tactical software platform for both the HIMARS and MLRS launcher fleets.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0603778A / <i>MLRS Product Improvement Program</i>	Project (Number/Name) DX8 / <i>HIMARS Product Improvement Program</i>

E. Performance Metrics N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0603778A / MLRS Product Improvement Program				Project (Number/Name) DZ8 / Long Range Precision Fires			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
DZ8: Long Range Precision Fires	-	19.901	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	19.901
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Starting in FY2017 funding for LRPF has been realigned to new OSD-directed PE 0607134A, Proj ES1.

A. Mission Description and Budget Item Justification

Long Range Precision Fires (LRPF) is being developed as a cluster and insensitive munition compliant system that replaces and improves upon Army Tactical Missile System (ATACMS) capabilities. The mission of the LRPF System will be to attack/neutralize/suppress/destroy targets using missile delivered indirect precision fires. LRPF will provide Joint Force Commanders with a 24/7, all-weather capability to attack critical and time sensitive area and point targets including threat air defense, missile launchers, command and control centers, assembly/staging areas and high payoff targets at all depths of the multi-domain battlefield. LRPF will counter the enemy's ability to conduct combat maneuver and air defense operations. LRPF requirements include: max range of greater than 400km, specified lethality against the designated target set, a Launch Pod Missile Container (LPMC) that holds a minimum of one missile, and compatibility with the existing launcher platforms (M270A1 Multiple Launch Rocket System (MLRS) and M142 High Mobility Artillery Rocket System (HIMARS)). LRPF is being designed with an open system architecture that provides the capability for future growth to counter new and emerging threats. Milestone A; Technology Maturation and Risk Reduction (TMRR) was approved on 31 March 2017.

The Army initially funded the development of the LRPF under PE 0603778A, Proj DZ8. Two DoD Ordnance Technology Consortium (DOTC) agreements were awarded to support efforts under the Material Solution Analysis Phase.

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

	FY 2016	FY 2017	FY 2018
Title: TM/RR	19.901	-	-
Description: Develop and prototype an insensitive munition compliant missile that provides increased range, improved lethality for both point and area targets, meets cluster munition policy requirements, and provides increased firepower with a multiple missile per launch pod solution. Long Range Precision Fires (LRPF) provides field artillery units with a deep-strike capability while supporting brigade, division, corps, Army, theater, Joint and Coalition forces in full, limited or expeditionary operations.			
FY 2016 Accomplishments: Investigated high-level requirements for the components and system based on the Technical Requirements Document (TRD), including minimum and maximum delivery range, effectiveness of the warhead, the accuracy of the missile system, and the interoperability of the missile system with the M142 and M270A1 launch platforms. Reviewed and assessed the LRPF target sets to include: Air Defense Radar, Missile Launch Site, and a Helicopter Staging Area. Assessed rocket motor design options and			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0603778A / <i>MLRS Product Improvement Program</i>	Project (Number/Name) DZ8 / <i>Long Range Precision Fires</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Launch Pod Missile Container (LPMC) requirements. Assessed technologies that provide a growth path to achieving objective range and effectiveness requirements as defined in the LRPF TRD. Assessed the Flight Termination System/Telemetry (FTS/TM) requirements for LRPF flight testing and determined an approach for development/integration and qualification/approval of an FTS/TM package.			
Accomplishments/Planned Programs Subtotals	19.901	-	-

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy

LRPF is being developed as a cluster and insensitive munition compliant system that replaces and improves upon ATACMS capabilities to provide Joint Force Commanders with a 24/7, all-weather, area target, long-range fires capability without placing aircraft and crews at risk. An AoA supporting the MS A decision has been completed by U.S. Army Training and Doctrine Command (TRADOC) Analysis Center-White Sands Missile Range (TRAC-WSMR), with the OSD letter of sufficiency issued in September 2015. Two DoD Ordnance Technology Consortium (DOTC) agreements were awarded to support efforts under the Material Solution Analysis (MSA)Phase. The Milestone Decision Authority (MDA) held a MS A decision review in 2QFY17. TMRR will include two DOTC award agreements for competitive prototyping leading to flight demonstrations and PDRs in FY19. Data from the TMRR phase to include results from the flight demonstrations will support the FY21 Engineering and Manufacturing Development (EMD) contract award. EMD will be awarded to a single industry team that has the best overall LRPF design. The EMD phase will complete product development, qualification, production readiness assessment, and limited user test.

E. Performance Metrics
N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0603813A / <i>TRACTOR PULL</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	9.461	3.960	4.014	-	4.014	4.067	4.333	4.414	4.544	Continuing	Continuing
ET1: <i>Tractor Peel</i>	-	9.461	3.960	4.014	-	4.014	4.067	4.333	4.414	4.544	Continuing	Continuing

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 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>
Previous President's Budget	9.461	3.960	3.863	-	3.863
Current President's Budget	9.461	3.960	4.014	-	4.014
Total Adjustments	0.000	0.000	0.151	-	0.151
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	0.151	-	0.151

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: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0605024A / Anti-Tamper Technology Support
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	3.638	4.094	-	4.094	4.362	7.233	6.575	6.769	0.000	32.671
FB1: Anti-Tamper Technology Support	-	0.000	3.638	4.094	-	4.094	4.362	7.233	6.575	6.769	0.000	32.671

Note

Anti-Tamper was a part of Programwide Activities (PE 0605801A M46) in FY16 and prior. New project FB1 established under PE 0605024A in FY17.

A. Mission Description and Budget Item Justification

Anti-Tamper (AT) Technology Support. The Protective Technologies (PT) organization is the Army's Technical Center for the DoD AT program, which is focused on preventing exploitation reverse engineering (RE) of U.S. systems lost or captured on the battlefield or sold via Foreign Military Sales (FMS) or Direct Commercial Sales (DCS). In support of this mission, PT's classified efforts are focused on AT Validation and Verification (V&V) activities with Army programs, AT/RE Lab facilities and equipment and AT/RE Lab assessments.

B. Program Change Summary (\$ in Millions)

	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>
Previous President's Budget	0.000	3.638	4.126	-	4.126
Current President's Budget	0.000	3.638	4.094	-	4.094
Total Adjustments	0.000	0.000	-0.032	-	-0.032
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	-0.044	-	-0.044
• CivPay Adjustments	0.000	0.000	0.012	-	0.012

Change Summary Explanation

FY 2018 funding decrease reflects a slight correction to technical assessment cost.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0605024A / <i>Anti-Tamper Technology Support</i>	Project (Number/Name) FB1 / <i>Anti-Tamper Technology Support</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
FB1: <i>Anti-Tamper Technology Support</i>	-	0.000	3.638	4.094	-	4.094	4.362	7.233	6.575	6.769	0.000	32.671
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Note

Anti-Tamper was a part of AMRDEC's Programwide Activities (PE 0605801A M46) in FY16 and prior. New project FB1 established under PE 0605024A in FY17.

A. Mission Description and Budget Item Justification

Anti-Tamper (AT) Technology Support. The Protective Technologies (PT) organization is the Army's Technical Center for the DoD AT program, which is focused on preventing exploitation reverse engineering (RE) of U.S. systems lost or captured on the battlefield or sold via Foreign Military Sales (FMS) or Direct Commercial Sales (DCS). In support of this mission, PT's classified efforts are focused on AT Validation and Verification (V&V) activities with Army programs, AT/RE Lab facilities and equipment and AT/RE Lab assessments.

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

	FY 2016	FY 2017	FY 2018
Title: Anti-Tamper (AT) Technology Support	-	3.638	4.094
Description: AT is a DoD program that encompasses the systems engineering activities intended to prevent and/or delay exploitation of critical technologies in U.S. weapon systems. These activities involve the entire life-cycle of systems acquisition, including research, development, implementation, and testing of AT measures.			
FY 2017 Plans: Maintain the core team of subject matter experts (SMEs) available for this mission to support the development of and evaluate the AT designs for Army programs, and in support of that primary mission, conduct technical assessments of micro-electronic parts used in the electronic designs of a number of critical Army weapons systems.			
FY 2018 Plans: Will maintain the core team of subject matter experts (SMEs) available for this mission to support the development of and evaluate the AT designs for Army programs, and in support of that primary mission, conduct technical assessments of micro-electronic parts used in the electronic designs of a number of critical Army weapons systems.			
Accomplishments/Planned Programs Subtotals	-	3.638	4.094

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

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0605024A / <i>Anti-Tamper Technology Support</i>	Project (Number/Name) FB1 / <i>Anti-Tamper Technology Support</i>

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

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	5.678	19.617	15.738	-	15.738	13.599	7.544	5.787	6.174	Continuing	Continuing
ER2: <i>Close Combat Technology</i>	-	0.836	4.300	3.774	-	3.774	0.612	0.171	0.174	1.500	0.000	11.367
ER5: <i>Indirect Fire and Fuze Technology</i>	-	2.651	0.883	2.268	-	2.268	2.653	2.646	2.648	2.500	Continuing	Continuing
ER6: <i>Direct Fire Technology</i>	-	2.191	14.434	9.696	-	9.696	10.334	4.727	2.965	2.174	Continuing	Continuing

A. Mission Description and Budget Item Justification

Project ER2: The Close Combat Technology program includes development efforts to upgrade Close Combat technologies, energetics, and munitions, such as counter explosives, grenades, demolitions, shoulder launched munitions, pyrotechnic simulators, countermeasure flares, non-lethal ammunition/systems, networked munitions and mines, that have been fielded or have received approval for full rate production. This program will identify, characterize, study, analyze, test and develop technologies to resolve close combat munition reliability, safety, environmental, storage, standardization, obsolescence and manufacturing/producibility issues.

FY 2018 funds will be used to support the following efforts: MK3A2 Offensive Hand Grenade, Countermeasure Flare Decoy Formulations, and AN-M82A Obscuration Grenade.

Project ER5: The Indirect Fire and Fuze Technology project includes product improvement development efforts to upgrade indirect fire weapon systems and munitions that have already been fielded and/or are in production. Indirect Fire Weapons and Munitions Product Improvement Projects include improved target engagement, increased reliability, availability, maintainability, and safety, standardization and interoperability with weapons and munitions of Allied Nations, defense exportability features, reduction of failure mechanisms, and supply chain risk through introduction of new and alternative technology and materiel solutions, improvement of manufacturing methods and their associated production and life cycle support processes, new capabilities in response to the evolving and emerging threats and countermeasures, and reduction/elimination of potential environmental and health risks associated with these products.

FY 2018 funding supports testing to demonstrate fuze setback spring interface improvements, engineering tests to prove-out the mortar fuze electronics upgrades, studies on medium caliber fuzes to improve throughput and reduce costs, testing to prove-out impact switch upgrades, evaluations on transceiver component replacement prototype devices for indirect fire and direct fire fuzes, studies on second source MEMS-based G-switches for medium and large caliber applications, and 81mm M821A3E1 HE IM Mortar completion of safety/environmental test and analysis and full arena testing and analysis of test data.

Project ER6: The Munitions, Survivability and Logistics program funding will be used to support direct fire ammunition from small caliber ammunition, 40mm grenade, medium caliber cannon ammunition and large caliber ammunition enhancements to lethality, effectiveness, survivability, accuracy and general product improvements.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>
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FY 2018 funds are used for a more lethal and safer design for 40mm grenades that will be built and tested. Warhead improvement and primer improvement for the 30mm Apache ammunition are also under development. A number of studies on potential improvements for training ammunition and environmentally friendly primers will be conducted. Potential improvements to 105mm and 120mm ammunition will be examined.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	4.945	14.517	7.001	-	7.001
Current President's Budget	5.678	19.617	15.738	-	15.738
Total Adjustments	0.733	5.100	8.737	-	8.737
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.733	5.100	8.737	-	8.737

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	Project (Number/Name) ER2 / <i>Close Combat Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
ER2: <i>Close Combat Technology</i>	-	0.836	4.300	3.774	-	3.774	0.612	0.171	0.174	1.500	0.000	11.367
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program includes development efforts to upgrade Close Combat technologies, energetics, and munitions, such as counter explosives, grenades, demolitions, shoulder launched munitions, pyrotechnic simulators, countermeasure flares, non-lethal ammunition/systems, networked munitions and mines, that have been fielded or have received approval for full rate production. This program will identify, characterize, study, analyze, test and develop technologies to resolve close combat munition reliability, safety, environmental, storage, standardization, obsolescence and manufacturing/producibility issues.

FY 2018 funds will be used to support the following efforts: MK3A2 Offensive Hand Grenade, Countermeasure Flare Decoy Formulations, and AN-M82A Obscuration Grenade.

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

	FY 2016	FY 2017	FY 2018
<p>Title: Claymore Force-on-Force Training Aids, Devices, Simulators, and Simulations (TADSS) Trainer</p> <p>Description: Develop an improved Claymore Force-on-Force Training Aids, Devices, Simulators, and Simulations (TADSS) Trainer. The Claymore does not have a TADSS trainer with sight, sound & Multiple Integrated Laser Engagement System (MILES) capability. Development of an improved Claymore trainer will allow Claymore to be trained at Combat Training Centers (CTCs) and will provide more realistic and effective training for the user when they are training Claymore as an end item and when training Claymore as initiated by Spider.</p> <p>FY 2016 Accomplishments: Designed and tested the Non-Pyro Claymore Simulation (NPCS), finalized the design and tested the Fireset Board and the Multiple Integrated Laser Engagement System (MILES) Emitting Unit. Conducted a Systems Requirements Review (SRR), a Preliminary Design Review (PDR), and performed a User Assessment and Demonstration of the System.</p> <p>FY 2017 Plans: Design and test Fireset Board, Non-Pyro Claymore simulation and Multiple Integrated Laser Engagement System (MILES) Emitting Unit. Conduct a Preliminary Design Review, perform user assessments and demonstrations and a preliminary Drop and Loose Cargo test. Conduct a Systems Verification Test. All efforts will lead to delivery of a production representative prototype Claymore TADSS trainer.</p>	0.353	0.950	-
<p>Title: MK3A2 Replacement, Offensive Hand Grenade Effort</p>	0.483	1.926	0.867

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	Project (Number/Name) ER2 / <i>Close Combat Technology</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>Description: The Current MK3A2 Offensive Hand Grenade can expose the warfighter to toxic levels of asbestos and is restricted for use in Continental United States and Outside Continental United State (CONUS/OCONUS). The warfighter cannot safely employ this grenade. Alternate munitions do not satisfy user requirements for incapacitating the enemy. This effort incorporates modern materials and insensitive explosives to provide a safer, producible offensive grenade.</p> <p>FY 2016 Accomplishments: Finalized the design of the grenade as well as its training device.</p> <p>FY 2017 Plans: Production Qualification Testing (PQT) will be conducted in addition to Insensitive Munitions testing and other testing required to support Type Classification (TC). The final report will be generated. TC documentation will be generated in preparation for TC in 3QFY19.</p> <p>FY 2018 Plans: Both Production Qualification and Arena testing will be conducted as well as documentation for Type Classification (TC) (planned for 3QFY19).</p>				
<p>Title: Countermeasure Flare Decoy Formulations</p> <p>Description: Improve the producibility of countermeasure (CM) decoy formulations in order to increase the production safety and functional reliability to protect aircraft against multiple threat systems.</p> <p>FY 2017 Plans: Develop prototypes and conduct developmental testing. Effort will result in a production representative prototype countermeasure.</p> <p>FY 2018 Plans: Improve the producibility of countermeasure (CM) decoy formulations and solutions in order to increase the production safety and functional reliability and performance improvement of solutions to protect aircraft against multiple threat systems. Develop prototype solutions and conduct testing. Effort will result in a production representative prototype countermeasure solutions.</p>		-	0.480	1.635
<p>Title: AN-M8A2 Obscuration Grenade</p> <p>Description: This effort supports the Type Classification / Production Prove Out of a new obscurant grenade that provides the warfighter with three times the performance of the current M83 without exposing the soldier to the carcinogens of the AN-M8. Use of the AN-M8 Obscuration Grenade has been discontinued in Continental United State and Outside Continental United State (CONUS/OCONUS) due to restrictions of Hexachlorethane on the battlefield. The M83 is incapable of providing smoke duration</p>		-	0.800	1.272

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	Project (Number/Name) ER2 / <i>Close Combat Technology</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>or density at the required performance level of the AN-M8, so the current warfighter strategy is to utilize two M83 Obscuration Grenades to replace the performance of the AN-M8.</p> <p>FY 2017 Plans: Effort during FY17 will include finalizing grenade design, producing test quantity, and beginning TC/FMR documentation.</p> <p>FY 2018 Plans: Validation of the Starter Cup design, and temperature testing of the final AN-M82 (HX) Obscuration Smoke Grenade.</p>				
<p>Title: Non-Lethal Ammunition Obsolescence</p> <p>Description: Due to advancement in technology, electronic components of fuzed items are rapidly becoming obsolete. Obsolescence slows or even stops production and delays delivery of systems to inventory which impacts warfighter readiness. This effort will fund the replacement of obsolete chips on the BA39, XM1112 Tactical Non Lethal Munition 40MM projectile. Qualification testing will also be required to ensure that the functionality of the round is unchanged.</p> <p>FY 2017 Plans: This effort will study alternatives to the obsolete components. A contract will be issued to build prototype components for initial testing.</p>		-	0.144	-
Accomplishments/Planned Programs Subtotals		0.836	4.300	3.774
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
Not Applicable for these items.				
E. Performance Metrics				
N/A				

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017			
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>					Project (Number/Name) ER5 / <i>Indirect Fire and Fuze Technology</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
ER5: <i>Indirect Fire and Fuze Technology</i>	-	2.651	0.883	2.268	-	2.268	2.653	2.646	2.648	2.500	Continuing	Continuing	
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

The Indirect Fire and Fuze Technology project includes product improvement development efforts to upgrade indirect fire weapon systems and munitions that have already been fielded and/or are in production. Indirect Fire Weapons and Munitions Product Improvement Projects include improved target engagement, increased reliability, availability, maintainability, and safety, standardization and interoperability with weapons and munitions of Allied Nations, defense exportability features, reduction of failure mechanisms, and supply chain risk through introduction of new and alternative technology and materiel solutions, improvement of manufacturing methods and their associated production and life cycle support processes, new capabilities in response to the evolving and emerging threats and countermeasures, and reduction/elimination of potential environmental and health risks associated with these products.

This supports the identification, study, analysis, and development of fuzing technologies and safe arm devices in production and in the field. This project will implement technologies into fuzing systems to preclude obsolescence, maximize standardization, enhance performance, and improve the safety and exportability of existing munitions. The project addresses two major areas: (1) analysis and (2) block upgrades. Analysis efforts will identify second sources for fuzing systems that may reduce cost by providing competition, and maintain production when sources or parts are no longer available. It will also allow for the performance enhancement of current ammunition items by conducting studies of major fuze components to detect and identify latent defects. The second major area is block upgrades, which will identify and perform studies on improvements to fuzes, increase commonality of fuze components and requirements. Block upgrades will enable the introduction of the latest technologies into fuzing, keep the fuzing design current to avoid obsolescence issues, and add capabilities.

This supports the implementation of IM improvements to the 81mm Mortar Cartridge while meeting all other Key Performance Parameters, namely lethality. The M821A3 IM cartridge does not meet lethality requirements as outlined in the User Requirements (Capability Production Document (CPD)). This project is to design an 81mm Mortar (M821A3E1) with pre-formed fragmentation to increase the lethality. The M821 series of 81mm Mortars is the primary 81mm go-to-war round for U.S. Army and USMC. This project will provide users a safer round, improving the IM technology and reducing the risk of unplanned stimuli. This project will also provide enhanced lethality over the M821A3, increasing the capability of the 81mm system. RDT&E funding is required to develop, test and qualify the pre-formed fragmentation design on the 81mm IM round and ensure that lethality performance requirements are met.

FY 2018 funding supports testing to demonstrate fuze setback spring interface improvements, engineering tests to prove-out the mortar fuze electronics upgrades, studies on medium caliber fuzes to improve throughput and reduce costs, testing to prove-out impact switch upgrades, evaluations on transceiver component replacement prototype devices for indirect fire and direct fire fuzes, studies on second source MEMS-based G-switches for medium and large caliber applications, and 81mm M821A3E1 HE IM Mortar completion of safety/environmental test and analysis and full arena testing and analysis of test data.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	Project (Number/Name) ER5 / <i>Indirect Fire and Fuze Technology</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>Title: Fuze Technology Improvements (FTI)</p> <p>Description: Activities include maturation, validation, and risk reduction of fuze technology and fuze component alternatives to increase sources of supply, improve performance, increase safety, and lower cost. Activities also include integration of fuze initiation improvements to increase reliability and lower fuze costs, evaluation of fuze electronic upgrades to improve safety and increase performance reliability, assessment of inductive fuze setting improvements to lower costs, and evaluation of medium caliber fuze setback interface improvements for increased safety.</p> <p>FY 2016 Accomplishments: Block Upgrades: Completed the Micro Electro Mechanical Systems (MEMS) component packaging improvements for increased performance and lower cost. Completed the mortar fuze delay primer improvements and implemented into production via Engineering Change Proposal (ECP). Conducted fuze setback spring interface modeling and simulation. Completed prototype fuze cover designs for evaluations of inductive setter interface and initialization of large caliber indirect fire munitions.</p> <p>FY 2017 Plans: Block Upgrades: Conduct engineering tests to prove-out the mortar fuze delay primer improvements. Conduct engineering tests to evaluate impact switch performance against mortar target sets. Conduct engineering tests to evaluate fuze setback spring interface improvements. Conduct tests to demonstrate fuze setter interface and initialization improvements.</p> <p>Analysis/Risk Mitigation: Conduct studies on electronic component replacement prototypes for indirect and direct fire fuzes due to component obsolescence.</p> <p>FY 2018 Plans: Block Upgrades: Will conduct tests to demonstrate fuze setback spring interface improvements. Will conduct engineering tests to prove-out the mortar fuze electronics upgrades. Will conduct studies on medium caliber fuzes to improve throughput and reduce costs. Will conduct tests to prove-out impact switch upgrades.</p> <p>Analysis/Risk Mitigation: Will conduct evaluations on transceiver component replacement prototype devices for indirect fire and direct fire fuzes. Will conduct studies on second source MEMS-based G-switches for medium and large caliber applications.</p>		1.336	0.625	1.818
<p>Title: 81mm M821A3E1 HE IM Mortar Program</p> <p>Description: Activities include the maturation of the lethality through modeling and simulation as well as testing to ensure the 81mm will meet all user requirements. Activities also include ballistic testing to ensure safe and effective firing of the 81mm Mortar. This will also include modeling to ensure the contour of the round will ensures stable interior and exterior ballistics.</p>		1.315	0.258	0.450

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	Project (Number/Name) ER5 / <i>Indirect Fire and Fuze Technology</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
Activities will also focus on maturation of the manufacturability of the round to ensure unit cost is as low as possible, this will be executed through loading studies and other Design of Experiments (DOE).				
FY 2016 Accomplishments: Completed ballistic flight testing and also arena lethality analysis which demonstrated the round can meet lethality and range requirements.				
FY 2017 Plans: Activities include refining the design to minimize unit cost impacts. The Program will conduct additional ballistic testing and lethality analysis to refine design and ensure it will meet all requirements. The program will also test Mortar assets to safety/ environmental extremes to ensure the round will be safe and effective.				
FY 2018 Plans: Program will complete safety/environmental test and analysis. Activities will include full arena testing and analysis of test data.				
Accomplishments/Planned Programs Subtotals		2.651	0.883	2.268
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
Fuze Technology Improvement (FTI) will improve current production munitions by exploiting existing fuzing technologies and inserting them into current fielded and/ or production fuzes, providing safer, more producible, and more lethal fuzing solutions. FTI develops second source suppliers and resolves component obsolescence issues to mitigate risk and prevent production interruptions in order to continue to provide safer, more reliable munitions for the Warfighter with significant risk reduction to production fuzes also benefiting the U.S. Taxpayer. The effort is a continuation of studies, analysis, evaluations, and development of fuzing technologies and safe and arm devices in production and in the field. This program will implement these technologies into fuzing systems to preclude component obsolescence, maximize standardization, enhance performance, and improve the safety and exportability of existing munitions.				
The 81mm M821A3E1 HE IM Mortar Project utilizes the DoD Ordnance Technology Consortium (DOTC) to conduct loading studies and produce test samples. The initiatives emphasize improving the manufacturability of the M821A3E1 to minimize unit cost burden in the future. Follow-on production of the M821A3E1 will utilize the component break-out strategy where the Office of the Project Manager (PM) Combat Ammunition Systems (CAS) will be the Systems Integrator in order to maximize efficiencies.				
E. Performance Metrics				
N/A				

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / Weapons and Munitions Product Improvement Programs	Project (Number/Name) ER6 / Direct Fire Technology
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
ER6: Direct Fire Technology	-	2.191	14.434	9.696	-	9.696	10.334	4.727	2.965	2.174	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Munitions, Survivability and Logistics program funding will be used to support direct fire ammunition from small caliber ammunition, 40mm grenade, medium caliber cannon ammunition and large caliber ammunition enhancements to lethality, effectiveness, survivability, accuracy and general product improvements.

FY 2018 funds are used for a more lethal and safer design for 40mm grenades that will be built and tested. Warhead improvement and primer improvement for the 30mm Apache ammunition are also under development. A number of studies on potential improvements for training ammunition and environmentally friendly primers will be conducted. Potential improvements to 105mm and 120mm ammunition will be examined.

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

	FY 2016	FY 2017	FY 2018
<p>Title: New Ammo Design Qualification & NATO Mission Support</p> <p>Description: This program ensures complete interchangeability of small caliber and automated cannon-caliber, and 40mm grenade ammunition and weapons among NATO countries to achieve the associated logistic, strategic and tactical advantages.</p> <p>FY 2016 Accomplishments: FY 2016 work supported NATO small arms ammunition interchangeability group meetings, documentation and test operations.</p>	0.065	-	-
<p>Title: Lightweight Ammunition</p> <p>Description: Develop, demonstrate, and qualify a Lightweight Small Caliber Ammunition (LSCA) 7.62mm, 5.56mm, and .50 cal capability that will provide an ammunition weight savings of ten to fifty percent to the M2, M240, M4A1, and M249 gunner, assistant gunner, and ammo bearer.</p> <p>FY 2017 Plans: FY 2017 funds used to perform government testing and continued improvement of candidate designs.</p> <p>FY 2018 Plans: FY 2018 funds supports continuation of government testing and improvement of candidate designs.</p>	-	0.264	0.855
<p>Title: Lead Free Primer</p> <p>Description: Automate and Integrate environmental friendly lead free primary explosives within the small caliber family of ammunition. Addresses health concerns of lead intake during firing by removing lead styphnate from small caliber primers.</p>	1.151	1.500	1.500

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	Project (Number/Name) ER6 / <i>Direct Fire Technology</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
Automated pilot line combined with new mix reduces human exposure, improves quality, improves safety and reduces environmental waste in manufacturing process.				
<p>FY 2016 Accomplishments: FY 2016 work supported optimizing primer mix for 5.56mm, 7.62mm, and .50 cal primers, developed master test plan for cartridge qualification, tested 5.56mm cartridges for compatibility as mix and process matures, completed design of automated pilot line to include mixing, dispensing, and drying of lead free primers, and began building pilot line process.</p> <p>FY 2017 Plans: FY 2017 work will support complete optimization of 5.56mm, 7.62mm, and .50 cal primer mix, test multiple 7.62mm cartridges and remaining 5.56mm cartridges for compatibility as pilot line process matures, begin Energetic Munition Qualification Board (EMQB) processes, complete development of pilot line process, and complete prove-out test plans for pilot line equipment.</p> <p>FY 2018 Plans: FY 2018 will complete the build for the 5.56mm primer qualification and initiate the 7.62mm and .50 caliber pilot lines. Finalize the Technical Data Packages for the three calibers and complete the EMQB process. Finally, refine and optimize the automation of the manufacturing process.</p>				
<p>Title: Support Sniper Ammunition Integration Into Army Standard Sniper Weapons</p> <p>Description: Modify existing sniper ammunition to support integration into new Army standard sniper weapons. Maintain compatibility with legacy sniper weapons while improving operational availability.</p> <p>FY 2017 Plans: FY 2017 work will test and evaluate sniper ammunition improvements.</p> <p>FY 2018 Plans: FY 2018 work continues to test and evaluate sniper ammunition improvements.</p>		-	0.450	1.360
<p>Title: Support Improvements in Direct Fire Propulsion Systems</p> <p>Description: Improve Direct Fire Propulsion Systems to increase user survivability.</p> <p>FY 2017 Plans: FY 2017 work will explore additional sources of supply in the National Technology and Industrial Base (NTIB) to reduce the dependence on foreign suppliers and pursue improvements to address temperature sensitivities of energetics.</p> <p>FY 2018 Plans:</p>		-	0.500	0.500

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	Project (Number/Name) ER6 / <i>Direct Fire Technology</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
FY 2018 work will continue to explore additional sources of supply in the National Technology and Industrial Base (NTIB) to reduce the dependence on foreign suppliers and pursue improvements to address temperature sensitivities of energetics and primer ballistics. Work will also include technology improvements to reduce muzzle flash.				
<p>Title: Improved M789 Lethality, Warhead Fragmentation Improvement</p> <p>Description: Improve 30mm M789 warhead lethality by performing trade studies and implementing advanced warhead and fuze technologies to promote more efficient fragmentation.</p> <p>FY 2016 Accomplishments: FY 2016 baselined M789 vs. improved M789 arena, shaped charge, and lethality data.</p> <p>FY 2017 Plans: FY 2017 work will support Request for Proposal (RFP), Solicitation, Contract Award, and Qualification Build.</p> <p>FY 2018 Plans: FY 2018 work will support the completion and implementation of trade studies following testing, TDP updating, and preparing for manufacturability and qualification build.</p>		0.083	1.500	1.000
<p>Title: M433 Warhead Improvement</p> <p>Description: 40mm: Improve lethality (fragmentation) of the M433 grenade.</p> <p>FY 2016 Accomplishments: FY 2016 work included conducting a demonstration of subsystem and system maturity with two integrated system demonstration tests. Testing confirmed integration maturity and enabled improvements in system manufacturing. Contracting actions were awarded to find a source to manufacture developmental test and evaluation hardware.</p> <p>FY 2017 Plans: FY 2017 work will conduct Developmental Testing (DT) / Pre Production Qualification Test (PPQT) build.</p> <p>FY 2018 Plans: FY 2018 work finishes Pre Production Qualification Tests (PPQT), perform Materiel Release (MR)/Engineering Change Proposal (ECP) actions, and support contracting actions to transition new Technical Data Package (TDP) into Full Rate Production (FRP).</p>		0.773	4.220	1.570
<p>Title: Target Practice Spotter Technology Insertion</p> <p>Description: Training Cartridge with impact initiated spotting charge. Goal is visible signature upon impact under all conditions.</p> <p>FY 2016 Accomplishments:</p>		0.050	-	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	Project (Number/Name) ER6 / <i>Direct Fire Technology</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
FY 2016 work finalized the program. Determined technology insertion is not feasible at this time.				
<p>Title: 20mm C-RAM Ammo Improvement</p> <p>Description: As per JUON CC-0562 for enhanced lethality, M940 20mm ammunition requires research and development efforts to increase the lethality effects of the land-based Phalanx Weapon System (LPWS) against larger rocket threats. This effort will increase the current capability of the M940 by incorporating design features to provide improvement to probability of Kill.</p> <p>FY 2017 Plans: FY 2017 funding will support the design and testing of multiple improved M940 concepts aimed at quickly providing enhanced lethality effects against large rocket threats.</p> <p>FY 2018 Plans: FY 2018 funding will continue to support the design and testing of multiple improved M940 concepts aimed at quickly providing enhanced lethality effects against large rocket threats. Concurrently, an optimized concept will be designed and tested to provide a more permanent solution with enhanced lethality and significant improvement to probability of kill.</p>		-	6.000	0.580
<p>Title: Stryker 30x173mm and Apache 30x113mm Airburst Munitions</p> <p>Description: Increase anti-personnel lethality and lethality within Military Operations in an Urban Terrain (MOUT) structures compared to current Army medium caliber solutions.</p> <p>FY 2018 Plans: FY 2018 funding supports the study of the 30x173mm airburst capable cartridge and programming/communication unit which interfaces with Stryker Infantry Carrier Vehicle (ICV) and/or Army Future Fighting Vehicles. Funding supports the 30x113 airburst capable cartridge and unit programming. Efforts will try to establish commonality for these key systems.</p>		-	-	0.653
<p>Title: Tank Ammunition Improvements</p> <p>Description: Develop and test potential improvements to 105mm and 120mm gun system ammunition.</p> <p>FY 2018 Plans: FY 2018 work will include various efforts for 105mm and 120mm tank ammunition, including chemical tracer improvements, combustible cartridge case design and fabrication improvements, and non-developmental cartridge testing for the M68 cannon.</p>		-	-	1.450
<p>Title: 40mm M576 Improvement Study</p> <p>Description: 40mm M576 product improvement will provide the warfighter with the ability to quickly defeat closed-in personnel targets</p>		-	-	0.178

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army							Date: May 2017				
Appropriation/Budget Activity 2040 / 7			R-1 Program Element (Number/Name) PE 0607131A / Weapons and Munitions Product Improvement Programs				Project (Number/Name) ER6 / Direct Fire Technology				
B. Accomplishments/Planned Programs (\$ in Millions)							FY 2016	FY 2017	FY 2018		
FY 2018 Plans: FY 2018 funding will be used to baseline the current M576 capabilities and explore improved candidate designs.											
Title: Improved Door Breach Munition							0.069	-	-		
Description: Product improved door breach munition to allow rapid breaching beyond current capability.											
FY 2016 Accomplishments: Qualified improved door breach munition to meet user requirements.											
Title: Medium Caliber Single Crystal Tungsten Evaluation							-	-	0.050		
Description: Testing will be conducted to determine the effectiveness of single crystal tungsten penetrators against armored targets.											
FY 2018 Plans: FY2018 work will include testing to determine the effectiveness of single crystal tungsten penetrators against armored targets.											
Accomplishments/Planned Programs Subtotals							2.191	14.434	9.696		
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• PE 0603639A Project EL8: <i>Lightweight Cartridge Case for Small Caliber Ammunition</i>	-	1.280	2.500	-	2.500	-	-	-	-	-	Continuing Continuing
• PE 0654802A Project EP6: <i>Lightweight Cartridge Case for Small Caliber Ammunition</i>	-	1.290	-	-	-	-	-	-	2.000	-	Continuing Continuing
Remarks The funding lines continue work for 7.62mm ammunition and the follow-on effort for the .50 Cal starting in FY 2022.											
D. Acquisition Strategy All contracts will be full and open competition firm fixed price.											
E. Performance Metrics N/A											

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>					R-1 Program Element (Number/Name) PE 0607133A / <i>TRACTOR SMOKE</i>							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	7.569	4.479	4.513	-	4.513	4.577	6.876	7.966	6.113	Continuing	Continuing
ET2: <i>Tractor Stove</i>	-	7.569	4.479	4.513	-	4.513	4.577	6.876	7.966	6.113	Continuing	Continuing

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)

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	7.569	4.479	4.368	-	4.368
Current President's Budget	7.569	4.479	4.513	-	4.513
Total Adjustments	0.000	0.000	0.145	-	0.145
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	0.145	-	0.145

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: FY 2018 Army											Date: May 2017	
Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>					R-1 Program Element (Number/Name) PE 0607134A / <i>Long Range Precision Fires (LRPF)</i>							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	67.006	102.014	-	102.014	111.505	91.086	125.185	107.175	Continuing	Continuing
ES1: <i>Long Range Precision Fires (LRPF)</i>	-	0.000	67.006	102.014	-	102.014	111.505	91.086	125.185	107.175	Continuing	Continuing

A. Mission Description and Budget Item Justification

Long Range Precision Fires (LRPF) is being developed as a cluster and insensitive munition compliant system that replaces and improves upon Army Tactical Missile System (ATACMS) capabilities. The mission of the LRPF System will be to attack/neutralize/suppress/destroy targets using missile delivered indirect precision fires. LRPF will provide Joint Force Commanders with a 24/7, all-weather capability to attack critical and time sensitive area and point targets including threat air defense, missile launchers, command and control centers, assembly/staging areas and high payoff targets at all depths of the multi-domain battlefield. The LRPF will counter the enemy's ability to conduct combat maneuver and air defense operations. LRPF requirements include: max range of greater than 400km, specified lethality against the designated target set, a Launch Pod Missile Container (LPMC) that holds a minimum of one missile, and compatibility with the existing launcher platforms (M270A1 Multiple Launch Rocket System (MLRS) and M142 High Mobility Artillery Rocket System (HIMARS)). LRPF is being designed with an open system architecture that provides the capability for future growth to counter new and emerging threats. Milestone A; Technology Maturation and Risk Reduction (TMRR) was approved on 31 March 2017.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.000	39.275	64.808	-	64.808
Current President's Budget	0.000	67.006	102.014	-	102.014
Total Adjustments	0.000	27.731	37.206	-	37.206
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	37.206	-	37.206
• Amended FY2017	0.000	27.731	0.000	-	0.000

Change Summary Explanation

FY 2017 funding reflects an increase of \$27.731M to ensure funding is available to purchase materials for component level testing and materials required to begin integration of full-up missiles required to support prototype flight test.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607134A / <i>Long Range Precision Fires (LRPF)</i>	
<p>FY 2018 funding reflects an increase of \$22.206M to PB17 Budget to fully fund the LRPF program to the DCAPE Independent Cost Estimate as directed during the LRPF MS A Defense Acquisition Board (DAB) and as documented in the Acquisition Decision Memorandum (ADM). FY18 also includes \$15.000M additional funding to purchase materials in preparation for prototype flight test.</p>		

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607134A / Long Range Precision Fires (LRPF)				Project (Number/Name) ES1 / Long Range Precision Fires (LRPF)			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
ES1: Long Range Precision Fires (LRPF)	-	0.000	67.006	102.014	-	102.014	111.505	91.086	125.185	107.175	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	8	-	8	-	-	-	7		

A. Mission Description and Budget Item Justification

Long Range Precision Fires (LRPF) is being developed as a cluster and insensitive munition compliant system that replaces and improves upon Army Tactical Missile System (ATACMS) capabilities. The mission of the LRPF System will be to attack/neutralize/suppress/destroy targets using missile delivered indirect precision fires. LRPF will provide Joint Force Commanders with a 24/7, all-weather capability to attack critical and time sensitive area and point targets including threat air defense, missile launchers, command and control centers, assembly/staging areas and high payoff targets at all depths of the multi-domain battlefield. LRPF will counter the enemy's ability to conduct combat maneuver and air defense operations. LRPF requirements include: max range of greater than 400km, specified lethality against the designated target set, a Launch Pod Missile Container (LPMC) that holds a minimum of one missile, and compatibility with the existing launcher platforms (M270A1 Multiple Launch Rocket System (MLRS) and M142 High Mobility Artillery Rocket System (HIMARS)). LRPF is being designed with an open system architecture that provides the capability for future growth to counter new and emerging threats. Milestone A; Technology Maturation and Risk Reduction (TMRR) was approved on 31 March 2017.

FY 2018 Base funding in the amount of \$102.014 million continues risk reduction activities through the execution of Technology Maturation and Risk Reduction (TMRR) system demonstration agreements. LRPF will be developed using competitive prototyping, carrying two contractors through the TMRR Phase. The FY18 funding will be used to continue execution of two TMRR prototyping and flight demonstration agreements, which include a System Requirements Review (SRR), functional reviews, prototype design activities, assessment of future growth capabilities, and initiates the building of eight (8) prototype missiles required to support flight demonstrations. Funding also supports Government management and Government systems engineering and test support activities.

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

	FY 2016	FY 2017	FY 2018
Title: TMRR	-	67.006	102.014
Description: Develop and prototype an insensitive munition compliant missile that provides increased range, improved lethality for both point and area targets, meets cluster munition policy requirements, and provides increased firepower with a multiple missile per launch pod solution. Long Range Precision Fires (LRPF) provides field artillery units with a deep-strike capability while supporting Brigade, Division, Corps, Army, Theater, Joint and Coalition forces in full, limited or expeditionary operations.			
FY 2017 Plans: Continue execution of two TMRR prototyping and flight demonstration contracts. Conduct System Requirements Reviews (SRRs), functional reviews, and prototype design activities. Develop a robust test program, including modeling and simulation, that			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607134A / Long Range Precision Fires (LRPF)	Project (Number/Name) ES1 / Long Range Precision Fires (LRPF)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
provides early insight into component/system level performance that can be leveraged to support Development and Operational Test requirements. FY 2018 Plans: Continue execution of two TMRR prototyping and flight demonstration agreements. Complete Launch Pod Missile Container (LPMC), static motor, warhead arena and insensitive munition component level testing and flight termination system development. Conduct Hardware in the Loop (HWIL), Software in the Loop (SWIL) and 6 degrees of freedom analysis of test data. Develop system level designs that incorporate technologies required to defeat an emerging threat. Initiate fabrication of prototype missiles required to support prototype flight demonstration. Conduct missile and launcher software development. Conduct early assessment and implementation of software cyber security requirements.			
Accomplishments/Planned Programs Subtotals	-	67.006	102.014

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

N/A

Remarks

D. Acquisition Strategy

LRPF is being developed as a cluster and insensitive munition compliant system that replaces and improves upon ATACMS capabilities to provide Joint Force Commanders with a 24/7, all-weather, area target, long-range fires capability without placing aircraft and crews at risk. An AoA supporting the MS A decision has been completed by U.S. Army Training and Doctrine Command (TRADOC) Analysis Center-White Sands Missile Range (TRAC-WSMR), with the OSD letter of sufficiency issued in September 2015. Two DoD Ordnance Technology Consortium (DOTC) agreements were awarded to support efforts under the Material Solution Analysis (MSA) Phase. TMRR will include two DOTC award agreements for competitive prototyping leading to flight demonstrations and PDRs in FY19. Data from the TMRR phase to include results from the flight demonstrations will support the FY21 Engineering and Manufacturing Development (EMD) contract award. EMD will be a competitive award to a single contractor. The EMD phase will complete product development, qualification, production readiness assessment, and limited user test.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607134A / Long Range Precision Fires (LRPF)	Project (Number/Name) ES1 / Long Range Precision Fires (LRPF)
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Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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	MIPR	PFRMS Project Office : RSA	0.000	-		7.231	Nov 2016	8.659	Nov 2017	-		8.659	62.902	78.792	0.000
Subtotal			0.000	-		7.231		8.659		-		8.659	62.902	78.792	0.000

Remarks
PFRMS - Precision Fires Rocket and Missile Systems; RSA - Redstone Arsenal, Alabama;

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
LRPF Risk Reduction - 2 Vendors (DOTC OTA)	C/CPIF	DOTC : Picatinny, NJ	0.000	-		50.550	May 2017	81.723	Oct 2017	-		81.723	473.161	605.434	0.000
Development Engineering Support	MIPR	AMCOM/AMRDEC : RSA	0.000	-		5.424	Nov 2016	5.971	Nov 2017	-		5.971	35.662	47.057	0.000
Subtotal			0.000	-		55.974		87.694		-		87.694	508.823	652.491	0.000

Remarks
LRPF - Long Range Precision Fires; AMCOM - Aviation and Missile Command; AMRDEC - U.S. Army Research, Development and Engineering Command; DOTC - DoD Ordnance Technology Consortium; OTA - Other Transaction Agreements

Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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, Testing, and Analysis	SS/T&M	ACC : RSA	0.000	-		3.351	Nov 2016	3.461	Nov 2017	-		3.461	16.658	23.470	0.000
Subtotal			0.000	-		3.351		3.461		-		3.461	16.658	23.470	0.000

Remarks
ACC - Army Contracting Command; RSA - Redstone Arsenal, AL

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607134A / Long Range Precision Fires (LRPF)	Project (Number/Name) ES1 / Long Range Precision Fires (LRPF)
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Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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	MIPR	WSMR; RTC : WSMR,NM; RSA, AL	0.000	-		0.450	Nov 2016	2.200	Nov 2017	-		2.200	93.131	95.781	0.000
Subtotal			0.000	-		0.450		2.200		-		2.200	93.131	95.781	0.000

Remarks
WSMR,NM - White Sands Missile Range, New Mexico; RTC - Redstone Test Center; RSA - Redstone Arsenal, Alabama

	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract		
Project Cost Totals	0.000	-		67.006		102.014	-	102.014	681.514	850.534	0.000

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607134A / Long Range Precision Fires (LRPF)	Project (Number/Name) ES1 / Long Range Precision Fires (LRPF)
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
Material Solution Analysis (MSA)																												
MSA Vendor #1 Contract (DOTC OTA)																												
MSA Vendor #2 Contract (DOTC OTA)																												
(1) Milestone A																												
Technology Maturation and Risk Reduction (TMRR) Phase																												
TMRR Vendor #1 Contract (DOTC OTA)																												
TMRR Vendor #2 Contract (DOTC OTA)																												
(2) Preliminary Design Review (PDR)													▲ 2															
(3) Milestone B																					▲ 3							
Engineering Manufacturing Development (EMD) Phase																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607134A / Long Range Precision Fires (LRPF)	Project (Number/Name) ES1 / Long Range Precision Fires (LRPF)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Materiel Solution Analysis (MSA)	1	2014	3	2017
MSA Vendor #1 Contract (DOTC OTA)	3	2016	3	2017
MSA Vendor #2 Contract (DOTC OTA)	3	2016	3	2017
Milestone A	2	2017	2	2017
Technology Maturation and Risk Reduction (TMRR) Phase	2	2017	1	2021
TMRR Vendor #1 Contract (DOTC OTA)	3	2017	1	2021
TMRR Vendor #2 Contract (DOTC OTA)	3	2017	1	2021
Preliminary Design Review (PDR)	3	2019	3	2019
Milestone B	2	2021	2	2021
Engineering Manufacturing Development (EMD) Phase	2	2021	2	2025

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0607135A / Apache Product Improvement Program							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	62.964	66.441	59.977	-	59.977	0.180	0.171	0.175	0.000	0.000	189.908
ES2: Apache Product Improvement Program	-	62.964	66.441	59.977	-	59.977	0.180	0.171	0.175	0.000	0.000	189.908

Note

Funds in this program were realigned in FY 2015 from Program Element 0203744A Aircraft Modifications/Product Improvement Programs, Project D17, for more efficient program management.

Funding for FY19-21 will be moved to the PE 677145, Project FD5 line.

A. Mission Description and Budget Item Justification

The Fiscal Year (FY) 2018 budget request for Apache AH-64E, previously known as Apache Block III, will fund the non-recurring engineering (NRE), development, and testing work associated with the planned remanufacture and new build of 690 Apache aircraft in the AH-64E configuration (deliveries began in Oct 2011). The AH-64E program consists of two Major Defense Acquisition Programs (MDAP), AH-64E Remanufacture and AH-64E New Build. This project also addresses obsolescence and reliability challenges and provides increased combat capability to the aircraft. Upgrades include: Unmanned Aircraft System (UAS) Level III-IV Control, Improved Situational Awareness, Upgraded Communications Suite, Improved Drive and Propulsion Systems, Improved Targeting Capability, Increased Computer Processing Capability and Speed, Improved Navigation Systems, Improved Diagnostics and Maintainability, and Joint Air to Ground Missile (JAGM) integration. Upgrades are integrated as incremental block modifications. The program addresses operational shortfalls identified during real-world combat missions and meets Longbow Apache Capability Production Document (CPD) requirements for modernization.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	65.562	66.441	59.786	-	59.786
Current President's Budget	62.964	66.441	59.977	-	59.977
Total Adjustments	-2.598	0.000	0.191	-	0.191
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-4.300	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	1.702	-			
• Adjustments to Budget Years	0.000	0.000	0.191	-	0.191

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607135A / Apache Product Improvement Program				Project (Number/Name) ES2 / Apache Product Improvement Program			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
ES2: Apache Product Improvement Program	-	62.964	66.441	59.977	-	59.977	0.180	0.171	0.175	0.000	0.000	189.908
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funds in this program were realigned in FY 2015 from Program Element 0203744A Aircraft Modifications/Product Improvement Programs Project ES2, Project D17, for more efficient program management.

Funding for FY19-21 will be moved to the PE 677145, Project FD5 line.

A. Mission Description and Budget Item Justification

The Fiscal Year (FY) 2018 budget request for Apache AH-64E, previously known as Apache Block III, will fund the non-recurring engineering (NRE), development, and testing work associated with the planned remanufacture and new build of 690 Apache aircraft in the AH-64E configuration (deliveries began in Oct 2011). The AH-64E program consists of two Major Defense Acquisition Programs (MDAP), AH-64E Remanufacture and AH-64E New Build. This project also addresses obsolescence and reliability challenges and provides increased combat capability to the aircraft. Upgrades include: Unmanned Aircraft System (UAS) Level III-IV Control, Improved Situational Awareness, Upgraded Communications Suite, Improved Drive and Propulsion Systems, Improved Targeting Capability, Increased Computer Processing Capability and Speed, Improved Navigation Systems, Improved Diagnostics and Maintainability, and Joint Air to Ground Missile (JAGM) integration. Upgrades are integrated as incremental block modifications. The program addresses operational shortfalls identified during real-world combat missions and meets Longbow Apache Capability Production Document (CPD) requirements for modernization.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Product Development	60.030	56.551	55.316	-	55.316
Description: Funding is provided for the following efforts by Boeing.					
FY 2016 Accomplishments:					
Development, Integration & Testing work associated with the planned remanufacture and new build of Apache aircraft in the AH- 64E Version 6 configuration (joint interoperability, crashworthy fuel tank kits, embedded diagnostics, communications, mission processor, and navigation upgrades) and to enhance operational capabilities. Risk reduction for Version 6 CPD capabilities to include cognitive decision aiding, soldier radio					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607135A / Apache Product Improvement Program	Project (Number/Name) ES2 / Apache Product Improvement Program			
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>waveform, modernized dayside assembly, modernized radio frequency interferometer, maritime targeting, and radar upgrades.</p> <p>FY 2017 Plans: Development, Integration & Testing work associated with the planned remanufacture and new build of Apache aircraft in the AH-64E Capability Version 6 configuration (cognitive decision aiding, soldier radio waveform, modernized dayside assembly, modernized radio frequency interferometer, maritime targeting, and radar upgrades) and to enhance operational capabilities, and JAGM integration.</p> <p>FY 2018 Base Plans: Development, Integration & Testing work associated with the planned remanufacture and new build of Apache aircraft in the AH-64E Capability Version 6 configuration (cognitive decision aiding, soldier radio waveform, modernized dayside assembly, modernized radio frequency interferometer, maritime targeting, and radar upgrades) and to enhance operational capabilities, and JAGM integration.</p>					
<p>Title: Support Costs</p> <p>Description: Funding is provided for the following effort.</p> <p>FY 2016 Accomplishments: GFE supporting Apache AH-64E tests and government R&D Facilities</p> <p>FY 2017 Plans: GFE supporting Apache AH-64E tests and government R&D Facilities.</p>	1.000	1.129	-	-	-
<p>Title: Test and Evaluation</p> <p>Description: Funding is provided for Development Testing and Evaluation and Operational Test and Evaluation.</p> <p>FY 2016 Accomplishments: Funding is provided for Development Testing and Evaluation and Operational Test and Evaluation, Government test oversight, test ranges, flight hour costs for MRL testing.</p> <p>FY 2017 Plans: Funding is provided for Development Testing and Evaluation and Operational Test and Evaluation.</p> <p>FY 2018 Base Plans:</p>	1.200	6.500	2.100	-	2.100

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607135A / Apache Product Improvement Program	Project (Number/Name) ES2 / Apache Product Improvement Program

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Funding is provided for Development Testing and Evaluation and Operational Test and Evaluation.					
Title: Management Services	0.734	2.261	2.561	-	2.561
Description: Funding is provided for the following effort: Payroll, Travel, Support Contractors, Matrix Support.					
FY 2016 Accomplishments: Funding is provided for the following effort: Payroll, Travel, Support Contractors, Matrix Support.					
FY 2017 Plans: Funding is provided for the following effort: Payroll, Travel, Support Contractors, Matrix Support.					
FY 2018 Base Plans: Funding is provided for the following effort: Payroll, Travel, Support Contractors, Matrix Support.					
Accomplishments/Planned Programs Subtotals	62.964	66.441	59.977	-	59.977

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• AA6605: AH-64 Mods	116.153	137.883	238.141	-	238.141	144.892	96.877	91.698	117.210	0.000	942.854
• A05111: AH-64 Apache Block IIIA Reman	1,353.391	1,066.284	725.926	39.040	764.966	999.774	1,018.859	917.758	1,002.769	0.000	7,123.801
• A05133: AH-64 Apache Block IIIB New Build	-	-	374.100	-	374.100	357.200	119.700	185.900	-	0.000	1,036.900

Remarks

D. Acquisition Strategy

The NRE will encompass subsystem integration and will utilize existing test aircraft, incorporate the technical insertions, and initiate appropriate qualification and operational flight-testing.

In FY14, a contract for Apache AH-64E Lot 3, initiating Full Rate Production, was awarded with options for Lot 4 and will continue to a total of 690 remanufactured and new build aircraft.

Training device concurrency will be maintained with each technical insertion. The Engineering/Manufacturing Design (EMD) effort is managed as Cost Reimbursable. Production efforts will be awarded as Fixed Price Incentive (FPI) and include the Advance Procurement requirements.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607135A / <i>Apache Product Improvement Program</i>	Project (Number/Name) ES2 / <i>Apache Product Improvement Program</i>

In FY13, FY14, and FY15 MRL NRE encompassed US Government (USG) design of the Hydra Launcher Electronics Assembly (LEA), modification of the M261 launcher, launcher fabrication, and launcher testing.

In FY15-FY18, Apache AH-64E Version 6 System Development and Demonstration (SDD) Contract.

Multi-year production authority has been approved.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607135A / Apache Product Improvement Program	Project (Number/Name) ES2 / Apache Product Improvement Program
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Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 (In-House, Travel, etc.)	MIPR	PMO AAH Matrix Support AMCOM Express : Redstone Arsenal, AL	5.296	0.734	Oct 2015	2.261		2.561	Oct 2017	-		2.561	0.000	10.852	0.000
Subtotal			5.296	0.734		2.261		2.561		-		2.561	0.000	10.852	0.000

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
The Boeing Company	SS/CPIF	Boeing Contracts : Mesa, AZ	54.377	60.030	Oct 2015	56.551		55.316	Oct 2017	-		55.316	0.000	226.274	0.000
Longbow Limited Liability (LBL) Contracts	SS/CPIF	Longbow Limited Liability (LBL) Contracts : Orlando, FL	9.000	-		-		-		-		-	0.000	9.000	0.000
Ground Fire Acquisition Development (GFAD)	SS/CPIF	PM AVIATION SYSTEMS Various Activities : Various	12.000	-		-		-		-		-	0.000	12.000	0.000
Subtotal			75.377	60.030		56.551		55.316		-		55.316	0.000	247.274	0.000

Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Support Activities	MIPR	Various : Various	1.726	1.000	Oct 2015	1.129		-		-		-	0.000	3.855	0
Subtotal			1.726	1.000		1.129		-		-		-	0.000	3.855	0.000

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607135A / Apache Product Improvement Program	Project (Number/Name) ES2 / Apache Product Improvement Program

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
NRE Contracts - Boeing	1	2011	3	2018
NRE Contracts - Longbow Limited Liability	1	2011	4	2016
Force Develop Test & Evaluation (FDTE III)	4	2017	4	2017
Follow-On Test & Eval II	2	2018	2	2018

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>					R-1 Program Element (Number/Name) PE 0607136A / <i>Blackhawk Product Improvement Program</i>							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	64.011	46.765	34.416	-	34.416	17.085	5.167	7.878	4.700	Continuing	Continuing
ES3: <i>Blackhawk Product Improvement Program</i>	-	64.011	46.765	34.416	-	34.416	17.085	5.167	7.878	4.700	Continuing	Continuing

Note

Funds in this program were realigned in Fiscal Year (FY) 2015 from Program Element 0203744A Aircraft Modifications/Product Improvement Programs, Project 504, for more efficient program management.

A. Mission Description and Budget Item Justification

The H-60L Digital Blackhawk, now designated as UH-60V, is designed to update the existing H-60L analog architecture to a digital infrastructure enabling the upgraded aircraft to have a similar Pilot-Vehicle Interface (PVI) to the H-60M. The program will address current capability gaps and meet operational requirements by employing an evolutionary acquisition approach to leverage mature technologies that have been successfully integrated on other military aircraft. The program will reduce obsolescence and increase commonality and interoperability by installing a digital cockpit, bussing and upgrading the communication/identification suite, improving navigation guidance, and integrating Aircraft Survivability Equipment (ASE), digital moving map, and Joint Variable Message Format (JVMF) messaging.

FY 2017 UH-60V funds hardware and software development as well as training material development and developmental testing.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	66.653	46.765	34.586	-	34.586
Current President's Budget	64.011	46.765	34.416	-	34.416
Total Adjustments	-2.642	0.000	-0.170	-	-0.170
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.642	-			
• Adjustments to Budget Years	0.000	0.000	-0.170	-	-0.170

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017			
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607136A / <i>Blackhawk Product Improvement Program</i>					Project (Number/Name) ES3 / <i>Blackhawk Product Improvement Program</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
ES3: <i>Blackhawk Product Improvement Program</i>	-	64.011	46.765	34.416	-	34.416	17.085	5.167	7.878	4.700	Continuing	Continuing	
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-			

Note

Funds in this program were realigned in Fiscal Year (FY) 2015 from Program Element 0203744A Aircraft Modifications/Product Improvement Programs, Projected 504, for more efficient program management.

A. Mission Description and Budget Item Justification

The H-60L Digital Blackhawk, now designated as UH-60V, is designed to update the existing H-60L analog architecture to a digital infrastructure enabling the upgraded aircraft to have a similar Pilot-Vehicle Interface (PVI) to the H-60M. The program will address current capability gaps and meet operational requirements by employing an evolutionary acquisition approach to leverage mature technologies that have been successfully integrated on other military aircraft. The program will reduce obsolescence and increase commonality and interoperability by installing a digital cockpit, bussing and upgrading the communication/identification suite, improving navigation guidance, and integrating Aircraft Survivability Equipment (ASE), digital moving map, and Joint Variable Message Format (JVMF) messaging.

FY 2017 UH-60V funds hardware and software development as well as training material development and developmental testing.

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

	FY 2016	FY 2017	FY 2018
Title: Product Development	53.102	34.335	24.007
Description: The UH-60V program provides an integrated digital map, integrated performance planning, common functionality and commonality of training with UH-60M. Product Development includes all activities related to Hardware and Software development, Prototype Manufacturing (5 units), Training Equipment, Data, and Production Engineering and Planning for the UH60V program. Examples of specific activities include drawing development, work instruction development, prototype builds, Preliminary Design Review (PDR)/Critical Design Review (CDR), Software Engineering Directorate (SED) Simulation Integration Laboratory (SIL) design, Software Development (aircraft and off aircraft), trainers, and training material development.			
FY 2016 Accomplishments: Continue development of the UH-60V kit. Refinement of Performance Specification and sub-system specifications to support requirements. Artifacts updated during FY16 to support design refinement and reviews include: Mechanical Drawings, Electrical Drawings, Installation Drawings, and Safety Documentation. Successful completion of Critical Design Review (CDR), Software Stages of Involvement Audit (SOI), and Technical Interchange Meeting (TIM). Conducted activities in support of Flight Readiness Review (FRR) to include Formal Qualification Testing (FQT) of software Build 1. Risk reduction activities conducted in the Bench Test Facility (BTF) for early assessment of software maturity. Delivered GFE/GFI for prototype development and System			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607136A / <i>Blackhawk Product Improvement Program</i>	Project (Number/Name) ES3 / <i>Blackhawk Product Improvement Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>Integration Laboratories. Completed de-modification of electrical and mechanical for EDM 1 and 2. Began installation of UH-60V kits on EDM 1 and EDM 2. Inducted EDM 4 & 5 at Corpus Christi Army Depot (CCAD).</p> <p>FY 2017 Plans: Conduct Physical Configuration Audit (PCA) on delivered UH-60V kit. Delivery of software Build 1 and associated technical data package (TDP) that will be used for first flight. Conduct FRR to obtain Airworthiness Release (AWR) for flight testing. Conduct Formal Qualification Testing (FQT), Software SOI 3 and TIM. Continue risk reduction activities in the SIL for early assessment of software maturity. Begin verification of Technical Manuals (TMs) on EDM 4 & 5. Complete installation of UH-60V kit on EDM 2 and begin installation on EDM 3. Begin induction activities on EDM 4 & 5 at Corpus Christi Army Depot (CCAD).</p> <p>FY 2018 Plans: Delivery of software Build 3 and associated technical data package (TDP) that will be used to support IOT&E. Complete installation of UH-60V kit on EDM 3 and begin Government verification of Technical Manuals (TMs). Complete installation of UH-60V kits on EDM 4 & 5. Begin TADSS development.</p>				
<p>Title: Support</p> <p>Description: Support Costs include Systems Engineering/Program Management (SEPM) type activities performed at the Prototype Integration Facility (PIF). This includes Army Engineering Directorate (AED) support for propulsion, structures, aeromechanics, mission equipment, as well as PIF program management.</p> <p>FY 2016 Accomplishments: Continued SEPM activities in support of UH-60V.</p> <p>FY 2017 Plans: Continue SEPM activities in support of UH-60V.</p> <p>FY 2018 Plans: Continue SEPM activities in support of UH-60V.</p>		3.065	3.104	2.681
<p>Title: Test & Evaluation</p> <p>Description: The Utility Helicopters Project Office (UHPO) is responsible for day-to-day test management activities to include execution of all developmental tests and support of operational tests for the UH-60V Program. The focal point for test management is the UH-60V Test Lead Engineer who is the chair for the UH-60V Test and Evaluation (T&E) Working-level Integrated Product Team. The UH-60 T&E team ensures integration and coordination of test and data requirements among all agencies involved in the test and acquisition of the UH-60V effort. T&E activities include, but not limited to, ensuring component hardware qualification is accomplished, system level Electromagnetic Environmental Effects (E3) testing, Daylight Readability testing, Air Traffic Control Radar Beacon System (ATCRBS), Identification Friend or Foe (IFF), Mark XIIA System (AIMS)</p>		1.920	3.597	3.800

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607136A / <i>Blackhawk Product Improvement Program</i>	Project (Number/Name) ES3 / <i>Blackhawk Product Improvement Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
certification testing, Limited User Test (LUT), Initial Operational Test and Evaluation (IOTE), Cybersecurity, Interoperability tests, and AFTD Baseline Flight Testing.				
<p>FY 2016 Accomplishments: Continued test planning and execution efforts for developmental system level test events. Continued the development and approval of system level checklists and the following test plans: flight test, Electromagnetic Compatibility (EMC), Modal Rap, Electromagnetic Vulnerability (EMV), Delta Electromagnetic Environmental Effects (E3), Interoperability and AIMs certification.</p> <p>FY 2017 Plans: Prepare, document and receive approval of flight test Airworthiness Release (AWR) for developmental flight test activities. Continue test planning and execution efforts for continuous improvement of system level test. Conduct test planning efforts for IOT&E.</p> <p>FY 2018 Plans: Complete flight testing on software Build 2 and review flight test report. Continue test planning and execution efforts for continuous improvement of system level testing to include software builds (3 & 4) for IOT&E. Conduct LUT.</p>				
<p>Title: Management Services</p> <p>Description: Management Services includes all activities related to Government/Contractor SEPM to include the cost of Government and Contractor personnel supporting the UH-60V program.</p> <p>FY 2016 Accomplishments: Continued core and contractor (SEPM) activities in support of UH-60V.</p> <p>FY 2017 Plans: Continue core and contractor (SEPM) activities in support of UH-60V.</p> <p>FY 2018 Plans: Continue core and contractor (SEPM) activities in support of UH-60V.</p>		5.924	5.729	3.928
Accomplishments/Planned Programs Subtotals		64.011	46.765	34.416

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607136A / <i>Blackhawk Product Improvement Program</i>	Project (Number/Name) ES3 / <i>Blackhawk Product Improvement Program</i>

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• UH-60 A and L Models A05009: <i>UH-60 Black Hawk A and L Models A05009</i>	55.441	46.173	76.516	-	76.516	168.085	211.146	215.457	219.159	0.000	991.977

Remarks

A05009 UH-60 Blackhawk A and L Models provides procurement funding for conversions to UH-60V starting in FY2018.

D. Acquisition Strategy

The UH-60V program plans to leverage a Government-owned Government-operated (GOGO) facility to design, integrate and build five production representative aircraft. The Prototype Integration Facility (PIF) will build three aircraft and two more aircraft will be built at Corpus Christi Army Depot (CCAD). The GOGO facility uses a cost plus contract vehicle and conducted full and open competition for the selection of the avionics solution provider.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607136A / <i>Blackhawk Product Improvement Program</i>	Project (Number/Name) ES3 / <i>Blackhawk Product Improvement Program</i>
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Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
UH-60V - Organic	MIPR	Various : Redstone Arsenal, AL	3.606	3.515	Oct 2015	3.231	Oct 2016	1.657	Oct 2017	-		1.657	0.000	12.009	0.000
UH-60V - Contractor	C/LH	Various : Redstone Arsenal, AL	2.576	2.409	Oct 2015	2.498	Oct 2016	2.271	Oct 2017	-		2.271	0.000	9.754	0.000
Subtotal			6.182	5.924		5.729		3.928		-		3.928	0.000	21.763	0.000

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
UH-60V Development Engineering	C/CPFF	AMRDEC PIF : Redstone Arsenal, AL	38.953	53.102	Oct 2015	34.335	Oct 2016	24.007	Oct 2017	-		24.007	0.000	150.397	0.000
Subtotal			38.953	53.102		34.335		24.007		-		24.007	0.000	150.397	0.000

Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
UH-60V	MIPR	Various : Redstone Arsenal, AL	3.171	3.065	Oct 2015	3.104	Oct 2016	2.681	Oct 2017	-		2.681	0.000	12.021	0.000
Subtotal			3.171	3.065		3.104		2.681		-		2.681	0.000	12.021	0.000

Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
UH-60V	MIPR	Redstone Test Center : Redstone Arsenal, AL	0.100	1.920	Jan 2016	3.597	Oct 2016	3.800	Oct 2017	-		3.800	0.000	9.417	0.000
Subtotal			0.100	1.920		3.597		3.800		-		3.800	0.000	9.417	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607136A / <i>Blackhawk Product Improvement Program</i>	Project (Number/Name) ES3 / <i>Blackhawk Product Improvement Program</i>
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Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Government Support

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	48.406	64.011		46.765		34.416		-		34.416	0.000	193.598	0.000

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607136A / <i>Blackhawk Product Improvement Program</i>	Project (Number/Name) ES3 / <i>Blackhawk Product Improvement Program</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
UH-60V Development (Research, Development, Test, and Evaluation (RDTE))	UH-60V EMD (Product Development)																											
Support (RDTE)	Support																											
Test and Evaluation (RDTE)	Test and Evaluation																											
Management Services (RDTE)	Management Services																											
UH-60V Future Integration Efforts (RDTE)																					Integration							
UH-60V Digital Modifications (Low Rate Initial Production (LRIP); (APA))																												
UH-60V Digital Modifications Production (APA)																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607136A / <i>Blackhawk Product Improvement Program</i>	Project (Number/Name) ES3 / <i>Blackhawk Product Improvement Program</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
UH-60V Development (Research, Development, Test, and Evaluation (RDTE)	4	2014	4	2020
Support (RDTE)	1	2014	4	2019
Test and Evaluation (RDTE)	4	2015	4	2019
Management Services (RDTE)	1	2014	4	2019
UH-60V Future Integration Efforts (RDTE)	1	2021	4	2022
UH-60V Digital Modifications (Low Rate Initial Production (LRIP); (APA)	4	2018	4	2019
UH-60V Digital Modifications Production (APA)	1	2020	1	2024

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0607137A / Chinook Product Improvement Program
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	31.122	91.848	194.567	-	194.567	131.124	59.383	35.740	41.030	Continuing	Continuing
ES4: Chinook Product Improvement Program	-	31.122	91.848	194.567	-	194.567	131.124	59.383	35.740	41.030	Continuing	Continuing

Note

Funds in this Program Element (PE) were realigned from PE 0203744A Aircraft Modifications/Product Improvement Programs, Project Number 430 Impr Cargo Helicopter.

A. Mission Description and Budget Item Justification

The CH-47 Chinook is the Army's only heavy lift helicopter and is an essential element of the Army Aviation portfolio strategy. This program funds improvements to the CH-47F System that include the transition from individual Engineering Change Proposals (ECPs) into a CH-47F Block II program of record with entry into Engineering/Manufacturing Design (EMD) phase with Milestone B approval expected in 3rd quarter 2017. Additionally, funding supports: continued development and testing of the Advanced Chinook Rotor Blades (ACRB) which will provide increased lift in high/hot conditions and reduce Operation and Support (O&S) costs, T55-GA-714A engine control and component upgrades, and advanced flight control and drive train component improvements to improve aircraft performance. Development of requirements specifications, studies and risk reduction prototyping are also part of this effort.

B. Program Change Summary (\$ in Millions)

	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>
Previous President's Budget	32.407	91.848	118.435	-	118.435
Current President's Budget	31.122	91.848	194.567	-	194.567
Total Adjustments	-1.285	0.000	76.132	-	76.132
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	78.614	-	78.614
• FY16 Actual Year End	-1.285	0.000	0.000	-	0.000
• PB17 WORKSET FOR EA008 INFLATION RATES	0.000	0.000	-1.864	-	-1.864
• PER DOM & DOR TO FUND RAPID CAPABILITIES OFFICE (RCO)	0.000	0.000	-0.618	-	-0.618

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army Date: May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607137A / <i>Chinook Product Improvement Program</i>
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Change Summary Explanation

The FY 2016 funds have been adjusted to actuals. The FY 2018 funds increase of \$78.614 million is based on an EMD Block II revised cost estimate, BES Adjustments for -2.482 million (-1.864 and -0.618).

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607137A / Chinook Product Improvement Program				Project (Number/Name) ES4 / Chinook Product Improvement Program			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
ES4: Chinook Product Improvement Program	-	31.122	91.848	194.567	-	194.567	131.124	59.383	35.740	41.030	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funds in this Program Element (PE) were realigned from PE 0203744A Aircraft Modifications/Product Improvement Programs, Project Number 430 Impr Cargo Helicopter.

A. Mission Description and Budget Item Justification

The CH-47 Chinook is the Army's only heavy lift helicopter and is an essential element of the Army Aviation portfolio strategy. This program funds improvements to the CH-47F System that include the transition from individual Engineering Change Proposals (ECPs) into a CH-47F Block II program of record with entry into Engineering/Manufacturing Design (EMD) phase with Milestone B approval expected in 3rd quarter 2017. Additionally, funding supports: continued development and testing of the Advanced Chinook Rotor Blades (ACRB) which will provide increased lift in high/hot conditions and reduce Operation and Support (O&S) costs, T55-GA-714A engine control and component upgrades, and advanced flight control and drive train component improvements to improve aircraft performance. Development of requirements specifications, studies and risk reduction prototyping are also part of this effort.

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

	FY 2016	FY 2017	FY 2018
Title: Modernization Integration	4.081	15.404	4.388
Description: Modernization Integration is an Airframe Component Improvement Program (ACIP) effort that provides system engineering, program management, and planning for manufacturing/modification, test, and logistics that will facilitate the integration of multiple ECPs.			
FY 2016 Accomplishments: Conducted System Level Preliminary Design Review (PDR). Developed Airframe Sub-System Specification (SSS) and Airworthiness Qualification Specification (AQS). Completed preliminary design for Ground Test Vehicle (GTV).			
FY 2017 Plans: Continue system integration non-recurring engineering prior to EMD. Develop the Air Vehicle AQS and EMD Disposition Document Completion of Manufacturing Tool Designs for specific cockpit and cabin positions. Update the Air Vehicle Survivability Assessment. Update weight and balance information. Generate and provide structural, stress, and fatigue substantiation. Develop the Test Unit Release for Heads-up Display Installation. Create manufacturing tool orders for all zones and prepare them for release. Generate preliminary manufacturing planning for the Block II Air Vehicle. Continue GTV design work.			
FY 2018 Plans:			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607137A / <i>Chinook Product Improvement Program</i>	Project (Number/Name) ES4 / <i>Chinook Product Improvement Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>This effort will develop a preliminary test article design that converts a CH-47D aircraft to a GTV and identify any new material required for GTV implementation. Finalize GTV design, continue Command Avionics Architecture System (CAAS) Coordination and Vehicle Interface Planning. Finalize Reliability and Maintainability (R&M) and Safety Analysis. Finalize and provide structural, stress, and fatigue substantiation. Update weight and balance data with the latest design inputs. Finalize vehicle level drawings and assemblies (including alignment definitions). Finalize all manufacturing tooling designs.</p> <p>Title: CH-47F Block II Engineering and Manufacturing Development (EMD)</p> <p>Description: The EMD Phase will begin after a 2017 Milestone (MS) B decision and the subsequent contract will develop affordable and executable manufacturing processes; complete system fabrication; remanufacture three production representative CH-47F Block II Chinook test articles; and reduce program risk.</p> <p>FY 2017 Plans: The Block II EMD contract planned for award in third quarter FY17 will integrate separate, on-going non-recurring engineering changes into the CH-47F Block II configuration to satisfy the Army's heavy lift requirement. The four-year EMD contract will provide design, development, integration, qualification, remanufacture and delivery of three production representative CH-47F Block II test articles. Conduct and support aircraft development; induction and teardown of Aircraft; delivery of documentation that demonstrates requirements verification; a production configuration baseline.</p> <p>FY 2018 Plans: Second year of the four year contract. Conduct and support aircraft development and assembly to include ACRB, airframe components, improved drive train (IDT) and rotor components, light weight fuel system and electrical components; delivery of documentation that demonstrates requirements verification; and production configuration baseline; building the GTV.</p>		-	38.453	107.289
<p>Title: Advanced Chinook Rotor Blade (ACRB)</p> <p>Description: This effort provides an ACRB which is a redesign of the current rotor blade to provide improved capability. It improves high/hot performance, reduces Operations and Support (O&S) costs and is a form, fit, function replacement for the legacy blade.</p> <p>FY 2016 Accomplishments: Conducted additional wind tunnel testing to validate the Best Technical Approach (BTA) 13 performance and vibratory loads. Built 12 ACRB blades to support component level testing and flight testing. Initiated build of 2 ACRB blades to support component level testing. Conducted Interim-First Flight Design Review (I-FFDR) and the final FFDR. Commenced testing on component level test specimens.</p> <p>FY 2017 Plans:</p>		10.345	12.828	17.700

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607137A / <i>Chinook Product Improvement Program</i>	Project (Number/Name) ES4 / <i>Chinook Product Improvement Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>Complete flight testing of ACRB to validate performance and demonstrate Test Readiness Level (TRL) 6. Conduct trade off analysis for ACRB design improvements to support Block II EMD flight test program. Commence preparation of blades for live fire testing.</p> <p>FY 2018 Plans: Complete build of ACRB blades to support component level testing. Commence testing of material coupons (samples) for component structural testing in support of ACRB full qualification requirements.</p>				
<p>Title: Improved Drive Train (IDT)</p> <p>Description: This effort addresses O&S cost reduction while simultaneously re-qualifying the combining, forward, and aft transmissions to a higher power level to maximize engine power available at sea-level conditions. Funding completes PDR and begins preparation for Critical Design Review (CDR) effort.</p> <p>FY 2016 Accomplishments: Purchased test materials to support the conduct of transmission re-qualification testing. Conducted material coupon testing to validate material properties and characteristics. Conducted initial bench testing, aft transmission static/dynamics strain surveys test, and the forward transmission demonstration test utilizing new material for the integral planetary carrier/forward rotor shaft. Completed Subsystem CDR which provided the technical basis for proceeding into fabrication, integration, and developmental test and evaluation of the components to allow the transmission re-qualification testing.</p> <p>FY 2017 Plans: Continue test preparation including purchase of test materials to support the C-61 (vertical shafting) coupon samples. Initiate forward transmission, static/dynamics strain surveys test, sync shaft fatigue tests, and the material coupon testing to assess material properties of component.</p> <p>FY 2018 Plans: Continue test preparation. Continue test execution for the forward transmission, static/dynamics strain surveys test, sync shaft fatigue tests. Initiate qualification endurance, overstress, gear tooth bending fatigue test for Aft/Forward transmission. Initiate reduced lubrication and oil out test planning for Aft/Combiner/Forward transmissions.</p>		6.266	6.842	19.500
<p>Title: Transportable Flight Proficiency Simulator (TFPS)</p> <p>Description: The TFPS is a high fidelity, motion cueing, transportable, flight simulator capable of training to include training for mission tasks and emergency procedures. Since it is a high fidelity, certified trainer, units can conduct individual training task in the simulator rather than the aircraft saving flying hour dollars.</p> <p>FY 2018 Plans:</p>		-	-	20.915

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607137A / <i>Chinook Product Improvement Program</i>	Project (Number/Name) ES4 / <i>Chinook Product Improvement Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
Redesign of the existing CH-47F TFPS to incorporate Block II changes.				
<p>Title: Electronic Control Unit (ECU) Software Upgrade</p> <p>Description: Software upgrade improves engine communication with the aircraft monitoring system to increase aircrew situational awareness and reduce workload. In addition software enhancements accommodate increased capability of the Improved Drive Train (IDT). Software upgrades will occur at designated intervals to allow efficient and expedient fielding of any improvements/enhancements.</p> <p>FY 2016 Accomplishments: Completed qualification of Version 3 ECU Software and Ground Support Equipment (GSE) 3.0 software.</p> <p>FY 2017 Plans: Testing and qualification of the software enhancements. Test Readiness Review (TRR) followed by the formal qualification and testing.</p> <p>FY 2018 Plans: Complete integration of Version 3+ ECU with Block II aircraft design, develop, and qualify a Version 4 ECU and conduct Electromagnetic Environmental Effects (E3) and Engine Testing on the Improved Hydro Mechanical Assembly (HMA).</p>		2.405	2.697	5.000
<p>Title: Ratio Detector Power Supply (RDPS)</p> <p>Description: The RDPS is a component of the engine torque measuring system. The RDPS addresses obsolescence related to one of the microprocessors and accuracy of the torque measurement signal. The redesigned RDPS improves the accuracy of the engine signal to the torque measuring system and provides improved mission planning capability to the aviators.</p> <p>FY 2016 Accomplishments: Design and development of a replacement T55-GA-714A Engine RDPS.</p>		2.905	-	-
<p>Title: In-house and Program Management Administration</p> <p>Description: This funding provides support costs for various government agencies.</p> <p>FY 2016 Accomplishments: Funded Support cost for various government agencies.</p> <p>FY 2017 Plans: This funding provides support costs for various government agencies to include the increased effort in support of Block II.</p> <p>FY 2018 Plans:</p>		1.620	4.592	13.053

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607137A / <i>Chinook Product Improvement Program</i>	Project (Number/Name) ES4 / <i>Chinook Product Improvement Program</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Continue funding support costs for various government agencies in addition to funding for Project Management Office Full Time Equivalent (FTE) employees supporting the Block II development Program.			
Title: Testing and Evaluation	3.500	11.032	6.722
Description: This effort incorporates all testing requirements to integrate numerous ECPs into one system level requirement to include the ACRB.			
FY 2016 Accomplishments: The continued maturing of the Sub-systems of the CH-47F Block II aircraft. Continued test preparations for initiation of the CH-47F Block II program. Continued developmental testing of the ACRB.			
FY 2017 Plans: Continue component level airworthiness qualification and Live Fire Testing for ACRB and developmental ECP components to characterize performance improvements. Finalize test planning activity for EMD ground test and continue test planning activity for EMD flight test.			
FY 2018 Plans: Include the continuation of the ACRB Live Fire Test and Evaluation (LFTE). Placement of a GTV fixture and endurance testing of the IDT subsystem.			
Accomplishments/Planned Programs Subtotals	31.122	91.848	194.567

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• AA0252: CH-47 CARGO HELICOPTER MODS	90.330	163.943	20.166	-	20.166	8.557	5.195	4.394	2.618	Continuing	Continuing
• A05105: CH-47 SLEP (Including Adv Proc)	646.767	556.257	88.560	-	88.560	152.528	190.917	367.421	404.367	Continuing	Continuing
• A05008: CH-47 CARGO HELICOPTER NEW BUILD	357.820	-	131.836	-	131.836	-	-	-	-	0	489.656

Remarks
The CH-47F program replaces the aging CH-47D aircraft by FY 2020, incorporates a new machined airframe, and includes a new Common Avionics Architecture System (CAAS) cockpit with digital communication/navigation capability allowing improved interoperability on the digital battlefield. The CH-47F program includes recapitalization of key dynamic components, bringing them to a near zero time.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607137A / Chinook Product Improvement Program	Project (Number/Name) ES4 / Chinook Product Improvement Program

D. Acquisition Strategy

Given the need to maintain the fleet's relevance through 2060, the PM is proposing a block strategy to facilitate incremental upgrades to the Chinook fleet. Using the CH-47F as a baseline, the H-47 Block II is the first increment of this potential multi-block strategy. The Block II program will restore performance lost due to the added weight of safety and survivability equipment incorporated since initial fielding in 2007. Additional objectives of the Block II program include: Efficiently incorporating multiple engineering changes; Accomplishing required mid-life airframe recapitalization; Converging the special operations and conventional Army designs; Establishing a foundation for future block upgrades; and Maintaining the industrial base until Future Vertical Lift (FVL)-Heavy is realized.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607137A / Chinook Product Improvement Program	Project (Number/Name) ES4 / Chinook Product Improvement Program
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Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Modernization Integration	SS/CPFF	Boeing Ridley : Park PA	11.396	4.081	Dec 2015	15.404	Nov 2016	4.388	Oct 2017	-		4.388	Continuing	Continuing	Continuing
Engineering and Manufacturing Development (Pre-Decisional)	SS/CPIF	Boeing Ridley : Park, PA	0.000	-		38.453	Jun 2017	107.289	Nov 2017	-		107.289	Continuing	Continuing	Continuing
Advanced Chinook Rotor Blade (ACRB)	SS/CPFF	Boeing Ridley : Park PA	8.350	10.345	Dec 2015	12.828	Mar 2017	17.700	Nov 2017	-		17.700	Continuing	Continuing	Continuing
Improved Drive Train	SS/CPFF	Boeing Ridley : Park, PA	5.396	6.266	Dec 2015	6.842	Oct 2016	19.500	Nov 2017	-		19.500	Continuing	Continuing	Continuing
Electronic Control Unit (ECU) Software Upgrade	SS/CPFF	Honeywell : Phoenix, AZ	3.505	2.405	Feb 2016	2.697	Apr 2017	5.000	Jul 2018	-		5.000	Continuing	Continuing	Continuing
Ratio Detector Power Supply (RDPS)	SS/CPFF	Boeing Ridley : Park, PA	2.665	2.905	Dec 2015	-		-		-		-	0.000	5.570	0.000
Transportable Flight Proficient Simulator (TFPS)	MIPR	NAVAIR : Patuxent River NAS, MD	0.000	-		-		20.915	Mar 2018	-		20.915	Continuing	Continuing	0.000
Subtotal			31.312	26.002		76.224		174.792		-		174.792	-	-	-

Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
PMO/OGA	Various	Various Government : Redstone Arsenal AL	1.771	1.620	Mar 2016	4.592	Oct 2016	13.053	Oct 2017	-		13.053	Continuing	Continuing	Continuing
Subtotal			1.771	1.620		4.592		13.053		-		13.053	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607137A / Chinook Product Improvement Program	Project (Number/Name) ES4 / Chinook Product Improvement Program
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Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Testing of configuration update ECPs to include the Advanced Chinook Rotor Blades	SS/CPFF	Boeing Ridley : Park PA	2.341	3.500	Jan 2016	11.032	Jun 2017	6.722	Nov 2017	-		6.722	Continuing	Continuing	Continuing
Subtotal			2.341	3.500		11.032		6.722		-		6.722	-	-	-

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		35.424	31.122		91.848		194.567		-		194.567	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607137A / Chinook Product Improvement Program	Project (Number/Name) ES4 / Chinook Product Improvement Program
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022							
	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 Integration	Modernization Integration																															
CH-47F Block II EMD (Pre-Decisional)									CH-47F Block II EMD																							
Advanced Chinook Rotor Blade (ARCB)									Advanced Chinook Rotor Blade																							
Improved Drive Train (IDT)									Improved Drive Train																							
Electronic Control Unit (ECU) Software Upgrade (Engine)	ECU Software Upgrade																															
Ratio Detector Power Supply (RDPS) (Engine)	RDPS																															
In-house and Program Management Administration	In-house and Program Management Administration																															
Testing and Evaluation	Testing and Evaluation																															
Transportable Flight Proficiency Simulator (TFPS)									Transportable Flight Proficiency Simulator (TFPS)																							

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607137A / <i>Chinook Product Improvement Program</i>	Project (Number/Name) ES4 / <i>Chinook Product Improvement Program</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Modernization Integration	3	2015	4	2018
CH-47F Block II EMD (Pre-Decisional)	3	2017	3	2021
Advanced Chinook Rotor Blade (ARCB)	1	2009	1	2022
Improved Drive Train (IDT)	3	2014	1	2022
Electronic Control Unit (ECU) Software Upgrade (Engine)	4	2010	4	2022
Ratio Detector Power Supply (RDPS) (Engine)	3	2015	3	2016
In-house and Program Management Administration	1	2016	4	2022
Testing and Evaluation	3	2015	4	2021
Transportable Flight Proficiency Simulator (TFPS)	2	2018	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0607138A / Fixed Wing Product Improvement Program
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	1.105	0.796	9.981	-	9.981	2.234	1.772	2.298	2.365	Continuing	Continuing
ES5: Fixed Wing Product Improvement Program	-	1.105	0.796	9.981	-	9.981	2.234	1.772	2.298	2.365	Continuing	Continuing

Note

Prior funding for this program was received on Program Element 0203744A Project D18. This is not a new start.

A. Mission Description and Budget Item Justification

The budget line provides for Fixed Wing (FW) fielded fleet Non-Recurring Engineering (NRE), development of supplemental type certificates (STC) and associated developmental testing, and integration of all Army fixed wing aircraft to provide Communications, Navigation and Surveillance (CNS), Aircraft Survivability Equipment (ASE), and Department of Defense (DoD) mandated safety equipment to meet current and evolving international and Army standards. As requirements for new avionics equipment continue, aircraft delays and airspace exclusions are likely for aircraft not properly equipped. Upgrade of communication and aircraft modifications will assure worldwide deployability for those required to deploy. This budget line will also provide funding for studies, evaluations and Analysis of Alternatives to support emerging Army fixed wing requirements for product improvements to support the FW fleet.

In accordance with the Office of the Secretary of Defense (OSD) Director of Operational Test and Evaluation (DOT&E) Working Oversight List (dated 26 Jun 15), the Fixed Wing Utility Aircraft (FUA) Program will be required to undergo both Live Fire Testing and Operational Testing. This budget line provides funding for development of the FUA Test and Evaluation Master Plan (TEMP), the execution of FUA Live Fire Test & Evaluation (LFT&E) including necessary hardware, and FUA Operational Testing including execution of Initial Operational Test & Evaluation.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	1.151	0.796	0.894	-	0.894
Current President's Budget	1.105	0.796	9.981	-	9.981
Total Adjustments	-0.046	0.000	9.087	-	9.087
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-0.046	0.000	9.087	-	9.087

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607138A / Fixed Wing Product Improvement Program				Project (Number/Name) ES5 / Fixed Wing Product Improvement Program			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
ES5: Fixed Wing Product Improvement Program	-	1.105	0.796	9.981	-	9.981	2.234	1.772	2.298	2.365	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding for this Program Element (PE) was previously on PE 0203744A Project D18 - Aircraft Modifications/Product Improvement Programs

A. Mission Description and Budget Item Justification

The budget line provides for Fixed Wing (FW) fielded fleet Non-Recurring Engineering (NRE), development of supplemental type certificates (STC) and associated developmental testing, and integration of all Army fixed wing aircraft to provide Communications, Navigation and Surveillance (CNS), Aircraft Survivability Equipment (ASE), and Department of Defense (DoD) mandated safety equipment to meet current and evolving international and Army standards. As requirements for new avionics equipment continue, aircraft delays and airspace exclusions are likely for aircraft not properly equipped. Upgrade of communication and aircraft modifications will assure worldwide deployability for those required to deploy. This budget line will also provide funding for studies, evaluations and Analysis of Alternatives to support emerging Army fixed wing requirements for product improvements to support the FW fleet.

In accordance with the Office of the Secretary of Defense (OSD) Director of Operational Test and Evaluation (DOT&E) Working Oversight List (dated 26 Jun 15), the Fixed Wing Utility Aircraft (FUA) Program will be required to undergo both Live Fire Testing and Operational Testing. This budget line provides funding for development of the FUA Test and Evaluation Master Plan (TEMP), the execution of FUA Live Fire Test & Evaluation (LFT&E) including necessary hardware, and FUA Operational Testing including execution of Initial Operational Test & Evaluation.

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

	FY 2016	FY 2017	FY 2018
Title: Non-recurring Engineering	1.036	-	-
Description: Non-recurring engineering efforts provide improved performance to Army fixed wing aircraft for communication, navigation, and surveillance equipment.			
FY 2016 Accomplishments: Non-recurring engineering efforts provide improved performance to Army fixed wing aircraft for communication, navigation, and surveillance equipment.			
Title: Program Management (PM)	0.069	-	0.594
Description: PM Fixed Wing (FW)			
FY 2016 Accomplishments:			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607138A / Fixed Wing Product Improvement Program	Project (Number/Name) ES5 / Fixed Wing Product Improvement Program
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Supported Test Planning			
FY 2018 Plans: PM Fixed Wing (FW)			
Title: Test And Evaluation	-	0.796	9.387
Description: Contractor hardware support for LFT&E on Fixed Wing Utility Aircraft (FUA).			
FY 2017 Plans: Funding provides for LFT&E hardware materials on FUA. The LFT&E hardware materials consist of Structural Wing, Engine, Propeller, Fuselage, Wing Iron Bird, Hydraulic System, Dry Bay Fire Suppression System, and ESOS System.			
FY 2018 Plans: FY18 funding supports FUA Developmental Test (DT) Production Qualification, planning/execution for Live Fire Test and Evaluation (LFT&E) for FUA and LFT&E hardware materials consisting of Structural Wing, Engine, Propeller, Fuselage, Wing Iron Bird, Hydraulic System, Dry Bay Fire Suppression System, and ESOS System. PQT includes electromagnetic environmental effects (E3), handling qualities, Safety of Flight (SOF), human factors, cyber security, AIMS certification, ASE, interoperability and COM/NAV to support final airworthiness release (AWR) for Phase 4 Initial Operational T&E (IOT&E).			
Accomplishments/Planned Programs Subtotals	1.105	0.796	9.981

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• A11300: Utility F/W Aircraft	0.879	58.046	75.115	-	75.115	97.517	133.195	100.045	101.396	Continuing	Continuing
• AA0270: Utility/ Cargo Airplane Mods	16.166	17.526	57.737	-	57.737	25.082	15.470	14.692	16.909	Continuing	Continuing

Remarks

D. Acquisition Strategy
The US Army Fixed Wing acquisition and modernization strategy leverages commercial derivative aircraft through the use of supplemental type certificates (STC) and associated testing and includes cockpit modernization for civil and tactical upgrades of military unique equipment and integration of Mission Equipment Packages (MEP). Cockpit modernization upgrades include items such as dual Flight Management Systems, Terrain Area Warning Systems, transponder, Mode S/5 transponders, Satellite Communications, Traffic Alert and Collision Avoidance II, Flight Data Recorders, Cockpit Voice Recorders, communication radios, military Global Positioning System (GPS), Wide Area Augmentation System/ Localizer Performance with Vertical Guidance, Automatic Dependence Surveillance Broadcast (ADS-B) Out, M-code GPS, Blue Force Tracker, and Smart books.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607138A / <i>Fixed Wing Product Improvement Program</i>	Project (Number/Name) ES5 / <i>Fixed Wing Product Improvement Program</i>

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>					R-1 Program Element (Number/Name) PE 0607139A / <i>Improved Turbine Engine Program</i>							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	49.137	126.105	204.304	-	204.304	196.074	253.327	247.405	322.920	Continuing	Continuing
ES6: <i>Improved Turbine Engine Program</i>	-	49.137	126.105	204.304	-	204.304	196.074	253.327	247.405	322.920	Continuing	Continuing

Note

For Fiscal Year (FY) 2014 and prior, all funding for the Improved Turbine Engine Program (ITEP) was contained in Program Element (PE) 0203744A – Aircraft Modifications/Product Improvement Programs, Project 504. FY 2015 funding was initially moved to PE 0203744A, Project EB1. Prior to execution, FY 2015 and beyond funding was moved to to PE 0607139A, Project ES6. This is not a New Start.

A. Mission Description and Budget Item Justification

ITEP develops, tests, qualifies, and integrates the next generation turboshaft engine on the Black Hawk and Apache aircraft. The Improved Turbine Engine (ITE) replaces the existing T700 engine design originated in the 1970's and meets the operational requirement of 6,000 feet pressure altitude and 95 degrees (6K/95). The ITE will fit inside the existing engine bays of the Black Hawk and Apache Helicopters and provides a significant power enhancement of up to fifty percent (total of 3,000 class shaft horsepower) with increased fuel efficiency. Additional benefits include improved design life, enhanced reliability, lower maintenance cost and restored capability lost due to aircraft weight growth, without increasing the logistics footprint. The program consists of systems engineering and program management, detailed design engineering, design assurance, hardware manufacturing and testing, component and module level development and testing, system level testing and qualification, as well as integration into the airframe.

FY 2016 funding provided for dual vendor competitive Technology Maturation/Risk Reduction (TMRR) contract awards, initial engine design effort, and continued platform/engine integration trade studies. FY 2017 funding continues engine design effort and the platform/engine integration trade studies. FY 2018 funds the remaining TMRR engine design effort, the Engineering and Manufacturing Development (EMD) SSEB for entry into Milestone B (MS B), and concludes the platform/engine integration trade studies. In FY 2019, the EMD contract will be awarded to one vendor, and platform/engine integration design engineering will begin. FY 2020 funding continues both the EMD effort and platform/engine integration A-kit development, resulting in a Critical Design Review (CDR) in FY 2020. FY 2021 continues the EMD effort, provides for First Engine To Test (FETT), and begins physical airframe integration. FY 2022 funding will provide Preliminary Flight Rating (PFR) testing, leading to an Air Worthiness Rating (AWR).

If funding permits, ITEP will continue to pursue potential program acceleration directed by the May 2016 AROC.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607139A / <i>Improved Turbine Engine Program</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	51.164	126.105	186.264	-	186.264
Current President's Budget	49.137	126.105	204.304	-	204.304
Total Adjustments	-2.027	0.000	18.040	-	18.040
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other Adjustments 1	-2.027	0.000	18.040	-	18.040

Change Summary Explanation

For Fiscal Year (FY) 2014 and prior, all funding for the Improved Turbine Engine Program (ITEP) was contained in Program Element (PE) 0203744A – Aircraft Modifications/Product Improvement Programs, Project 504. FY 2015 funding was initially moved to PE 0203744A, Project EB1. Prior to execution, FY 2015 and beyond funding was moved to to PE 0607139A, Project ES6. This is not a New Start.

Additional Army funding in FY 2018 provided to fully fund initial TMRR contracts to the MS-A Army Cost Position values.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607139A / Improved Turbine Engine Program				Project (Number/Name) ES6 / Improved Turbine Engine Program			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
ES6: Improved Turbine Engine Program	-	49.137	126.105	204.304	-	204.304	196.074	253.327	247.405	322.920	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

For Fiscal Year (FY) 2014 and prior, all funding for the Improved Turbine Engine Program (ITEP) was contained in Program Element (PE) 0203744A – Aircraft Modifications/Product Improvement Programs, Project 504. FY 2015 funding was initially moved to PE 0203744A, Project EB1. Prior to execution, FY 2015 and beyond funding was moved to to PE 0607139A, Project ES6. This is not a New Start.

A. Mission Description and Budget Item Justification

ITEP develops, tests, qualifies, and integrates the next generation turboshaft engine on the Black Hawk and Apache aircraft. The Improved Turbine Engine (ITE) replaces the existing T700 engine design originated in the 1970's and meets the operational requirement of 6000 feet pressure altitude and 95 degrees (6K/95). The ITE will fit inside the existing engine bays of the Black Hawk and Apache Helicopters and provides a significant power enhancement of up to fifty percent (total of 3,000 class shaft horsepower) with increased fuel efficiency. Additional benefits include improved design life, enhanced reliability, lower maintenance cost and restored capability lost due to aircraft weight growth, without increasing the logistics footprint. The program consists of systems engineering and program management, detailed design engineering, design assurance, hardware manufacturing and testing, component and module level development and testing, system level testing and qualification, as well as integration into the airframe.

FY 2016 funding provided for dual vendor competitive Technology Maturation/Risk Reduction (TMRR) contract awards, initial engine design effort, and continued platform/engine integration trade studies. FY 2017 funding continues engine design effort and the platform/engine integration trade studies. FY 2018 funds the remaining TMRR engine design effort, the Engineering and Manufacturing Development (EMD) SSEB for entry into Milestone B (MS B), and concludes the platform/engine integration trade studies. In FY 2019, the EMD contract will be awarded to one vendor, and platform/engine integration design engineering will begin. FY 2020 funding continues both the EMD effort and platform/engine integration A-kit development, resulting in a Critical Design Review (CDR) in FY 2020. FY 2021 continues the EMD effort, provides for First Engine To Test (FETT), and begins physical airframe integration. FY 2022 funding will provide Preliminary Flight Rating (PFR) testing, leading to an Air Worthiness Rating (AWR).

If funding permits, ITEP will continue to pursue potential program acceleration directed by the May 2016 AROC.

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

	FY 2016	FY 2017	FY 2018
Title: ITEP	49.137	126.105	204.304
Description: ITEP - a multi-platform turbine engine development required across existing Army aircraft to fill the capability gaps for Army Aviation Operations			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607139A / <i>Improved Turbine Engine Program</i>	Project (Number/Name) ES6 / <i>Improved Turbine Engine Program</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
<p><i>FY 2016 Accomplishments:</i> Executed Systems Engineering/Program Management efforts, dual vendor competitive TMRR contract awarded, initial engine design effort, and continued aircraft platform/engine integration trade studies.</p> <p><i>FY 2017 Plans:</i> Systems Engineering/Program Management requirements, provide for incremental funding of dual vendor competitive TMRR contracts awarded in FY16, initial engine design effort, and continues aircraft platform/engine integration trade studies.</p> <p><i>FY 2018 Plans:</i> Continue Systems Engineering/Program Management activities, provide for final increment of funding of dual vendor competitive TMRR contract awarded in FY16, culminating in a Preliminary Design Review (PDR), continues aircraft platform/engine integration trade studies. Executes EMD SSEB.</p>			
Accomplishments/Planned Programs Subtotals	49.137	126.105	204.304

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

N/A

Remarks

For Fiscal Year (FY) 2014 and prior, all funding for the Improved Turbine Engine Program (ITEP) was contained in Program Element (PE) 0203744A – Aircraft Modifications/Product Improvement Programs, Project 504. FY 2015 funding was initially moved to PE 0203744A, Project EB1. Prior to execution, FY 2015 and beyond funding was moved to to PE 0607139A, Project ES6. This is not a New Start.

D. Acquisition Strategy

ITEP TMRR contracts were based on Full and Open Competition. Awarded Fixed Price Incentive (Firm Target) contracts in FY 2016 to two vendors for TMRR. Following a successful Milestone B decision, currently planned for 1Q19, there will be a down-select to one vendor to be awarded on a cost-plus-incentive-fee contract.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607139A / Improved Turbine Engine Program	Project (Number/Name) ES6 / Improved Turbine Engine Program
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Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
ITEP SEPM - Organic	Allot	Program Management Office (PMO) Improved Turbine Engine/ Future Vertical Lift (ITE/FVL), Various : Redstone Arsenal, AL	7.241	4.921	Oct 2015	6.568	Oct 2016	3.796	Oct 2017	-		3.796	Continuing	Continuing	Continuing
ITEP SEPM - Contractor	C/IDIQ	PMO Huntsville, AL Various : PMO Huntsville, AL Various	2.178	2.604	Oct 2015	1.246	Oct 2016	1.892	Oct 2017	-		1.892	Continuing	Continuing	Continuing
ITEP SEPM - OGA	MIPR	PMO Huntsville, AL Various : PMO Huntsville, AL Various	5.211	4.443	Oct 2015	-		3.499	Oct 2017	-		3.499	Continuing	Continuing	Continuing
ITEP EMD SSEB	MIPR	PMO Huntsville, AL Various : PMO Huntsville, AL Various	0.000	-		-		7.744	Oct 2017	-		7.744	0.000	7.744	0.000
Subtotal			14.630	11.968		7.814		16.931		-		16.931	-	-	-

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
ITEP Technology Maturation/Risk Reduction (TMRR) Contracts	C/FPIF	General Electric Company (GE), and Advanced Turbine Engine Company (ATEC) : Lynn, MA (GE), and Huntsville, AL (ATEC)	0.000	32.910	Aug 2016	104.478	Oct 2016	118.698	Oct 2017	-		118.698	0.000	256.086	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607139A / Improved Turbine Engine Program	Project (Number/Name) ES6 / Improved Turbine Engine Program
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Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Boeing - ITEP Vehicle Platform Integration Trade Studies Contract	SS/IDIQ	Program Management Office (PMO) Improved Turbine Engine/ Future Vertical Lift (ITEP/FVL), Various : Redstone Arsenal, AL	15.798	-		2.905	Oct 2016	3.325	Oct 2017	-		3.325	1.500	23.528	0.000
Sikorsky Aircraft - ITEP Vehicle Platform Integration Trade Studies Contract	SS/FPIF	Program Management Office (PMO) Improved Turbine Engine/ Future Vertical Lift (ITEP/FVL), Various : Redstone Arsenal, AL	18.900	-		4.468	Oct 2016	5.833	Oct 2017	-		5.833	1.630	30.831	0.000
EMD Program Acceleration	C/FPIF	TBD : TBD	0.000	-		-		20.000	Oct 2017	-		20.000	0.000	20.000	0.000
Apache Integration and Qualification Phase 1	SS/CPFF	The Boeing Company : Phoenix, AZ	0.000	-		-		29.806	Jan 2018	-		29.806	0.000	29.806	0.000
Subtotal			34.698	32.910		111.851		177.662		-		177.662	3.130	360.251	0.000

Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
ITEP Engineering Support - Organic	Allot	Program Management Office (PMO) Improved Turbine Engine/ Future Vertical Lift (ITEP/FVL), Various : Redstone Arsenal, AL	0.000	0.164	Oct 2015	1.143	Oct 2016	0.313	Oct 2017	-		0.313	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 7				PE 0607139A / Improved Turbine Engine Program				ES6 / Improved Turbine Engine Program							
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
ITEP Engineering Support - Contractor	C/IDIQ	Program Management Office (PMO) Improved Turbine Engine/ Future Vertical Lift (ITEP/FVL), Various : Redstone Arsenal, AL	0.000	0.781	Oct 2015	1.662	Oct 2016	2.704	Oct 2017	-		2.704	Continuing	Continuing	Continuing
ITEP Engineering Support - OGA	MIPR	Program Management Office (PMO) Improved Turbine Engine/ Future Vertical Lift (ITEP/FVL), Various : Redstone Arsenal, AL	0.000	3.314	Oct 2015	3.635	Oct 2016	6.694	Oct 2017	-		6.694	Continuing	Continuing	Continuing
Subtotal			0.000	4.259		6.440		9.711		-		9.711	-	-	-
Project Cost Totals			49.328	49.137		126.105		204.304		-		204.304	-	-	-
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607139A / Improved Turbine Engine Program	Project (Number/Name) ES6 / Improved Turbine Engine Program
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
ITEP Systems Engineering/Program Management																												
ITEP Development Engineering																												
(1) EMD RFP Release Decision Point																												
(2) Milestone B																												
ITEP Detailed Design (EMD)																												
ITEP Air Vehicle Integration Trade Studies																												
ITEP Air Vehicle Integration																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607139A / Improved Turbine Engine Program	Project (Number/Name) ES6 / Improved Turbine Engine Program

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
ITEP Systems Engineering/Program Management	1	2015	1	2026
ITEP Development Engineering	4	2016	2	2018
EMD RFP Release Decision Point	4	2017	4	2017
Milestone B	1	2019	1	2019
ITEP Detailed Design (EMD)	1	2019	2	2024
ITEP Air Vehicle Integration Trade Studies	1	2015	4	2018
ITEP Air Vehicle Integration	2	2018	2	2024

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0607140A / Emerging Technologies from NIE							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	2.383	2.369	1.023	-	1.023	0.000	0.000	0.000	0.000	0.000	5.775
ES7: Emerging Technologies from NIE	-	2.383	2.369	1.023	-	1.023	0.000	0.000	0.000	0.000	0.000	5.775

A. Mission Description and Budget Item Justification

Emerging Technologies from Network Integration Evaluation (NIE) supports the Army's Equipment Modernization Strategy, Army Force Generation (ARFORGEN) cycle and consolidates capabilities to gain efficiencies. These funds provide for an iterative and incremental approach to software development and hardware/software integration as a result of NIEs and Joint Warfighter Assessments (JWA). These funds promote industry's efforts to support the Army's Modernization Plan for Force 2025 and beyond. These funds will facilitate the identification, assessment and acquisition of capability solutions for the Army.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	2.481	2.369	0.000	-	0.000
Current President's Budget	2.383	2.369	1.023	-	1.023
Total Adjustments	-0.098	0.000	1.023	-	1.023
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.098	-			
• Adjustments to Budget Years	0.000	0.000	1.023	-	1.023

Change Summary Explanation

FY 2016 funds in the amount of (.098) million was transferred to support SBIR/STTR.

FY 2018 Base funds in the amount of \$1.023 million was added to support the completion of Ground EW capability with enhanced and networked for Versatile Radio Observation & Direction Finding (VROD) / Modular Adaptive Transmitter (VMAX) and Sabre Fury previously assessed at AWA 17.1.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607140A / <i>Emerging Technologies from NIE</i>				Project (Number/Name) ES7 / <i>Emerging Technologies from NIE</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
<i>ES7: Emerging Technologies from NIE</i>	-	2.383	2.369	1.023	-	1.023	0.000	0.000	0.000	0.000	0.000	5.775
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Emerging Technologies from Network Integration Evaluation (NIE) supports the Army's Equipment Modernization Strategy, Army Force Generation (ARFORGEN) cycle and consolidates capabilities to gain efficiencies. These funds provide for an iterative and incremental approach to software development and hardware/software integration as a result of NIEs and Army Warfighting Assessments (AWA). These funds promote industry's efforts to support the Army's Modernization Plan for Force 2025 and beyond. These funds will facilitate the identification, assessment and acquisition of capability solutions for the Army.

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

	FY 2016	FY 2017	FY 2018
Title: Emerging Technologies from NIEs	2.383	2.369	1.023
Description: To mature, test, integrate and evaluate traditional and nontraditional small business and industry's technologies.			
FY 2016 Accomplishments: These funds were used to mature, test, and integrate technologies that were demonstrated and evaluated during previous NIE/ AWA Events. This includes improvements of technologies from previous NIEs that will then be evaluated and baselined at a NIE for fielding in a Capability Set (CS). These funds will affect technologies from NIE/AWA 16.1, (2 QTR FY16), NIE 16.2 (4QTR FY16) and/or AWA 17.1 (2QTR FY17).			
For NIE 16.2, the Vehicular Integration for C4ISR/EW Interoperability (VICTORY) In-Vehicle Network (IVN) was able to further mature and assess the implementation of features/improvements from previous NIE events.			
FY 2017 Plans: Electronic Warfare Phase 1 Requirements (In support of USAREUR ONS - 16-21509) - will mature and demonstrate Ground EW capability with enhanced and networked for Versatile Radio Observation & Direction Finding (VROD) / Modular Adaptive Transmitter (VMAX) and Sabre Fury previously assessed at AWA 17.1.			
FY 2018 Plans: Electronic Warfare Phase 1 Requirements (In support of USAREUR ONS - 16-21509) - will complete Ground EW capability with enhanced and networked for Versatile Radio Observation & Direction Finding (VROD) / Modular Adaptive Transmitter (VMAX) and Sabre Fury previously assessed at AWA 17.1.			
Accomplishments/Planned Programs Subtotals	2.383	2.369	1.023

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607140A / Emerging Technologies from NIE	Project (Number/Name) ES7 / Emerging Technologies from NIE

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

N/A

Remarks

This is the only project within this Program Element.

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0607141A / Logistics Automation
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	1.318	4.563	1.504	-	1.504	0.000	0.000	0.000	0.000	Continuing	Continuing
DY1: Logistics Information Warehouse (LIW)	-	0.000	1.957	1.504	-	1.504	0.000	0.000	0.000	0.000	Continuing	Continuing
DY2: Lead Material Integrator (LMI) (DST)	-	1.318	2.606	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note
FY 2018 Base Funding is reduced because program is entering sustainment.

A. Mission Description and Budget Item Justification

The Logistics Information Warehouse (LIW) has been designated by the Secretary of the Army as the primary system for the accessing, acquiring, and delivery of materiel data. This includes data from all sources designated as Authoritative, as well as, system derived data and appropriate reference data. This data will be used in support of materiel sourcing and distribution and other Materiel Enterprise missions. It enables Command visibility of business intelligence and resulting metrics for critical logistics components enabling enterprise-level analytics to be performed in support of the equipping mission within the Army's Tiered Readiness processes. LOGSA and its LIW suite of products and services provide the Army community with vital logistics data necessary for the planning, conducting and sustainment of war fighting capability worldwide. The LMI-DST directly supports Tiered Readiness by linking available equipment to the Generated Force model. Specifically, LMI-DST synchronizes an Army authoritative Demand Signal for manning, equipping, services & infrastructure and authoritative resourcing (money) information, resulting in an accurate prediction of a ready and properly equipped force. The Army Financial Liability Investigation of Property Loss Tracker (AFT) tool is a web-based, automated FLIPL processing and tracking system which provides an electronic FLIPL documentation packet that includes intelligent, digital versions of required forms and allows for attachment of supporting documentation.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	1.673	4.563	4.308	-	4.308
Current President's Budget	1.318	4.563	1.504	-	1.504
Total Adjustments	-0.355	0.000	-2.804	-	-2.804
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.066	-			
• Other Adjustments 1	-0.289	0.000	-2.804	-	-2.804

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army Date: May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607141A / <i>Logistics Automation</i>
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Change Summary Explanation

FY 2016 Base Funding in the amount of (.289) million was reprogrammed to support a higher Army priority.

FY 2018 Base Funding is reduced because Logistics Information Warehouse (LIW) program is entering sustainment.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607141A / <i>Logistics Automation</i>				Project (Number/Name) DY1 / <i>Logistics Information Warehouse (LIW)</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
DY1: <i>Logistics Information Warehouse (LIW)</i>	-	0.000	1.957	1.504	-	1.504	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FY 2018 Base Funding is reduced because Logistics Information Warehouse (LIW) program is entering sustainment.

A. Mission Description and Budget Item Justification

The Logistics Information Warehouse (LIW) is designated as the Army's authoritative materiel data repository. As chartered by the Secretary of The Army, LIW will provide enterprise-accepted and trusted information for analysis, aggregation, and reuse in support of the Lead Materiel Integrator (LMI) mission. As an Army enterprise-level repository and retrieval system to facilitate accurate choices and rapid decision making. Specifically, LIW will provide all required data structured in a way that allows for querying and reporting; e.g., equipment authorizations, equipment on-hand, new procurement schedules, RESET production schedules and in transit visibility from origin and distribution to final destination, in support of the information needs of the Army Materiel Command (AMC) and other command logistics managers. This includes data from all sources designated as authoritative, as well as system derived data and appropriate reference data. This data will be used in support of materiel sourcing and distribution and other Materiel Enterprise missions. LIW enables visibility of business intelligence and resulting metrics for critical logistics components enabling enterprise-level analytics to be performed in support of the equipping mission within the Army's Tiered Readiness processes. LIW supports the tenants of Mission Command by logistically empowering the Commander to successfully integrate and synchronize logistics information with warfighter functions in time and space to maximize potential for mission success. ADDITIONAL CAPABILITIES: LIW provides the data and custom business intelligence environment to enable Command-specific analysis and presentation of business intelligence displays to satisfy unique command management requirements. LIW serves as the single logistics repository which bridges the Army ERP systems (GCSS-Army, LMP, AESIP, GFEBS) with enduring legacy systems.

LOGSA is requesting RDTE funds to develop and enhance the Materiel Common Operating Picture (M-COP). The M-COP provides interactive views, models, and simulations that directly address Warfighter priorities by giving senior Army leaders the ability to visualize current and future materiel requirements, materiel readiness levels and Warfighter materiel readiness options of the Logistics Readiness Center (LRC) at the installation level. Data from many agencies is integrated into M-COP views, assisting with information superiority for joint and inter-agency operations (examples: assisting CENTCOM, NORTHCOM, and FEMA).

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

	FY 2016	FY 2017	FY 2018
Title: LIW	-	1.957	1.504
Description: Execution of tasks to create Army Logistics Repository.			
FY 2017 Plans:			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607141A / <i>Logistics Automation</i>	Project (Number/Name) DY1 / <i>Logistics Information Warehouse (LIW)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Continue Develop Materiel Common Operating Picture (M-COP), continuing Best of Breed			
<i>FY 2018 Plans:</i> Funds Logistics Information Warehouse			
Accomplishments/Planned Programs Subtotals	-	1.957	1.504

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

N/A

Remarks

D. Acquisition Strategy

Utilize contract services available through LITES contract vehicle in CHESS.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607141A / <i>Logistics Automation</i>				Project (Number/Name) DY2 / <i>Lead Material Integrator (LMI) (DST)</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
DY2: <i>Lead Material Integrator (LMI) (DST)</i>	-	1.318	2.606	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Lead Materiel Integrator Decision Support Tool (LMI DST) is a software solution, resident within the Logistics Information Warehouse, that supports the Army Materiel Command in its mission as the Army Lead Materiel Integrator as well as materiel managers at Army Commands, Army Service Component Commands, Direct Reporting Units, Corps and Divisions with making informed equipping decisions. The LMI DST directly supports Army Forces Generation (ARFORGEN) by linking available equipment to the Generated Force model.

Specifically, development will enable the tool to consume and display additional data sources, such as maintenance data from both legacy and Enterprise data sources - a critical capability during the fielding of GCSS-Army; provide additional modules, including Second Destination Transportation Planning, supporting USARC and NGB requirements to deprecate legacy systems and a Readiness Cost Banding module to implement analysis algorithms to deliver decisions to optimize readiness within Army cost constraints. New development will also enable equippers to redistribute items, based on their level of modernization, limiting transportation costs of moving outdated equipment.

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

	FY 2016	FY 2017	FY 2018
Title: LMI/DST	1.318	2.606	-
Description: The Lead Materiel Integrator Decision Support Tool (LMI DST) is a software solution, resident within the Logistics Information Warehouse.			
FY 2016 Accomplishments: Development of LMI DST Version 5.			
FY 2017 Plans: Development of LMI DST Version 5.			
Accomplishments/Planned Programs Subtotals	1.318	2.606	-

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

N/A

Remarks

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army Date: May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607141A / <i>Logistics Automation</i>	Project (Number/Name) DY2 / <i>Lead Material Integrator (LMI) (DST)</i>
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D. Acquisition Strategy

The LMI DST is a development effort to meet the Secretary of the Army's intent in designating the Army Materiel Command as the Lead Materiel Integrator and the Logistics Information Warehouse (LIW) as the authoritative repository of Army logistics domain data. The LMI DST integrates logistics domain data from the LIW with materiel demand requirements from the Readiness Enterprise to enable automated decision support for equippers throughout the Army. In August 2011, a sole source contract was awarded to ProModel Corporation to leverage their COTS modeling and simulation capability, the ProModel Application Framework to develop the Lead Materiel Integrator Decision Support Tool, which is a GOTS product. The project utilizes an agile development methodology. Versions 1-4 were released on a six-month cadence between December 2011 and April 2013. LMI DST development and sustainment have been transitioned to LOGSA's Information and Technology Services Contract. Requirements for additional development were collected from Army Commands and vetted through a General Officer Steering Committee, chaired by Army Materiel Command. RDTE funding supports future major version releases.

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development					PE 0607142A / Aviation Rocket System Product Improvement & Dev							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	8.000	10.064	-	10.064	26.103	24.503	17.373	13.770	Continuing	Continuing
EW9: Aviation Rocket System Product Improvement and Dev	-	0.000	8.000	10.064	-	10.064	26.103	24.503	17.373	13.770	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Aviation Rockets Product Improvement and Development line will fund the development, integration and test of new munitions to meet user requirements. Additionally, it will fund a range of improvement initiatives to modernize the Hydra-70 2.75 Inch rocket and launcher system to include improvements to performance, safety, reliability, transportability, producibility, affordability and Insensitive Munitions (IM) compliance. The current Hydra-70 2.75 inch rocket system is more than 50 years old and is in need of performance improvements to comply with 1) USC - Title 10, Chapter 141, Section 2389, 2) DoD Directive 5000.1, CJCS Instruction 3170.01C, USD (AT&L) Memorandum of January 26, 1999, "Exemption for Existing Inventory Items to IM Requirements", and 3) existing/emerging HQDA G-3/5/7 and TRADOC aviation weapon requirements for guided and unguided rocket systems. Improvements will include design, qualification and integration of precision guidance capability, increased lethality, improved target suppression, increased standoff range, reduced minimum engagement range, improved pre-launch constraints and munitions communications/programmability, increased stowed kills, increased product reliability, improved hardness against unplanned stimuli, reduced war fighter workload, and reduced environmental impact for both manned and unmanned applications.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	8.000	10.064	-	10.064
Total Adjustments	0.000	8.000	10.064	-	10.064
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	8.000	10.064	-	10.064

Change Summary Explanation

The Aviation Rockets Product Improvement and Development line will fund the development, integration and test of new munitions to meet user requirements. Additionally, it will fund a range of improvement initiatives to modernize the Hydra-70 2.75 Inch rocket and launcher system to include improvements to performance, safety, reliability, transportability, producibility, affordability and Insensitive Munitions (IM) compliance.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607142A / Aviation Rocket System Product Improvement & Dev				Project (Number/Name) EW9 / Aviation Rocket System Product Improvement and Dev			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EW9: Aviation Rocket System Product Improvement and Dev	-	0.000	8.000	10.064	-	10.064	26.103	24.503	17.373	13.770	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Aviation Rockets Product Improvement and Development line will fund the development, integration and test of new munitions to meet user requirements. Additionally, it will fund a range of improvement initiatives to modernize the Hydra-70 2.75 Inch rocket and launcher system to include improvements to performance, safety, reliability, transportability, producibility, affordability and Insensitive Munitions (IM) compliance. The current Hydra-70 2.75 inch rocket system is more than 50 years old and is in need of performance improvements to comply with 1) USC - Title 10, Chapter 141, Section 2389, 2) DoD Directive 5000.1, CJCS Instruction 3170.01C, USD (AT&L) Memorandum of January 26, 1999, "Exemption for Existing Inventory Items to IM Requirements", and 3) existing/emerging HQDA G-3/5/7 and TRADOC aviation weapon requirements for guided and unguided rocket systems. Improvements will include design, qualification and integration of precision guidance capability, increased lethality, improved target suppression, increased standoff range, reduced minimum engagement range, improved pre-launch constraints and munitions communications/programmability, increased stowed kills, increased product reliability, improved hardness against unplanned stimuli, reduced war fighter workload, and reduced environmental impact for both manned and unmanned applications.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Advanced Precision Kill Weapon System (APKWS)	-	-	3.536	-	3.536
Description: These funds will be used to optimize APKWS integration on the Apache and for activities required to obtain an Army Full Materiel Release (FMR) for APKWS II. This effort will include design and build of all-up-round (AUR) containers and test assets, conduct environmental qualification testing, perform ground firings, update aviation platform software, support Apache weapon survey firings, provide technical support to platform integration and testing, and development and revision of training/maintenance materiel.					
FY 2018 Base Plans: Begin FMR efforts and analysis needed to optimize fire control integration on the AH-64 for guided variants.					
Title: Modernized Rocket Launcher Increment 1	-	-	2.930	-	2.930
Description: This effort will provide the HYDRA launcher the capability to interface with aircraft using the current and future MIL-STD-1760 design specification. This redesign effort will include the development of a Hydra Launcher Electronic Assembly (HYLEA) that utilizes a new, non-proprietary, open systems architecture design allowing easy compatibility when integrating aircraft that are compatible with the 1760 standard. The inherent					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607142A / Aviation Rocket System Product Improvement & Dev	Project (Number/Name) EW9 / Aviation Rocket System Product Improvement and Dev			
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
flexibility of a common HYLEA affords opportunities for additional launcher configurations and will serve as a building block for future small air to ground weapon systems.					
FY 2018 Base Plans: The focus of the FY2018 MRL Inc. 1 effort is to complete the final design and development of the HYLEA software and hardware efforts, Conduct a full MRL inc1 CDR, Develop test assets (XM906 launcher), Conduct a full Qualification and demonstration effort, support Apache weapons integration, and provide program management, contract, and OGA support.					
Title: Insensitive Munitions (IM) Compliance Description: Incorporation of IM-compliant explosives and design features into the Hydra-70 Rocket System to increase system insensitivity to unplanned stimuli. FY 2018 Base Plans: 1. Qualify the XM283 Warhead / XM1165 Fuze for fielding in place of the M151, achieving warhead compliance with Fast Cook Off, Slow Cook Off, and Bullet Impact IM requirements. 2. Begin transition of demonstrated venting technology to production MK66 motor and associated containers to achieve compliance with Fast Cook Off and Slow Cook Off IM requirements.	-	-	2.000	-	2.000
Title: Smart Digital Interface Description: The Smart Digital Interface program is an effort to support the future smart, two-way digital communications capability to be included in the fully capable Integrated Munitions Launcher (IML). This effort will evaluate launcher-to-munitions physical interfaces for the fully capable smart munitions and launcher system to reduce both programmatic and technical risk as well as to inform requirements for a government owned, non-proprietary physical interface definition. FY 2018 Base Plans: Complete the program phase 1 physical interface candidate evaluation, interface asset availability determination, and interface concept selection. Begin the phase 2 test asset development/procurement and testing.	-	-	1.598	-	1.598
Title: Penetrating Warhead Description: These funds will be used test and qualify/integrate a penetrating warhead on AH-64 Apache to include development of required improvements. This effort will include design and build of all-up-round (AUR) containers and test assets, conduct environmental qualification testing, perform ground firings, update aviation	-	8.000	-	-	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607142A / Aviation Rocket System Product Improvement & Dev	Project (Number/Name) EW9 / Aviation Rocket System Product Improvement and Dev
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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
platform software, support Apache weapon survey firings, provide technical support to platform integration and testing, and development and revision of training/maintenance materiel.					
<i>FY 2017 Plans:</i> 1. Perform munition testing and initiate platform integration activities for a penetrating warhead on AH-64. 2. Begin development of penetrating warhead AUR container					
Accomplishments/Planned Programs Subtotals	-	8.000	10.064	-	10.064

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• E37300: <i>Rockets Hydra, All Types</i>	171.193	140.064	161.155	75.820	236.975	92.088	76.818	50.100	80.569	1,746.001	2,593.808

Remarks

D. Acquisition Strategy

The Acquisition Strategy is to utilize in-house expertise, Other Government Agencies expertise and to execute Cost Plus Fixed Fee Engineering Services contracts. The strategy allows for the Government to have the ability to support urgent operational needs and to support unanticipated incidents, which require immediate and expert attention. Each product will have an individual strategy developed in a timely manner. This strategy will allow for the Government to maintain the capability of the Hydra-70 All-Up-Round Rocket, its variants, and Small Guided Munitions requirements.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity 2040 / 7				R-1 Program Element (Number/Name) PE 0607142A / Aviation Rocket System Product Improvement & Dev				Project (Number/Name) EW9 / Aviation Rocket System Product Improvement and Dev							
Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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/ Project Management	SS/ Various	ARSGM Product Office : Redstone Arsenal, AL	0.000	-		1.200		0.507		-		0.507	Continuing	Continuing	0.000
Subtotal			0.000	-		1.200		0.507		-		0.507	-	-	0.000
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Advance Kill Precision Munitions System (APKWS)	MIPR	AMRDEC : Redstone Arsenal, AL	0.000	-		-		2.944	Nov 2017	-		2.944	Continuing	Continuing	0.000
Modernized Rocket Launcher Increment 1	MIPR	AMRDEC : Redstone Arsenal, AL	0.000	-		-		2.197	Nov 2017	-		2.197	Continuing	Continuing	0.000
Insensitive Munitions (IM) Compliance	SS/CPFF	GDOTS : Wilimington, VT	0.000	-		-		1.710	Nov 2017	-		1.710	Continuing	Continuing	0.000
Smart Digital Interface	MIPR	AMRDEC : Redstone Arsenal, AL	0.000	-		-		0.500	Nov 2017	-		0.500	Continuing	Continuing	0.000
Penetrating Warhead	MIPR	Various : Various Performers	0.000	-		4.700		-		-		-	Continuing	Continuing	0.000
Subtotal			0.000	-		4.700		7.351		-		7.351	-	-	0.000
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Research Studies	MIPR	AMRDEC : Redstone Arsenal, AL	0.000	-		0.700		0.415	Nov 2017	-		0.415	Continuing	Continuing	0.000
Subtotal			0.000	-		0.700		0.415		-		0.415	-	-	0.000

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607142A / Aviation Rocket System Product Improvement & Dev	Project (Number/Name) EW9 / Aviation Rocket System Product Improvement and Dev
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
APKWS									APKWS																			
Moderized Rocket Launcher Increment 1									Moderized Rocket Launcher Increment 1																			
Hydra-70 Improvements																	Hydra-70 Improvements											
Insensitive Munitions (IM) Compliance																	Insensitive Munitions (IM) Compliance											
Smart Digital Interface																	Smart Digital Interface											
Penetrating Warhead																	Penetrating Warhead											

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607142A / Aviation Rocket System Product Improvement & Dev	Project (Number/Name) EW9 / Aviation Rocket System Product Improvement and Dev

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
APKWS	1	2018	1	2020
Moderized Rocket Launcher Increment 1	1	2018	1	2020
Hydra-70 Improvements	1	2019	1	2028
Insensitive Munitions (IM) Compliance	1	2018	4	2020
Smart Digital Interface	1	2018	1	2020
Penetrating Warhead	3	2017	4	2019

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607143A / <i>Unmanned Aircraft System Universal Products</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	38.463	-	38.463	25.794	6.794	5.651	6.271	Continuing	Continuing
EX1: <i>Unmanned Aircraft Systems Universal Products</i>	-	0.000	0.000	38.463	-	38.463	25.794	6.794	5.651	6.271	Continuing	Continuing

A. Mission Description and Budget Item Justification

Note:

The Universal product program was previously funded under 0203744A Gray Eagle Modifications and 0305233A Shadow Modifications.

The Universal Products consist of the Universal Ground Control Station (UGCS), the Universal Ground Data Terminal (UGDT) and the Universal Mission Simulator (UMS). The Universal Products will be capable of flight and payload control of multiple unmanned aircraft systems. Protected in a climate-controlled, standard S-280 or S-788 U.S. Army shelter and mounted on either a standard Army FMTV or HMMWV, the UGCS receives and disseminates battlefield video and situational awareness data through state-of-the-art operator consoles. Consoles can be used to provide aircraft command and control, payload control and weapons launch.

The UGDT provides a Line of Sight (LOS) capability for transmit and receipt of UAS command and control, and UAS payload product. The UGDT is the common datalink system for U. S. Army UAS.

The Universal Mission Simulator (UMS) consists of the hardware and software required to fully train UAS operators to full Readiness Level (RL) 1. The UMS will be capable of training and simulating flight and payload control of multiple unmanned aircraft systems and features Directorate of Simulation (DOS) accredited Shadow software and Gray Eagle software.

Justification: FY2018 Universal Product Base funding of \$38.867 will be used for starting the development of modifications needed to address UGCS obsolescence, maintain interoperability, increase commonality (including a controller to support weapons), and continue development of training devices in support of Trainer System Engineering, Software/System Sustainment, Currency, and Field Support.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607143A / <i>Unmanned Aircraft System Universal Products</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	38.463	-	38.463
Total Adjustments	0.000	0.000	38.463	-	38.463
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	0.001	-	0.001
• New APE - Initial Funding	0.000	0.000	38.462	-	38.462

Change Summary Explanation

New Funding APE, thus no funding in previous President's Budget.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7				R-1 Program Element (Number/Name) PE 0607143A / <i>Unmanned Aircraft System Universal Products</i>				Project (Number/Name) EX1 / <i>Unmanned Aircraft Systems Universal Products</i>				
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EX1: <i>Unmanned Aircraft Systems Universal Products</i>	-	0.000	0.000	38.463	-	38.463	25.794	6.794	5.651	6.271	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Note

The Universal product program was previously funded under 0203744A Gray Eagle Modifications MQ-1 and 0305233A Shadow Modifications RQ 7.

The Universal Products consist of the Universal Ground Control Station (UGCS), the Universal Ground Data Terminal (UGDT) and the Universal Mission Simulator (UMS). The Universal Products will be capable of flight and payload control of multiple unmanned aircraft systems. Protected in a climate-controlled, standard S-280 or S-788 U.S. Army shelter and mounted on either a standard Army FMTV or HMMWV, the UGCS receives and disseminates battlefield video and situational awareness data through state-of-the-art operator consoles. Consoles can be used to provide aircraft command and control, payload control and weapons launch.

The UGDT provides a Line of Sight (LOS) capability for transmit and receipt of UAS command and control, and UAS payload product. The UGDT is the common datalink system for U. S. Army UAS.

The Universal Mission Simulator (UMS) consists of the hardware and software required to fully train UAS operators to full Readiness Level (RL) 1. The UMS will be capable of training and simulating flight and payload control of multiple unmanned aircraft systems and features Directorate of Simulation (DOS) accredited Shadow software and Gray Eagle software.

Justification: FY2018 Universal Product Base funding of \$38.463 will be used for starting the development of modifications needed to address UGCS obsolescence, maintain interoperability, increase commonality (including a controller to support weapons), and continue development of training devices in support of Trainer System Engineering, Software/System Sustainment, Currency, and Field Support.

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

	FY 2016	FY 2017	FY 2018
Title: Universal Products (UGCS and UGDT) Improvements	-	-	33.009
Description: Funding is provided for the following Universal Product improvements			
FY 2018 Plans:			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607143A / <i>Unmanned Aircraft System Universal Products</i>	Project (Number/Name) EX1 / <i>Unmanned Aircraft Systems Universal Products</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
Development of Universal Products Improvements - Funding supports starting development of Hardware, Software and documentation to ensure a supportable UGCS and UGDT that is interoperable and increases commonality. The UGCS and UGDT will be used across Army UAS.				
Title: Training Device Improvements		-	-	5.454
Description: Funding is provided for the following training device improvements				
FY 2018 Plans: Funding supports starting development and integration of hardware, software and documentation to support updated training capabilities utilizing the UMS and UGCS.				
Accomplishments/Planned Programs Subtotals		-	-	38.463
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
The Universal Products began full rate production as a part of the MQ-1C and RQ-7 programs of record (both ACAT 1C) after Milestone III/C decisions were reached for both programs. Continued development of the Universal Products will be accomplished through a series of modifications and retrofits. Individual development/integration efforts will be based on competitive awards. Expected to award in May 2018 timeframe and will result in a Cost Plus Fixed Fee contracts.				
E. Performance Metrics				
N/A				

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army													Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607143A / Unmanned Aircraft System Universal Products					Project (Number/Name) EX1 / Unmanned Aircraft Systems Universal Products					
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Universal Products (UGCS and UGDT) Improvements	C/CPFF	TBD : TBD	0.000	-		-		33.009	May 2018	-		33.009	0.000	33.009	0.000
Training Device Improvements	C/CPFF	TBD : TBD	0.000	-		-		5.454	May 2018	-		5.454	0.000	5.454	0.000
Subtotal			0.000	-		-		38.463		-		38.463	0.000	38.463	0.000
			Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	-		0.000		38.463		-		38.463	0.000	38.463	0.000

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607143A / <i>Unmanned Aircraft System Universal Products</i>	Project (Number/Name) EX1 / <i>Unmanned Aircraft Systems Universal Products</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022							
	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				
Universal Products (UGCS and UGDT) Improvements																													UGCS/UGDT Improve			
Training Device Improvements																													Trng Dev Improve			

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607143A / <i>Unmanned Aircraft System Universal Products</i>	Project (Number/Name) EX1 / <i>Unmanned Aircraft Systems Universal Products</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Universal Products (UGCS and UGDT) Improvements	3	2018	4	2022
Training Device Improvements	3	2018	4	2022

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607665A / <i>Family of Biometrics</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	7.179	12.098	6.159	-	6.159	1.426	1.438	1.341	1.207	Continuing	Continuing
DT2: <i>Non-MIP Biometrics</i>	-	5.772	10.848	5.500	-	5.500	0.000	0.000	0.000	0.000	0.000	22.120
DU2: <i>Management Agency</i>	-	1.407	1.250	0.659	-	0.659	1.426	1.438	1.341	1.207	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Biometrics Enabling Capability (BEC) product office has full life-cycle management responsibility of the DoD authoritative biometrics enterprise repository system, known as DoD Automated Biometrics Identification System (DoD ABIS). BEC Increment 0 is comprised of the current version (v1.2) of DoD ABIS and the Service Life Extension Program (SLEP) which is DoD ABIS v1.3. DoD ABIS supports identity superiority capabilities for Warfighters to identify known or suspected terrorists and third country nationals in the course of military operations. DoD ABIS provides matching, sharing, and storing of biometrics data. The capability can receive multi-modal biometrics submissions to include iris, face, palm, and finger prints from biometrics collection devices, which will support the Warfighter in making retain, capture, or release decisions. Biometric Automated Toolset-Army (BAT-A) is the Army Program of Record for the current Army collection capability. DoD ABIS has a direct impact on the availability of critical intelligence information that is of vital interest to DoD and other government agencies, including Department of Justice (DoJ), Federal Bureau of Investigation (FBI), Department of Homeland Security (DHS), and Department of State (DoS).

The Defense Forensics and Biometrics Agency (DFBA) is the Executive Manager for Army Biometrics and the DoD proponent to establish and maintain Research, Development, Test & Evaluation (RDTE) and information management support throughout the Armed Services. DFBA leads in the development and implementation of biometric technologies for Combatant Commands (CCMDs), Services, and Agencies; delivers capabilities that contribute to the enhancement of the biometric community; increases Joint Service interoperability; and empowers the warfighter by improving operational effectiveness on the battlefield. The DFBA strategy pursues technology opportunities through scientific discovery and makes investments responsive to specific requirements identified by combat developers. These directives are carried out by the DFBA Office of the Chief Scientist (OCS). OCS coordinates all science and technology (S&T) efforts and oversees the RDT&E program.

Justification:
 FY18 RDT&E funding in the amount of \$5.5 million (DT2: Non-MIP Biometrics) enables the BEC product office to continue the DoD ABIS Service Life Extension Program (SLEP). Funding supports a required update to the Search core, transaction manager and the authoritative repository, as well as improved / enhanced interoperability with FBI, Department of Homeland Security and other government entities. Updates to the current Electronic Biometric Transmission Standard (EBTS) which is required in order to enable International Caveat, also improves sharing of data throughout the biometric community. This funding also supports testing of the DoD ABIS SLEP.

FY 2018 funding in the amount of \$0.659 million for Project DU2 will provide DFBA the ability to actively manage internal and external research efforts to ensure scientific merit, feasibility, and DFBA objectives and requirements are met. DFBA conducts biometric T&E activities, including standards conformance and Automated Biometric Identification System (ABIS) interoperability assessments, supporting DoD acquisition organizations, and providing subject matter expertise to DoD and non-DoD government stakeholders.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607665A / <i>Family of Biometrics</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	13.237	12.098	0.531	-	0.531
Current President's Budget	7.179	12.098	6.159	-	6.159
Total Adjustments	-6.058	0.000	5.628	-	5.628
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-5.531	-			
• SBIR/STTR Transfer	-0.527	-			
• Adjustments to Budget Years	0.000	0.000	0.128	-	0.128
• Other Adjustments 1	0.000	0.000	5.500	-	5.500

Change Summary Explanation

FY16 RDT&E funding in the amount of \$5.531 million was reprogrammed to support other priority Army requirements. This FY16 reprogramming also supported a re-phasing of funding requirements to better align with the revised program schedule.

FY18 RDT&E funding in the amount of \$5.5 million (DT2: Non-MIP Biometrics) enables the BEC product office to continue the SLEP of the DoD ABIS. Funding supports a required update to the search core, transaction manager and the authoritative repository, as well as improved / enhanced interoperability with the Department of Justice, Department of Homeland Security and other government entities. Updates to the current Electronic Biometric Transmission Standard (EBTS) which is required in order to enable International Caveat, also improves sharing of data throughout the biometric community. This funding also supports testing of the DoD ABIS SLEP.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607665A / Family of Biometrics				Project (Number/Name) DT2 / Non-MIP Biometrics			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
DT2: Non-MIP Biometrics	-	5.772	10.848	5.500	-	5.500	0.000	0.000	0.000	0.000	0.000	22.120
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Biometrics Enabling Capability (BEC) product office has full life-cycle management responsibility of the DoD authoritative biometrics enterprise repository system, known as DoD Automated Biometrics Identification System (DoD ABIS). BEC Increment 0 is comprised of the current version (v1.2) of DoD ABIS and the Service Life Extension Program (SLEP) which is DoD ABIS v1.3. DoD ABIS supports identity superiority capabilities for Warfighters to identify known or suspected terrorists and third country nationals in the course of military operations. DoD ABIS provides matching, sharing, and storing of biometrics data. The capability can receive multi-modal biometrics submissions to include iris, face, palm, and finger prints from biometrics collection devices, which will support the Warfighter in making retain, capture, or release decisions. Biometric Automated Toolset-Army (BAT-A) is the Army Program of Record for the current Army collection capability. DoD ABIS has a direct impact on the availability of critical intelligence information that is of vital interest to DoD and other government agencies, including Department of Justice (DoJ), Federal Bureau of Investigation (FBI), Department of Homeland Security (DHS), and Department of State (DoS).

Justification:

FY18 RDT&E funding in the amount of \$5.5M (DT2: Non-MIP Biometrics) enables the BEC product office to continue the DoD ABIS Service Life Extension Program (SLEP). Funding supports a required update to the Search core, transaction manager and the authoritative repository, as well as improved / enhanced interoperability with FBI, Department of Homeland Security and other government entities. Updates to the current Electronic Biometric Transmission Standard (EBTS) which is required in order to enable International Caveat, also improves sharing of data throughout the biometric community. This funding also supports testing of the DoD ABIS SLEP .

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

	FY 2016	FY 2017	FY 2018
Title: DoD ABIS (BEC 0)	5.772	10.848	5.500
Description: Supports development and testing activities for the DoD ABIS (BEC Increment 0).			
FY 2016 Accomplishments: FY16 Base RDT&E funding supports the Systems Integrator Follow on Contract for the SLEP, DoD ABIS v1.3.			
FY 2017 Plans: FY17 Base RDT&E funding will support the completion of end of life upgrades and associated developmental testing in support of a service life extension to the DoD ABIS system baseline that will extend the life of the system through FY22.			
FY 2018 Plans: Supports development and testing activities for the DoD Automated Biometric Identification System (ABIS) (BEC Increment 0). BEC Increment 0 is comprised of the current version (v1.2) of DoD ABIS and the Service Life Extension Program (SLEP) which is DoD ABIS v1.3. Funding supports the continuation of the SLEP of the DoD (ABIS), including a required update to the Search			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607665A / Family of Biometrics	Project (Number/Name) DT2 / Non-MIP Biometrics

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
core, transaction manager and the authoritative repository, as well as improved / enhanced interoperability with FBI, Department of Homeland Security and other government entities. Funding also supports the required testing of the SLEP DoD ABIS.			
Accomplishments/Planned Programs Subtotals	5.772	10.848	5.500

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

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• OPA: Biometrics Enabling Capability-OPA BA1300	-	2.978	-	-	-	-	-	-	-	0.000	2.978
• OMA: Biometrics Enabling Capability-OMA	16.675	19.567	16.768	-	16.768	17.891	18.210	17.275	17.682	0	124.068

Remarks

D. Acquisition Strategy

The Army Acquisition Strategy for this program is to; a) award a Bridge Contract in FY17 to the current Systems Integration contractor to continue the operations and sustainment of the current capability (DoD ABIS v1.2); b) conduct a full and open competition in FY17 to competitively select the contractor to perform the Service Life Extension (DoD ABIS v1.3) Development and Deployment. This upgrade is extremely critical in order to replace end of life hardware and software components, including Commercial Off the Shelf products whose versions currently included in DoD ABIS v1.2 are no longer supported. The SLEP (v1.3) will extend the service life of the current capability through FY22 and transition to sustainment and will improve interoperability with other government entities such as the FBI, DHS, and Department of Justice. The Army is currently developing and staffing the requirements documentation and strategy for the next / future Biometrics Enabling Capability that will continue to improve upon the DoD Automated Biometric Identification System.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607665A / Family of Biometrics				Project (Number/Name) DU2 / Management Agency			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
DU2: Management Agency	-	1.407	1.250	0.659	-	0.659	1.426	1.438	1.341	1.207	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Defense Forensics and Biometrics Agency (DFBA) is the Executive Manager for Army biometrics and the DoD proponent to establish and maintain Research, Development, Test & Evaluation (RDTE) and information management support throughout the armed services. DFBA leads in the development and implementation of biometric technologies for Combatant Commands (CCMDs), Services, and Agencies; delivers capabilities that contribute to the enhancement of the biometric community; increases Joint Service interoperability; and empowers the warfighter by improving operational effectiveness on the battlefield. The DFBA strategy pursues technology opportunities through scientific discovery and makes investments responsive to specific requirements identified by combat developers. These directives are carried out by DFBA's Office of the Chief Scientist (OCS). OCS coordinates all science and technology (S&T) efforts and oversees the RDT&E program.

Justification:

FY 2018 funding in the amount of \$0.659 million will provide DFBA the ability to actively manage internal and external research efforts to ensure scientific merit, feasibility, and DFBA objectives and requirements are met. DFBA conducts biometric T&E activities, including standards conformance and DoD Automated Biometric Identification System (ABIS) interoperability assessments, supporting DoD acquisition organizations, and providing subject matter expertise to DoD and non-DoD government stakeholders.

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

	FY 2016	FY 2017	FY 2018
Title: Development and Implementation of Biometric Technologies	1.407	1.250	0.659
Description: Development and Implementation of Biometric Technologies			
FY 2016 Accomplishments: FY2016 funding in the amount of \$1.407 million provided DFBA the ability to actively manage internal and external research efforts to ensure scientific merit, feasibility, and DFBA objectives and requirements are met. DFBA conducts biometric T&E activities, including standards conformance and Automated Biometric Identification System (ABIS) interoperability assessments, supporting DoD acquisition organizations, and providing subject matter expertise to DoD and non-DoD government stakeholders.			
FY 2017 Plans: FY2017 funding in the amount of \$1.250 million will provide DFBA the ability to actively manage internal and external research efforts to ensure scientific merit, feasibility, and DFBA objectives and requirements are met. DFBA conducts biometric T&E activities, including standards conformance and Automated Biometric Identification System (ABIS) interoperability assessments, supporting DoD acquisition organizations, and providing subject matter expertise to DoD and non-DoD government stakeholders.			
FY 2018 Plans:			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607665A / <i>Family of Biometrics</i>	Project (Number/Name) DU2 / <i>Management Agency</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
FY 2018 funding in the amount of \$.659 million will provide DFBA the ability to actively manage internal and external research efforts to ensure scientific merit, feasibility, and DFBA objectives and requirements are met. DFBA conducts biometric T&E activities, including standards conformance and DoD Automated Biometric Identification System (ABIS) interoperability assessments, supporting DoD acquisition organizations, and providing subject matter expertise to DoD and non-DoD government stakeholders.			
Accomplishments/Planned Programs Subtotals	1.407	1.250	0.659

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

N/A

Remarks

D. Acquisition Strategy

Support DoD Acquisition organizations in developmental testing, systems integration, and/or independent verification and validation of biometric systems.

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607865A / <i>Patriot Product Improvement</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	87.537	49.482	90.217	-	90.217	69.976	41.973	62.928	80.407	Continuing	Continuing
DV8: <i>Patriot Product Improvement</i>	-	87.537	49.482	90.217	-	90.217	69.976	41.973	62.928	80.407	Continuing	Continuing

Note

Beginning FY17, funding specific to LTAMD-C realigned to PE 0604114A, Lower Tier Missile Defense (LTAMD) Capability.

A. Mission Description and Budget Item Justification

PATRIOT is an advanced Surface-to-Air guided missile system with a high probability of kill, capable of operation in the presence of Electronic Countermeasures (ECM) and able to conduct multiple simultaneous engagements against high performance air breathing targets and ballistic missiles likely to be encountered by U.S. Forces. The PATRIOT Product Improvement Program provides for the upgrade of the PATRIOT System through individual materiel changes and upgrades to the PATRIOT system to address operational lessons learned, enhancements to joint force interoperability, and other system performance improvements to provide overmatch capability with the emerging threat.

The software funding provides improvements to the PATRIOT system against the evolving threat. This effort supports work with national agencies to evaluate, assess, and develop means to mitigate threat trends and specific threat developments potentially impacting system performance. Specific improvements may be developed and fielded under this task if warranted. The effort maintains the Mission Tailoring Database, responding to immediate tactical concerns. Database updates are fielded between major software upgrades as necessary.

Funding provides authority to identify, analyze, design and test materiel solutions to counter cybersecurity and electronic warfare shortcomings to all elements of the Patriot Air Defense Weapon System.

FY2018 base dollars in the amount of \$90.217 million continues Software Improvement for Threat Evolution, Upper Tier Debris Mitigation (UTDM), THAAD/PATRIOT Interoperability, Advanced Electronic Counter Measures (AECM), Anti-Radiation Missile (ARM) Asset Defense, Assured Positioning, Navigation and Timing (PNT), Combat ID enhancements, Tasks 2, 6, and 7 activities, and to reestablish Test Detachment. Initiates Tactical Telemetry Ground Station development and Radar Digital Processor (RDP) Waveform Suite in support of the PATRIOT Product Improvement Program (PIP). The FY2018 funding request was reduced by \$29.209 million to account for the availability of prior year execution balances.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607865A / <i>Patriot Product Improvement</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	89.816	49.482	119.426	-	119.426
Current President's Budget	87.537	49.482	90.217	-	90.217
Total Adjustments	-2.279	0.000	-29.209	-	-29.209
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-2.279	0.000	-29.209	-	-29.209

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0607865A / <i>Patriot Product Improvement</i>				Project (Number/Name) DV8 / <i>Patriot Product Improvement</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
DV8: <i>Patriot Product Improvement</i>	-	87.537	49.482	90.217	-	90.217	69.976	41.973	62.928	80.407	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning FY17, funding specific to LTAMD-C realigned to PE 0604114A, Lower Tier Missile Defense (LTAMD) Capability.

A. Mission Description and Budget Item Justification

Software Improvements for threat evolution: Performs necessary analysis and development efforts to maintain PATRIOT system effectiveness against evolving threat technologies and specific threat capabilities. This effort identifies evolving threats and threat characteristics that might present a challenge to PATRIOT's current capabilities and develops initial concepts to maintain system effectiveness relative to these threats.

Upper-Tier Debris Mitigation (UTDM): Implements algorithms to mitigate system impacts of debris from Upper Tier intercepts associated with operating in the Ballistic Missile Defense System (BMDS) environment. Debris from Upper Tier intercepts can cause significant radar loading effects and the potential for erroneous engagements and missile wastage on debris.

RDP Waveform Suite: Develops a comprehensive set of waveforms in the RDP to improve PATRIOT radar capabilities against current and evolving threats, including support to Task 6 and 7 efforts (see below), and implements advanced data collection enabled by the RDP to support further system improvements. The RDP implementation allows significant radar waveform improvements necessary to counter evolving threats.

THAAD/PATRIOT Interoperability: Implements improvements to THAAD/PATRIOT Interoperability and addresses Joint Defense Network deficiencies that impact Tactical Ballistic Missile battle management and force/engagement operations. Efforts will be concentrated on joint, collaborative force operations (defense design and planning) and enhanced Tactical Digital Information Link - Joint interoperability.

Advanced Electronic Counter Measures (AECM): This task investigates the implications of advanced technology Digital Radio Frequency Memory available on airborne platforms that enables new ECM techniques which could adversely affect Air and Missile Defense System effectiveness.

Task 2: Implements improved ground system and interceptor capabilities (PATRIOT Advanced Capability-2/Guidance Enhanced Missiles, PATRIOT Advanced Capability-3, and Missile Segment Enhancement) to counter emerging Tactical Ballistic Missile threats.

Task 6: Software improvements enhance discrimination of higher altitude Tactical Ballistic Missile Re-entry Vehicles (RVs) from associated objects to support the full engagement capabilities of the interceptor. Longer-range detection, track, and improved high-altitude discrimination are required to achieve the required lethality

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607865A / <i>Patriot Product Improvement</i>	Project (Number/Name) DV8 / <i>Patriot Product Improvement</i>
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performance against the RV and to mitigate missile wastage against separation debris. This task leverages the signal processing capabilities of the Radar Digital Processor, and supports the high altitude engagements required by the PATRIOT Advanced Capability-3 (PAC-3) and PAC-3 Missile Segment Enhancement missiles.

Task 7: Software improvements analyze existing and evolving Tactical Ballistic Missile countermeasures and their effects on PATRIOT system effectiveness. Develops concepts to address countermeasure effects and ensure the PATRIOT system maintains its effectiveness. Develops detailed system requirements to implement concepts; design/code/test software implementation leveraging Radar Digital Processor, Modernized Adjunct Processor, Enhanced Weapons Control Computer - Emulator and Flight Solution Computer-Redesign processing capabilities.

Assured Positioning, Navigation, and Timing (PNT): Efforts will develop and test the military's improved Global Position M-Code with Patriot Major End Items (MEI) integrating the improved anti-jamming and secure access of military GPS signals. This effort meets the requirement for Assured PNT through M-Code as mandated by FY2011 National Defense Act, public law 111-383 & 913.

Combat ID Enhancements: Develop and implement improvements to the Radar Digital Processor-Capability Combat ID capabilities and additional Non-Cooperative Target Recognition techniques to further mitigate misclassification and fratricide risk, and to provide the Warfighter with improved situational awareness.

Flat Panel Array Concept Development: This task provides studies for initial concepts and performance capabilities related to the implementation of an Active Electronically Scanned Array (AESA) transmitter/antenna into the PATRIOT radar. These assessments are needed to refine user community expectations and requirements, and to prepare a viable set of requirements to support a competitive modernization competition.

Anti-Radiation Missile (ARM) Asset Defense: Provides improved capability for PATRIOT to protect other Army and Joint Services Sensors from ARM attacks. Builds on an initial capability provided in Post-Deployment Build-7 by determining remaining gaps, identifying and evaluating alternatives, and implementing further improvements.

Tactical Telemetry Ground Station: Develops a ground-based telemetry receive station to be deployed with the tactical units and collect PAC-3 telemetry data for tactical engagements. This data will be used to assess missile and system effectiveness in tactical environments against real-world threats, and will support the development of operational improvements (Firing Doctrine and other system settings) and system software improvements to mitigate stressing threat behaviors.

U.S. Government and contractor support for PIP efforts.

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

	FY 2016	FY 2017	FY 2018
Title: PATRIOT Product Improvement	87.537	49.482	90.217
Description: Continuous Improvement to Counter the Evolving Threat.			
FY 2016 Accomplishments: -Continued Software Improvement for Threat Evolution and began efforts for Upper Tier Debris Mitigation (UTDM) and THAAD/PATRIOT Interoperability.			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607865A / <i>Patriot Product Improvement</i>	Project (Number/Name) DV8 / <i>Patriot Product Improvement</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
<ul style="list-style-type: none"> -Continued Combat ID enhancements and Tasks 2, 6, and 7 activities. -Continued Radar Digital Processor (RDP) integration into the PDB-8 system configuration to support the U.S. FY2017 fielding, to provide the field with additional capability and growth potential to counter emerging threats. -Continued Advanced Electronic Counter Measures (AECM) development and began Anti-Radiation Missile (ARM) Defense development. -Completed Flat Panel Array Concept Development -Completed RDP developmental efforts. -U.S. Government and contractor support to counter emerging threat. <p><i>FY 2017 Plans:</i></p> <ul style="list-style-type: none"> -Continues Software Improvement for Threat Evolution and efforts for Advanced Electronic Countermeasures (AECM). -Continues Combat ID Enhancements. -Continues Tasks 2, 6, and 7 activities. -U.S. Government and contractor support to counter emerging threat. -Initiate development activities associated with Positioning, Navigation, and Timing (PNT). <p><i>FY 2018 Plans:</i></p> <ul style="list-style-type: none"> -Continues Software Improvement for Threat Evolution, UTM, THAAD/PATRIOT Interoperability and AECM. -Begins Tactical Telemetry Ground Station development. -Continues Combat ID enhancements, Assured PNT and ARM Asset Defense development. -Continues Tasks 2, 6, and 7 activities. -Begins RDP Waveform Suite activities -U.S. Government and contractor support to counter emerging threat. 			
Accomplishments/Planned Programs Subtotals	87.537	49.482	90.217

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• C50700: <i>Patriot Mods (C50700)</i>	241.883	425.307	305.814	-	305.814	256.204	201.228	234.245	214.324	Continuing	Continuing

Remarks
The improvements/enhancements developed through the PATRIOT Product Improvement Program (PIP) are interrelated with the hardware kits that are procured and installed under the Missile Procurement, Army (MIPA) appropriation's PATRIOT Mods program and maximize the PAC-3 MSE capabilities.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607865A / Patriot Product Improvement	Project (Number/Name) DV8 / Patriot Product Improvement

D. Acquisition Strategy

The design objective of the PATRIOT system was to provide a baseline system capable of modification to cope with continuing threat evolution. This program minimizes technological risks and provides a means of enhancing system capability through planned upgrades of deployed systems. The PATRIOT Product Improvement Program upgrades the PATRIOT system to address operational lessons learned, enhancements to joint force interoperability and communications, and other system performance improvements to provide overmatch capability against the emerging threat. Upgrades are implemented through individual hardware and software materiel changes and fielded incrementally. This program encompasses several changes which will require the use of a variety of acquisition methods to develop, test, procure and field. Future software capabilities will be incorporated into future Post Deployment Build (PDB) releases.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity 2040 / 7				R-1 Program Element (Number/Name) PE 0607865A / Patriot Product Improvement				Project (Number/Name) DV8 / Patriot Product Improvement							
Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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	MIPR	RSA, AL : RSA, AL	1.900	1.721	Oct 2015	2.379	Oct 2016	5.177	Oct 2017	-		5.177	Continuing	Continuing	Continuing
U.S. Contracts	Various	Multiple : Multiple	2.161	1.600	Feb 2016	1.600	Feb 2017	1.600	Feb 2018	-		1.600	Continuing	Continuing	Continuing
Subtotal			4.061	3.321		3.979		6.777		-		6.777	-	-	-
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Improvement for Threat Evolution	Various	Multiple : Multiple	21.770	9.600	Jan 2016	8.442	Jan 2017	9.246	Jan 2018	-		9.246	Continuing	Continuing	0.000
Upper Tier Debris Mitigation (UTDM)	Various	Multiple : Multiple	0.000	1.000	Jan 2016	-		4.000	Jan 2018	-		4.000	Continuing	Continuing	0.000
Radar Digital Processor (RDP) Development	Various	Raytheon : Andover, Massachusetts	48.335	1.500	Jan 2016	-		-		-		-	0.000	49.835	0.000
RDP Waveform Suite	Various	Raytheon : Andover, Massachusetts	0.000	-		-		2.500	Jan 2018	-		2.500	Continuing	Continuing	0.000
THAAD PATRIOT Interoperability	Various	Raytheon : Andover, Massachusetts	1.200	2.000	Feb 2016	-		4.000	Feb 2018	-		4.000	Continuing	Continuing	0.000
Advanced Electronic Counter Measures (AECM)	Various	Multiple : Multiple	26.700	15.000	Jan 2016	9.000	Jan 2017	15.158	Jan 2018	-		15.158	Continuing	Continuing	0.000
Task 2 Non-Ballistic Tactical Ballistic Missile (TBM)	Various	Multiple : Multiple	10.700	14.000	Jan 2016	5.400	Feb 2017	8.000	Jan 2018	-		8.000	Continuing	Continuing	0.000
Task 6 Discrimination Improvements	Various	Multiple : Multiple	6.500	15.500	Feb 2016	6.000	Feb 2017	9.500	Feb 2018	-		9.500	Continuing	Continuing	0.000
Task 7 Tactical Ballistic Missile (TBM) Countermeasures	Various	Multiple : Multiple	1.000	12.000	Jan 2016	4.000	May 2017	10.700	Jan 2018	-		10.700	Continuing	Continuing	0.000
Assured PNT	Various	Multiple : Multiple	0.000	-		7.440	Jan 2017	3.600	Jan 2018	-		3.600	Continuing	Continuing	0.000
Combat ID Enhancements	Various	Multiple : Multiple	1.800	9.016	Feb 2016	4.621	May 2017	9.000	Feb 2018	-		9.000	Continuing	Continuing	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607865A / <i>Patriot Product Improvement</i>	Project (Number/Name) DV8 / <i>Patriot Product Improvement</i>
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Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Flat Panel Array Concept Development	Various	Multiple : Multiple	1.300	2.000	Jan 2016	-		-		-		-	0.000	3.300	0.000
Anti-Radiation Missile (ARM) Asset Defense	Various	Raytheon : Andover, Massachusetts	0.000	2.000	Feb 2016	-		3.000	Feb 2018	-		3.000	Continuing	Continuing	0.000
Tactical Telemetry Ground Station	Various	Multiple : Multiple	0.000	-		-		4.036	Jan 2018	-		4.036	Continuing	Continuing	0.000
Subtotal			119.305	83.616		44.903		82.740		-		82.740	-	-	0.000

Remarks
The contract method type Sole Source/Various is Fixed Price Level of Effort which includes Cost Plus Fixed Fee for material, ODC, and travel.

Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
RDEC and Other Govt Agencies	MIPR	RDEC and OGA'S : RSA, AL	3.312	0.600	Jan 2016	0.600	Jan 2017	0.700	Jan 2018	-		0.700	Continuing	Continuing	Continuing
Subtotal			3.312	0.600		0.600		0.700		-		0.700	-	-	-
Project Cost Totals			126.678	87.537		49.482		90.217		-		90.217	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607865A / <i>Patriot Product Improvement</i>	Project (Number/Name) DV8 / <i>Patriot Product Improvement</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
Software Build	Software Build																											
Advanced Electronic Counter Measures (AECM)	AECM																											
Software Improvement for Threat Evolution	Software Threat																											
Combat ID Enhancements	Combat ID Enhancements																											
(1) PDB 8 IOC									PDB-8 IOC																			
PDB 8 Fielding									PDB-8 Fielding																			
Task 2 Non-Ballistic Tactical Ballistic Missile (TBM)	Task 2 Non-Ballistic TBM																											
Task 6 Discrimination Improvements	Task 6 Discrimination Improvements																											
Task 7 Tactical Ballistic Missile (TBM) Countermeasures	Task 7 TBM Countermeasures																											
Assured PNT					Assured PNT																							
Radar Digital Processor Development	RDP Development																											
Lower Tier Air & Missile Defense-Capability (LTAMD-C) Concept Study	LTAMD-C Concept Study																											
Tactical Telemetry Ground Station									Tactical Telemetry Ground Station																			

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607865A / <i>Patriot Product Improvement</i>	Project (Number/Name) DV8 / <i>Patriot Product Improvement</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Software Build	4	2005	4	2022
Advanced Electronic Counter Measures (AECM)	1	2014	4	2022
Software Improvement for Threat Evolution	1	2014	4	2022
Combat ID Enhancements	1	2014	4	2022
PDB 8 IOC	2	2018	2	2018
PDB 8 Fielding	2	2018	4	2022
Task 2 Non-Ballistic Tactical Ballistic Missile (TBM)	1	2015	4	2022
Task 6 Discrimination Improvements	1	2014	4	2021
Task 7 Tactical Ballistic Missile (TBM) Countermeasures	1	2015	4	2022
Assured PNT	1	2017	4	2021
Radar Digital Processor Development	1	2012	3	2016
Lower Tier Air & Missile Defense-Capability (LTAMD-C) Concept Study	1	2014	4	2016
Tactical Telemetry Ground Station	2	2018	4	2022

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0202429A / <i>Aerostat Joint Project - COCOM Exercise</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	10.171	45.482	6.749	-	6.749	0.001	0.000	0.000	0.000	0.000	62.403
EP8: <i>COCOM Exercise</i>	-	10.171	45.482	6.749	-	6.749	0.001	0.000	0.000	0.000	0.000	62.403

A. Mission Description and Budget Item Justification

Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS) is a supporting program for Army and Joint Integrated Air and Missile Defense, providing elevated, persistent, over the horizon surveillance and fire control quality data on Army and Joint networks, enabling protection of the U.S. and coalition forces as well as critical geo political assets from Cruise Missiles, Aircraft, Unmanned Aerial Vehicles, Tactical Ballistic Missiles, Large Caliber Rockets, and Surface Moving Targets. A JLENS Orbit consists of two systems: a fire control radar system and a wide-area surveillance radar system. Each radar system consists of a separate 74-meter tethered aerostat, mobile mooring station, radar and communications payload, processing station, and associated ground support equipment. The systems are designed to work together, but can operate independently. The JLENS Orbit is transportable by road, rail, sea and air.

JLENS uses advanced sensor and networking technologies to provide persistent, 360-degree, wide-area surveillance and precision tracking of Land Attack Cruise Missiles and other types of Air Breathing Threats. This information is distributed via joint service networks and provides fire control quality data to Surface to Air missile systems, such as Army Patriot and Navy Aegis, increasing the weapons' capabilities by allowing systems to engage targets normally below, outside, or beyond surface based weapons' field of view. JLENS also provides fire control quality data to fighter aircraft, allowing the aircraft to engage hostile threats from extended ranges, and contributes to the development of a single integrated air picture.

JLENS prepared and participated in Operation Noble Eagle (ONE) with NORAD-USNORTHCOM National Capital Region (NCR) Integrated Air Defense System (IADS) Operational Exercise (OPEX) from FY14-FY16 as directed by the Joint Requirements Oversight Council Memorandum (JROCM) 021-13 signed by the Vice Chairman of the Joint Chiefs of Staff on 31 January 2013. The OPEX included an operational assessment to "inform a future decision for enduring operational employment", in accordance with Joint Requirements Oversight Council Memorandum (JROCM) 021-13. The Combatant Command (CCMD) objective for the OPEX was to provide the full range of JLENS Orbit level capability to include: Persistent Wide Area Surveillance (WAS) through Battle Command System Fixed (BCS-F) Integration Combat Identification (CID) / Electronic Identification (EID) Precision Cue to Fighters/Ground-Based Air Defense (GBAD) via Tactical Data Link (TDL) Integrated Fire Control to Fighters (IFC)/ GBAD via TDL.

JLENS ended OPEX participation in October 2015 with the direction to store the system in place.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0202429A / <i>Aerostat Joint Project - COCOM Exercise</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	10.565	45.482	6.746	-	6.746
Current President's Budget	10.171	45.482	6.749	-	6.749
Total Adjustments	-0.394	0.000	0.003	-	0.003
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.394	-			
• Adjustments to Budget Years	0.000	0.000	0.003	-	0.003

Change Summary Explanation

FY16 adjustments include .394 million dollar transfer in support of SBIR/STTR.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0202429A / Aerostat Joint Project - COCOM Exercise	Project (Number/Name) EP8 / COCOM Exercise
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EP8: COCOM Exercise	-	10.171	45.482	6.749	-	6.749	0.001	0.000	0.000	0.000	0.000	62.403
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS) is a supporting program for Army and Joint Integrated Air and Missile Defense, providing elevated, persistent, over the horizon surveillance and fire control quality data on Army and Joint networks, enabling protection of the U.S. and coalition forces as well as critical geo political assets from Cruise Missiles, Aircraft, Unmanned Aerial Vehicles, Tactical Ballistic Missiles, Large Caliber Rockets, and Surface Moving Targets. A JLENS Orbit consists of two systems: a fire control radar system and a wide-area surveillance radar system. Each radar system consists of a separate 74-meter tethered aerostat, mobile mooring station, radar and communications payload, processing station, and associated ground support equipment. The systems are designed to work together, but can operate independently. The JLENS Orbit is transportable by road, rail, sea and air.

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JLENS prepared for and participated in Operation Noble Eagle (ONE) with NORAD-USNORTHCOM National Capital Region (NCR) Integrated Air Defense System (IADS) Operational Exercise (OPEX) from FY14-FY16, as directed by the Joint Requirements Oversight Council Memorandum (JROCM) 021-13 signed by the Vice Chairman of the Joint Chiefs of Staff on 31 January 2013. JLENS participation in the OPEX was to allow for a combatant commander's operational assessment of JLENS capabilities to "inform a future decision for enduring operational employment".

Operational Control of JLENS for the OPEX was transferred to the NORAD/NORTHCOM Joint Air Defense Operations Center (JADOC) on 15 October 2015. Due to a tether break accident on 28 October 2015 and resulting loss of the Fire Control System aerostat and significant damage to the Radar and Mobile Mooring Station, the Commander NORAD/NORTHCOM suspended JLENS participation in the OPEX pending results of accident investigations and Failure Review Board recommendations. JLENS participation in the OPEX was terminated per an Under Secretary for Defense Policy decision memorandum dated 15 June 2016. In accordance with Army Acquisition Executive (AAE) direction, JLENS equipment supporting the OPEX was packed and stored at the APG sites effective 21 June 2016, pending higher headquarters decision on the future of the JLENS program.

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

	FY 2016	FY 2017	FY 2018
Title: JLENS Exercise	10.171	45.482	6.749

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0202429A / Aerostat Joint Project - COCOM Exercise	Project (Number/Name) EP8 / COCOM Exercise

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
<p>Description: Plan and execute JLENS participation in the NORAD-USNORTHCOM National Capital Region Integrated Air Defense System (IADS) OPEX.</p> <p>FY 2016 Accomplishments: Provided new equipment training, execution of operations of the JLENS Exercise program in support of North American Aerospace Defense Command (NORAD)/United States Northern Command (NORTHCOM) Operation Noble Eagle, and government program management support of the JLENS Exercise. Continued to support CCIA. Conducted failure review board to determine root cause analysis and corrective actions in response to an aerostat breakaway accident. Packed, stored and maintained Orbit 1 to be available if directed for re-participation for the Operational Exercise (OPEX) in FY17. Performed technical assessments, studies, cost reduction, risk reduction, and complete required program documentation to include necessary enhancements, as required, to address NCR specific requirements for JLENS, Information Assurance, Cyber Security, and System Trouble Reports. Provided for the continued support of all Orbits, to include maintaining components of a second JLENS Orbit in storage.</p> <p>FY 2017 Plans: Provides new equipment training, execution of operations of the JLENS Exercise program in support of North American Aerospace Defense Command (NORAD)/United States Northern Command (NORTHCOM) Operation Noble Eagle, and government program management support of the JLENS Exercise. Reconstitute the equipment damaged as a result of the breakaway accident and implement corrective actions, as required, based on Failure Review Board recommendations, to allow safe return to flight. Re-establish Orbit 1 from storage to Operational configuration to allow re-participation in the OPEC. Continue to support CCIA. Perform technical assessments, studies, cost reduction, risk reduction, and complete required program documentation to include necessary enhancements, as required, to address NCR specific requirements for JLENS, Information Assurance, Cyber Security, and System Trouble Reports. Provides for the continued support of all Orbits, to include maintaining components of a second JLENS Orbit in storage. Support to the Exercise will continue through completion of FY2017 including displacement of the system.</p> <p>FY 2018 Plans: Perform program shutdown activities to include disposition of assets and program office support.</p>			
Accomplishments/Planned Programs Subtotals	10.171	45.482	6.749

C. Other Program Funding Summary (\$ in Millions) N/A
Remarks

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0202429A / Aerostat Joint Project - COCOM Exercise	Project (Number/Name) EP8 / COCOM Exercise

D. Acquisition Strategy

JLENS prepared for and participated in Operation Noble Eagle (ONE) with NORAD-USNORTHCOM National Capital Region (NCR) Integrated Air Defense System (IADS) Operational Exercise (OPEX) from FY14-FY16, as directed by the Joint Requirements Oversight Council Memorandum (JROCM) 021-13 signed by the Vice Chairman of the Joint Chiefs of Staff on 31 January 2013. JLENS participation in the OPEX was to allow for a combatant commander's operational assessment of JLENS capabilities to "inform a future decision for enduring operational employment".

Operational Control of JLENS for the OPEX was transferred to the NORAD/NORTHCOM Joint Air Defense Operations Center (JADOC) on 15 October 2015. Due to a tether break accident on 28 October 2015 resulting in the loss of the Fire Control System aerostat, significant damage to the Radar and Mobile Mooring Station, the Commander NORAD/NORTHCOM suspended JLENS participation in the OPEX pending results from accident investigations and Failure Review Board recommendations. JLENS participation in the OPEX was terminated per an Under Secretary for Defense Policy decision memorandum dated 15 June 2016. In accordance with Army Acquisition Executive (AAE) direction, JLENS equipment supporting the OPEX was packed and stored at the APG sites effective 21 June 2016, pending higher headquarters decision on the future of the JLENS program. Courses of action under consideration are staging JLENS equipment in indefinite storage to meet potential future contingency requirements; and termination of the JLENS program with disposition/demilitarization of JLENS equipment.

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	30.669	30.455	33.520	-	33.520	29.558	10.431	8.000	6.692	Continuing	Continuing
EF6: JADOCS	-	10.787	2.825	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	13.612
EF7: Pocket-Sized Forward Entry Device (PFED) Inc 2	-	3.356	1.966	4.537	-	4.537	3.926	3.154	1.526	0.000	Continuing	Continuing
EF8: AFATDS Increment 1	-	16.526	25.664	28.983	-	28.983	25.632	7.277	6.474	6.692	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element provides development for fire support command and control systems used by all Services from platoon to echelons above Corps. There are two developmental efforts that are being executed concurrently FY18 and beyond: Pocket-sized Forward Entry Device (Increment II) (project code EF7) and Advanced Field Artillery Tactical Data System (AFATDS) (Increment I) (project code EF8). The development on the Joint Automated Deep Operations Coordination System (JADOCS) (project code EF6) will be completed in FY17.

Joint Automated Deep Operations Coordination System (JADOCS) is a Joint and Coalition targeting, coordination mission management software application. It links Command and Control (C2), Intelligence, and Air operations information with execution systems using real time collaborative targeting managers, customized for each service or specific functional area. JADOCS is used to significantly enhance the Joint Force and Component Command's capability to simultaneously develop, coordinate and execute Dynamic and Time Sensitive targets and fire missions, as well as battle space coordination worldwide. JADOCS provides coordination and de-confliction of targeting information at all levels of command structure for the military. JADOCS is used by Air, Ground, Maritime, and Special Operations forces. It provides horizontal (across Services) as well as vertical (within Services) coordination of missions to ensure a common picture of targeting operational status across the entire joint force. As a software application, JADOCS can be configured and customized for each user and location.

Pocket-sized Forward Entry Device (PFED) Increment II is a software application that operates on the Nett Warrior End User Device (EUD). It will provide the dismounted Forward Observer (FO) and Fire Support Teams (FISTs) the capability and functionality to accurately and rapidly locate ground targets and digitally process a Call For Fire. PFED Increment II answers the Mobile Handheld Computing Environment requirement that all handheld applications reside on the Nett Warrior EUD.

AFATDS 7.0 modernizes the existing AFATDS program currently in the field. AFATDS 7.0 enhances the existing AFATDS baseline by: (1) Providing a modernized web service based backend that will simplify long-term maintenance of the software, (2) Bringing AFATDS into full compliance with the Army's Common Operating Environment (COE) Command Post Computing Environment (CPCE) initiative and (3) Enhancing overall usability of the system through the implementation of a role-based capability architecture with embedded training that allows the AFATDS operator to receive on-the-spot training for any aspect of AFATDS via interactive instruction.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0203728A / <i>Joint Automated Deep Operation Coordination System (JADOCS)</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	35.719	30.455	37.442	-	37.442
Current President's Budget	30.669	30.455	33.520	-	33.520
Total Adjustments	-5.050	0.000	-3.922	-	-3.922
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-3.666	-			
• SBIR/STTR Transfer	-1.384	-			
• Adjustments to Budget Years	0.000	0.000	-3.922	-	-3.922

Change Summary Explanation

FY 2016 Base Funding in the amount of (1.384) million was transferred to support SBIR/STTR.
 FY 2016 Base Funding in the amount of (3.666) million was reprogrammed in support of higher Army priorities.

FY 2018 Base Funding reduced by (3.922) based on current execution of the program.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)	Project (Number/Name) EF6 / JADOCS
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EF6: JADOCS	-	10.787	2.825	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	13.612
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Joint Automated Deep Operations Coordination System (JADOCS) is a Joint and Coalition targeting, coordination mission management software application. It links Command and Control (C2), Intelligence, and Air operations information with execution systems using real time collaborative targeting managers, customized for each service or specific functional area. JADOCS is used to significantly enhance the Joint Force and Component Command's capability to simultaneously develop, coordinate and execute Dynamic and Time Sensitive targets and fire missions, as well as battle space coordination worldwide. JADOCS provides coordination and de-confliction of targeting information at all levels of command structure for the military.

JADOCS is used by Air, Ground, Maritime, and Special Operations forces. It provides horizontal (across Services) as well as vertical (within Services) coordination of missions to ensure a common picture of targeting operational status across the entire joint force. As a software application, JADOCS can be configured and customized for each user and location.

JADOCS fires and targeting capabilities will migrate to AFATDS v 7.1. JADOCS v2.0 will be sustained throughout the force until AFATDS 7.1 is fielded and satisfies the requirement for JADOCS fires and targeting functionality. JADOCS v 2.0 software is being developed by CECOM Life Cycle Management Command, Software Engineering Center (SEC).

There is no FY18 RDTE funding request.

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

	FY 2016	FY 2017	FY 2018
<p>Title: JADOCS Software Development Efforts</p> <p>Description: Software development of JADOCS v2.0 software.</p> <p>FY 2016 Accomplishments: Continue development of JADOCS v2.0 software. Complete software Engineering Release (ER) 2 and ER 3. Test each ER to meet all JADOCS 2.0 requirements. JADOCS 2.0 completes development in the fourth quarter FY16.</p> <p>FY 2017 Plans: Finalize JADOCS v2.0 software development including the Test Readiness Review (TRR), Formal Qualification Test (FQT) and delivery of JADOCS 2.0 software. Finalize and deliver JADOCS 2.0 documentation and training materials.</p>	9.687	1.329	-
<p>Title: Program Management Support Costs for JADOCS</p>	0.700	0.596	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)	Project (Number/Name) EF6 / JADOCS

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
<p>Description: Program support for JADOCS v2.0 software development efforts.</p> <p>FY 2016 Accomplishments: Continue program support for JADOCS version 2.0 software development.</p> <p>FY 2017 Plans: Continue program support for JADOCS version 2.0 through test and materiel release of the software. Finalize and deliver JADOCS 2.0 documentation and training materials.</p>			
<p>Title: Army and Joint Testing Activities</p> <p>Description: Conduct and support Army and Joint Testing Activities.</p> <p>FY 2016 Accomplishments: Continue support of Army and Joint testing activities; conduct Independent Verification and Validation (IV&V) of the JADOCS version 2.0 software.</p> <p>FY 2017 Plans: Continue support of Army and Joint test planning activities; conduct IV&V of the JADOCS version 2.0 software. Finalize JADOCS v2.0 software development including Army Confidence Demo at Fort Sill, Ok, Joint development and operational test and Army Interoperability Certification (AIC) testing.</p>	0.400	0.900	-
Accomplishments/Planned Programs Subtotals	10.787	2.825	-

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018	FY 2018	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Cost To	Total Cost
			Base	OCO	Total					Complete	
• B28504: JOINT AUTOMATED DEEP OPNS COORDINATION SYSTEM	-	1.969	1.722	-	1.722	-	-	-	-	0.000	3.691

Remarks

D. Acquisition Strategy
JADOCS v2.0 will be the last major version of JADOCS software. JADOCS v2.0 will interoperate with AFATDS. JADOCS v 2.0 will be maintained and sustained until the Joint Users requirements are met by AFATDS and other systems. JADOCS 2.0 is developed under agreement with the LCMC SEC.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)	Project (Number/Name) EF6 / JADOCS

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)				Project (Number/Name) EF7 / Pocket-Sized Forward Entry Device (PFED) Inc 2			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EF7: Pocket-Sized Forward Entry Device (PFED) Inc 2	-	3.356	1.966	4.537	-	4.537	3.926	3.154	1.526	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Pocket-sized Forward Entry Device (PFED) Increment II is a software application that operates on the Nett Warrior End User Device (EUD). It will provide the dismounted Forward Observer (FO) and Fire Support Teams (FISTs) the capability and functionality to accurately and rapidly locate ground targets and digitally process a Call For Fire. PFED Increment II answers the Mobile Handheld Computing Environment requirement that all handheld applications reside on the Nett Warrior EUD.

FY18 funding of \$4.537million supports the evolutionary software development and testing of PFED Increment II and transition to the mounted computing environment.

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

	FY 2016	FY 2017	FY 2018
<p>Title: Program Management Support Costs for PFED Increment II</p> <p>Description: Program support for PFED INC II software development efforts.</p> <p>FY 2016 Accomplishments: Provided program support for PFED INC II software development.</p> <p>FY 2017 Plans: Continue program support for PFED INC II software development.</p> <p>FY 2018 Plans: Provide Program Management Office (PMO) support (Core, Matrix, and SETA) for all aspects of the PFED Inc II program including requirements development, software development efforts, logistics, and business management support.</p>	0.600	0.267	0.662
<p>Title: PFED INC II Software Development</p> <p>Description: PFED INC II Software Development</p> <p>FY 2016 Accomplishments: Continued software development for the Block 1 capability. Conducted developmental test events, and Independent Verification and Validation testing.</p> <p>FY 2017 Plans:</p>	2.496	1.453	3.525

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)	Project (Number/Name) EF7 / Pocket-Sized Forward Entry Device (PFED) Inc 2
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Complete software development for the Block 1 capability. Conduct a Full Deployment Decision in order to obtain a Full Materiel Release of the Block 1 capability. Develop the performance specification for Block 2 capabilities based on validated requirements. Begin development of Block 2 capability. FY 2018 Plans: Development and testing of Block 2 capabilities. Complete hardware/software integration with Nett Warrior EUD and MFOCS. Complete software Information Assurance certification.			
Title: Testing Description: Conduct and Support Army Testing Activities FY 2016 Accomplishments: Performed Developmental Testing of the Block 1 capability. FY 2017 Plans: Complete Operational Testing and Evaluation of the Block 1.0 capability. Begin test planning for Block 2 capabilities. FY 2018 Plans: Prepare and execute Engineering Release Evaluation/Testing.	0.260	0.246	0.350
Accomplishments/Planned Programs Subtotals	3.356	1.966	4.537

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• BZ9851: BZ9851 POCKET FORWARD ENTRY DEVICE (PFED) - OPA	1.190	4.093	4.213	-	4.213	3.486	3.772	3.849	5.921	Continuing	Continuing

Remarks

D. Acquisition Strategy
On 18 May 2015, the Milestone Decision Authority (PEO C3T) signed the Acquisition Decision Memorandum (ADM) approving the PFED Increment II Milestone B. The Acquisition Decision Memorandum (ADM) officially approved entry into the Development phase as an Acquisition Category (ACAT) III program.

PFED Increment II leverages an Army Science and Technology investment by transitioning a software application that has been developed and used in proponent experimentation events (e.g. Army Expeditionary Warrior Experiment (AEWE) and Bold Quest). Upon a successful Milestone B decision in FY2015, this software

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army Date: May 2017

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
2040 / 7	PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)	EF7 / Pocket-Sized Forward Entry Device (PFED) Inc 2

application transitioned to PM Mission Command to conduct all Army developmental and operational test and evaluation requirements. PFED Increment II will be integrated onto the Nett Warrior End User Devices (EUDs) and will be fielded by PM Soldier Warrior (PM SWAR). Training on the PFED Increment II software will be conducted by PM Mission Command as units are fielded the capability.

PM Mission Command will continue to manage future capability blocks of software development. PM Mission Command will continue to coordinate with PM Soldier Warrior to field and train future versions of the software, as described above.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)	Project (Number/Name) EF8 / AFATDS Increment 1
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EF8: AFATDS Increment 1	-	16.526	25.664	28.983	-	28.983	25.632	7.277	6.474	6.692	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Advanced Field Artillery Tactical Data System (AFATDS) 7.0 modernizes the existing AFATDS software currently in the field. AFATDS 7.0 enhances the existing AFATDS baseline by: (1) Providing a modernized web service based backend that will simplify long-term maintenance of the software, (2) Bringing AFATDS into full compliance with the Army's Common Operating Environment (COE) Command Post Computing Environment (CPCE) initiative and (3) Enhancing overall usability of the system through the implementation of a role-based capability architecture with embedded training that allows the AFATDS operator to receive on-the-spot training for any aspect of AFATDS via interactive instruction.

FY18 funding in the amount of \$28.983 million will be used to continue development efforts on AFATDS version 7.0.

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

	FY 2016	FY 2017	FY 2018
<p>Title: Program Management Costs for AFATDS software development</p> <p>Description: Provide program support for AFATDS software development efforts.</p> <p>FY 2016 Accomplishments: Provided matrix support and Program Management Office (PMO) efforts. Continued development and testing of V6.8.1.1. Conducted Risk Reduction Analysis, Solution Refinement, Requirements Development and Request for Proposal (RFP) Evaluation of V7.0 contract.</p> <p>FY 2017 Plans: Provides Program Management Office (PMO) support (Core, Matrix, and SETA) for all aspects of the AFATDS program including requirements development, software development efforts, logistics, and business management support.</p> <p>FY 2018 Plans: Provide Program Management Office (PMO) support (Core, Matrix, and SETA) for all aspect of the AFATDS program including requirements analysis, software development efforts, logistics, and business management support.</p>	4.140	2.350	2.560
<p>Title: AFATDS software development efforts</p> <p>Description: Development of AFATDS software - including V6.8.1.1 and V7.0</p> <p>FY 2016 Accomplishments: Completed of AFATDS V6.8.1.1 development.</p>	12.036	21.791	26.423

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)	Project (Number/Name) EF8 / AFATDS Increment 1		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>Initiated AFATDS V6.8.1.1 P1 development. Version V6.8.1.1 P1 implements Army Tactical Missile System and the DoD mandated Windows 10 upgrade.</p> <p>Completed the Request for Proposal (RFP) evaluation for AFATDS V7.0. V7.0 will focus on architecture modernization to provide role/duty-based functionality for Fire Support, Fire Control, and Fire Direction Capabilities, support for net-centric operations, web-enabled network interoperability, execution of Joint critical operational activities, embedded training, and exploitation of Army Common Operating Environment (COE) Computing Environment.</p> <p>FY 2017 Plans: Complete development of AFATDS V6.8.1.1 P1. Initiate the development of AFATDS V6.8.1.1 P2. Version V6.8.1.1 P2 support AFATDS fires requirements during the initial AFATDS V7.0 development period. V6.8.1.1 P2 provides USMC and Army requirements. Initiate the development on V7.0. V7.0 will focus on architecture modernization to provide role/duty-based functionality for Fire Support, Fire Control, and Fire Direction Capabilities, support for net-centric operations, web-enabled network interoperability, execution of Joint critical operational activities, embedded training, and exploitation of Army Common Operating Environment (COE) Computing Environment.</p> <p>FY 2018 Plans: Continue the development of AFATDS V6.8.1.1 P2. While FY17 development will focus on AFATDS application back end modernization, FY 18 Development will include building fire support, fire control and fire direction role based capabilities, integrating available CP CE v3 common components, and updating the user interface for the application.</p>				
<p>Title: Defensive Cyber Tools</p> <p>Description: Integration of Tactical Public Key Infrastructure (T-PKI) defensive cyber tools into AFATDS v7.0</p> <p>FY 2017 Plans: Engineer and integrate the software architecture and system design of Tactical Public Key Infrastructure (T-PKI) defensive cyber tools into AFATDS v7.0.</p>		-	1.100	-
<p>Title: Operational and Developmental Testing</p> <p>Description: Conduct and support test activities for AFATDS development.</p> <p>FY 2016 Accomplishments: Awaiting contract award to initiate Testing efforts.</p> <p>FY 2017 Plans:</p>		0.350	0.423	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)	Project (Number/Name) EF8 / AFATDS Increment 1

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Complete AFATDS V6.8.1.1 P1 testing. AFATDS Version 7.0, prepare for: Army Interoperability Certification (AIC); Development Testing (DT); and Army Warfighting Assessment (AWA).			
Accomplishments/Planned Programs Subtotals	16.526	25.664	28.983

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• B28620: MOD OF IN-SVC EQUIP, AFATDS	0.048	2.598	2.765	-	2.765	11.250	18.857	12.387	2.700	0.000	50.605

Remarks

D. Acquisition Strategy

On 13 May 2015, the Army Acquisition Executive (AAE) determined that a modernization of the existing AFATDS software code is required to comply with Army Common Operating Environment (COE) standards to be executed as AFATDS 7.0. In V7.0, the PM will re-design AFATDS to provide the operator role/duty-based interaction, a dynamic embedded training capability, integration of COE compliant architectures and allowance for more efficient insertion of future capabilities.

Development of future AFATDS capabilities will be considered based on requirements approved through the Fires Center of Excellence (FCoE) Tactical Software Requirements Governance Board.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)	Project (Number/Name) EF8 / AFATDS Increment 1
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Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 AFATDS (Core)	Sub Allot	PM Mission Command (MC) : APG, MD	1.247	1.244		0.707		0.810		-		0.810	0.000	4.008	0.000
Program Management Support for AFATDS (Matrix)	IA	Various Matrix Orgs (Govt) : Aberdeen PG, MD	0.000	0.890		0.900		1.010		-		1.010	0.000	2.800	0.000
Program Management Support for AFATDS (SETA Contr)	C/FFP	CRSA : Aberdeen PG, MD	0.000	0.500		0.743		0.540		-		0.540	0.000	1.783	0.000
Program Management Support for AFATDS (FFRDC)	FFRDC	MITRE : APG, MD	0.000	-		-		0.200		-		0.200	0.000	0.200	0.000
Subtotal			1.247	2.634		2.350		2.560		-		2.560	0.000	8.791	0.000

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Development of AFATDS Version 6.8.1.1	C/CPFF	Raytheon Systems Corp. : Ft. Wayne, IN	12.600	9.036		-		-		-		-	0.000	21.636	33.188
Software Development of AFATDS Version 7.0	C/CPFF	TBD : TBD	0.000	3.000	Dec 2016	20.791	Dec 2016	26.423		-		26.423	0.000	50.214	0.000
Subtotal			12.600	12.036		20.791		26.423		-		26.423	0.000	71.850	33.188

Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Information Assurance and Engineering Support for AFATDS requirements	C/CPFF	CSC : Various Locations	1.060	-		-		-		-		-	0.000	1.060	0

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)	Project (Number/Name) EF8 / AFATDS Increment 1
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Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Defensive Cyber Tools (T-PKI)	TBD	TBD : TBD	0.000	-		1.100		-		-		-	0	1.100	0
Risk Reduction Analysis, Solution Refinement, Requirements Development, RFP Development.	IA	US Army Operational Test Command : Ft Hood, Tx	0.000	1.506		-		-		-		-	0	1.506	0
Subtotal			1.060	1.506		1.100		-		-		-	0.000	3.666	0.000

Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Confidence Demo for AFATDS V6.8.x requirements.	IA	Army Test & Evaluation Command (ATEC)/Fires Test Directorate (FTD) : Various Locations	0.626	-		-		-		-		-	0	0.626	0
Independent Verification and Validation of AFATDS V7.0 requirements	C/CPFF	Engility : Various Locations	0.515	-		1.023		-		-		-	0	1.538	0
Developmental Testing for AFATDS v7.0	IA	Multiple Govt Test Agencies (ATEC, ATC, EPG) : Multiple	0.000	0.350		0.400		-		-		-	0	0.750	0
Subtotal			1.141	0.350		1.423		-		-		-	0.000	2.914	0.000

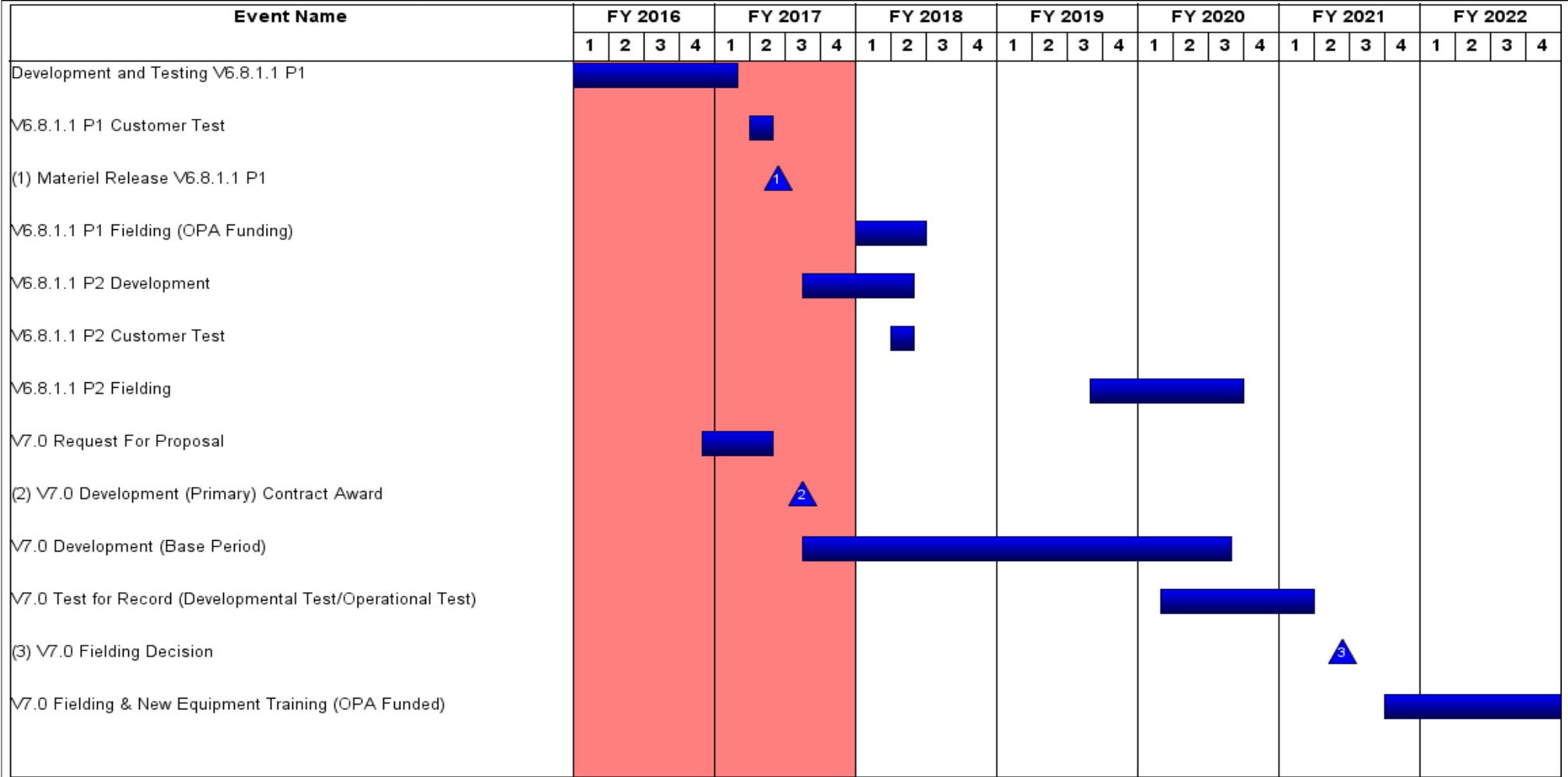
	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		16.048	16.526	25.664	28.983	-	28.983	0.000	87.221	33.188

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)	Project (Number/Name) EF8 / AFATDS Increment 1
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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)	Project (Number/Name) EF8 / AFATDS Increment 1
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
(1) V7.0.X Development (Option) Contract Option																	▲											
V7.0.X Development (Option Period)																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203728A / Joint Automated Deep Operation Coordination System (JADOCS)	Project (Number/Name) EF8 / AFATDS Increment 1

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Development and Testing V6.8.1.1 P1	3	2014	1	2017
V6.8.1.1 P1 Customer Test	2	2017	2	2017
Material Release V6.8.1.1 P1	2	2017	2	2017
V6.8.1.1 P1 Fielding (OPA Funding)	1	2018	2	2018
V6.8.1.1 P2 Development	3	2017	2	2018
V6.8.1.1 P2 Customer Test	2	2018	2	2018
V6.8.1.1 P2 Fielding	3	2019	3	2020
V7.0 Request For Proposal	4	2016	2	2017
V7.0 Development (Primary) Contract Award	3	2017	3	2017
V7.0 Development (Base Period)	3	2017	3	2020
V7.0 Test for Record (Developmental Test/Operational Test)	1	2020	1	2021
V7.0 Fielding Decision	2	2021	2	2021
V7.0 Fielding & New Equipment Training (OPA Funded)	4	2021	2	2023
V7.0.X Development (Option) Contract Option	3	2020	3	2020
V7.0.X Development (Option Period)	3	2020	3	2022

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0203735A / Combat Vehicle Improvement Programs
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	382.176	327.357	343.175	-	343.175	422.303	336.976	301.993	265.989	Continuing	Continuing
280: Recov Veh Improv Prog	-	0.000	0.000	5.000	-	5.000	15.000	16.900	97.300	100.393	Continuing	Continuing
330: Abrams Tank Improve Prog	-	73.768	88.452	108.570	-	108.570	159.380	108.000	68.000	59.939	Continuing	Continuing
371: Bradley Improve Prog	-	91.752	102.382	130.863	-	130.863	179.400	149.000	87.500	81.889	Continuing	Continuing
431: M113 IMPROVEMENTS	-	0.000	0.000	15.000	-	15.000	8.000	5.000	0.000	0.000	0.000	28.000
EE2: Stryker Improvement	-	215.136	136.523	80.642	-	80.642	60.523	58.076	49.193	23.768	Continuing	Continuing
FD8: Light Armored Vehicle Improvement	-	1.520	0.000	3.100	-	3.100	0.000	0.000	0.000	0.000	0.000	4.620

Note
 PE Number 0203735A/Project EE2 funds the development of Stryker Engineering Change Proposal (ECP) 1, Stryker Operational Needs Statement (ONS) Lethality, Stryker ECP 2 Lethality suite, and Stryker Survivability Enhancements.
 PE Number 0203735A/Project FD8 funds the development of LAV25 enhancements. The Recovery Vehicle Improvement program (280) is a new start effort. The M113 Improvements program (431) is a new start effort.

A. Mission Description and Budget Item Justification
 This Program Element (PE) corrects vehicle deficiencies identified during Army operations; continues technical system upgrades to include the integration of applicable technologies on ground systems; addresses needed evolutionary enhancements to tracked combat vehicles; and develops technology improvements which have application to or insertion opportunities across multiple Ground Combat Systems vehicles. This PE provides combat effectiveness and Operating and Support (O&S) cost reduction enhancements for the Abrams tanks, Bradley Fighting Vehicles and Stryker Family of Vehicles (FOVs) through a series of product improvements.

The strategy for Abrams and Bradley will focus on incrementally delivering capability to the warfighter to meet both near-term limitations as well as mitigating gaps and maintaining combat overmatch in the future. This effort was approved by the Army Acquisition Executive in 3Q FY 2011.

The Abrams M1A2 SEP V2 and M2/M3A3 Bradley Fighting Vehicles are at or exceed Space, Weight, and Power-Cooling (SWaP-C) limitations. In order to host and restore lost platform capability, the Abrams Tank and Bradley Fighting Vehicle programs will execute a series of Engineering Change Proposals (ECPs) to support the current embedded systems and to facilitate integration of technologies currently in development under other existing Programs of Record. The ECPs are not intended to exceed the operational capability outlined in current system requirements documents, but rather to ensure that the existing system performance is not further degraded and that Army mission equipment packages can be integrated on the Abrams and Bradley Platforms.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	
<p>Stryker Improvement will address the development of Lethality, Survivability, Mobility, and Communication, Command and Control (C3) improvements within the Stryker Family of Vehicles (FoV). Principal development efforts include upgrades associated with the ECP 1, Operational Needs Statement Lethality (ONS), Stryker Survivability Enhancements, and ECP 2 efforts. ECP 1 power generation, suspension, and network upgrades will both restore Stryker Double-V Hull (DVH) Space, Weight, and Power-Cooling (SWaP-C) lost as a result of incorporating vehicle changes to counter threats encountered during deployment operations while allowing the future network to be hosted without further degradation in vehicle protection and mobility. The Stryker ONS Lethality effort will address an Urgent Operational Need to increase the firepower of Stryker Infantry Carrier Vehicles (ICV) within the US Army European Command (USAREUR). The ONS Lethality effort will integrate a 30mm-equipped weapon station that will provide USAREUR with precision direct firepower to overwhelm the enemy in encounter actions and suppressive fire to preserve mounted and dismounted freedom of movement. The Stryker Survivability Enhancement will address evolving threats by assessing survivability improvements, to include passive protection systems, active protection systems, and an under-armor fire capability for Stryker-equipped reconnaissance troops. The ECP 2 effort will focus on the integration a suite of complementary lethality upgrades (medium caliber weapon, under armor Javelin, common masted sensor, improved target acquisition optics, and other capabilities) that will improve the suppressive fire and armored vehicle engagement capabilities across the Army's Stryker Brigade Combat Teams (SBCTs).</p> <p>Light Armored Vehicle improvement program will design, test and modify two Light Armored Vehicles (LAV-25A2s) for Low Velocity Air Drop (LVAD) to inform operational concepts for Infantry Brigade Combat Teams (IBCT) in support of Global Response Force early entry operations. This will directly support the expeditionary maneuver excursion that will be conducted by the XVIII Airborne Corps in FY17-18.</p> <p>M113 improvements will develop an affordable solution for upgrading the M113s to enhance protection, survivability, mobility and power generation to support the current and future network systems. This will provide the necessary enhancements to the M113 capability for Echelons Above Brigade (EAB) units with priority to the forward deployed units and equipment sets. The Armored Multi Purpose Vehicle (AMPV) program will replace all M113 family of vehicles in Armored Brigade Combat Teams (ABCT).</p> <p>The Recovery Vehicle Improvement program is a group of ECPs that will allow the current recovery vehicle to regain Single Vehicle Recovery for the heaviest tracked combat vehicle. The current M88A2 is not capable of single vehicle recovery of the M1A2 SEPv2 in all situations and the M1A2 SEPv3 fielding in FY20 will further exacerbate the recovery problem.</p>		

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0203735A / Combat Vehicle Improvement Programs
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	354.667	316.857	249.464	-	249.464
Current President's Budget	382.176	327.357	343.175	-	343.175
Total Adjustments	27.509	10.500	93.711	-	93.711
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.760	-			
• SBIR/STTR Transfer	26.749	-			
• Adjustments to Budget Years	0.000	0.000	93.711	-	93.711
• Amended 2017	0.000	10.500	0.000	-	0.000

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: EE2: Stryker Improvement

- Congressional Add: Stryker Operational Needs Statement Lethality Development (Engineering/Prototypes) Congressional Add
- Congressional Add: Stryker Operational Needs Statement Lethality Testing Congressional Add
- Congressional Add: Stryker Operational Needs Statement Lethality Contractor Support to Test Congressional Add
- Congressional Add: Stryker Operational Needs Statement Lethality Government Engineering and Project Management Congressional Add

Congressional Add Subtotals for Project: EE2

Congressional Add Totals for all Projects

	FY 2016	FY 2017
Congressional Add: Stryker Operational Needs Statement Lethality Development (Engineering/Prototypes) Congressional Add	70.146	-
Congressional Add: Stryker Operational Needs Statement Lethality Testing Congressional Add	6.410	-
Congressional Add: Stryker Operational Needs Statement Lethality Contractor Support to Test Congressional Add	16.456	-
Congressional Add: Stryker Operational Needs Statement Lethality Government Engineering and Project Management Congressional Add	4.488	-
Congressional Add Subtotals for Project: EE2	97.500	-
Congressional Add Totals for all Projects	97.500	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 280 / <i>Recov Veh Improv Prog</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
280: <i>Recov Veh Improv Prog</i>	-	0.000	0.000	5.000	-	5.000	15.000	16.900	97.300	100.393	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The Recovery Vehicle Improvement program is a new start effort.

A. Mission Description and Budget Item Justification

The M88A2 Heavy Equipment Recovery Combat Utility Lift and Evacuation System (HERCULES), a designated ACAT IC program since 15 Jun 2016, has been providing towing, winching, and hoisting operations to support battlefield recovery operations and evacuation of heavy tanks and other tracked combat vehicles since its production and deployment in 1998. The HERCULES recovers tanks mired to different depths, removes M1 Abrams turrets and power packs, and uprights overturned heavy combat vehicles. The HERCULES provides Single Vehicle Recovery of the 70 Ton Abrams tank.

The 1998 Operational Requirements Document (ORD) required Single Vehicle Recovery (SVR) of a 70T Main Battle Tank. The Abrams SEPv2 CURRENTLY exceeds the 70T ORD requirement and the M88A2 is unable to safely perform SVR of MBT in all conditions. SEPv3 further exacerbates the problem. Current doctrine requires a holdback vehicle for loads > 70T and the M88A2 multi-vehicle towing is not resourced or trained. The approved CPD as of 10 Jan 2017, requires the Improved M88A2 (M88A2E1) to enable "Single Vehicle Recovery of the heaviest tracked combat vehicle."

Technical assessments and analyses will be used to clarify the capability gap (Single Vehicle Recovery), evaluate design solution concepts, and inform key program decision points. The goal of the assessments will be to provide confidence to Army Leadership that a M88A2E1 solution is affordable, achievable, and technologically feasible with manageable risk. Limited analyses, conducted to date, suggests that upgrades to the M88A2 track, suspension, transmission, hydraulics and potentially powertrain are required.

FY 2018 Base dollars in the amount of \$5 million will be used to support M88A2 baseline testing and conduct sub-system trade analyses. FY 2018 Base dollars will also be used for Program Management Support and Contractor and Government Systems Engineering for labor and travel to effectively manage the program.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Program Management (PMO) Support	-	-	2.000	-	2.000
Description: Program Management Office Support includes Systems Engineering, Government and Contractor salaries, travel and other support costs required to effectively manage the program.					
FY 2018 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 280 / <i>Recov Veh Improv Prog</i>
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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
The United States Government (USG) will conduct a Request for Proposal (RFP) to meet track requirements, down-select track options and will conduct both the sub-system trade and Cost Benefit Analyses (CBA). The CBA will determine a path forward. Program Management Office (PMO) also support System Engineering (SE) and conducting System Level Analysis of Alternatives (AoA) with TRADOC Analysis Center (TRAC) in FY 2018. The PMO and SE support will include labor, travel and other support costs to effectively manage the program.					
Title: Test and Evaluation Description: Concept and Evaluation activities include contractor and government testing, as well as test documentation development. Contractor prove-out testing will be conducted using U.S. Army test facilities. Evaluation activities also include the testing of other platform inbound technologies, along with the development of test documentation to include Test and Evaluation Master Plans, test procedures and reports. FY 2018 Base Plans: USG will conduct system/sub-system tests on engine, suspension, rear-lift, etc. The concept, demonstration and evaluation events will occur at various government sites (Army Test and Evaluation Command (ATEC), Aberdeen Proving Ground (APG), Yuma Proving Grounds (YPG) and TARDEC). Contractor will conduct sub-system trades, technical evaluations, requirements development, test support, deliverables, support TRADOC Analysis Center (TRAC) AoA, and powertrain upgrades as a result of caterpillar engine integration.	-	-	3.000	-	3.000
Accomplishments/Planned Programs Subtotals	-	-	5.000	-	5.000

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

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• GA0570: <i>Improved Recovery Vehicle (M88A2 HERCULES)</i>	187.129	226.963	72.402	-	72.402	-	-	-	-	0	486.494
• G80571: <i>M88 FOV MODS</i>	14.878	8.685	4.826	-	4.826	4.558	-	-	-	0	32.947

Remarks

D. Acquisition Strategy

The M88A2 ECP1 Program Strategy is designed to address the loss of Single Vehicle Recovery (SVR) capability for systems in excess of 70 Tons including all variants of the Abrams Main Battle Tank (MBT). An Acquisition Strategy is being developed for this effort.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 280 / <i>Recov Veh Improv Prog</i>

<u>E. Performance Metrics</u> N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>				Project (Number/Name) 330 / <i>Abrams Tank Improve Prog</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
330: <i>Abrams Tank Improve Prog</i>	-	73.768	88.452	108.570	-	108.570	159.380	108.000	68.000	59.939	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Army has approved Engineering Change Proposals (ECPs) for the Abrams Main Battle Tank to restore lost capability, host inbound technologies, and to meet objective performance requirements called out in approved platform requirements documents. The strategy for Abrams will focus on incrementally delivering capability to the warfighter to meet both near-term limitations as well as mitigating gaps and maintaining combat overmatch in the future. This approach was approved by the Army Acquisition Executive in 3Q FY2011.

The Abrams vehicle is at or exceeds Space, Weight, and Power-Cooling (SWaP-C) limitations. In order to restore lost platform capability, the Abrams Tank will execute a series of ECPs to support the current embedded systems and to facilitate integration of technologies currently in development. The ECPs are not intended to exceed the operational capability outlined in current system requirements documents, but rather to ensure that the existing system performance is not further degraded and that Army mission equipment packages can be integrated on the Abrams. The ECPs will incorporate lost power generation and distribution technologies, force protection and survivability improvements to counter evolving threats to include, but not limited to Active Protection Systems, technologies to mitigate obsolescence issues, in-bound technologies under development, and technologies to decrease the overall weight of the tank.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Abrams Power Engineering Change Proposal (ECP) 1A	25.000	8.886	7.998	-	7.998
Description: The improvements implemented through the Abrams Power ECP 1A program will restore lost power generation and distribution, mitigate impending obsolescence, and incorporate inbound technologies currently under development.					
FY 2016 Accomplishments: A The ECP 1a program completed a System Verification Review (SVR) and Production Readiness Review (PRR). The program also approved an ECP 1a Technical Data Package (TDP). The United States Government (USG) continued Production Prove-Out Test (PPT) throughout FY16 and completed root cause and corrective actions for failures found during testing. The ECP 1A team integrated mine blast improvements, updated the Portable Maintenance Device (PMD), updated the Recording and Simulation Unit (RSU), and Joint Chemical Agent Detector (JCAD) hardware, along with the software required to run these devices. The logistics team					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 330 / <i>Abrams Tank Improve Prog</i>			
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
continued to develop the technical manuals and field support equipment. The team also started cyber security testing of the Commander's Display Unit (CDU). FY 2017 Plans: Engineering will integrate mine blast survivability improvements, support Cross Domain Solution (CDS) testing, update system software, and complete Root Cause & Corrective Action (RCCA) on test failures. Three prototype vehicles will be updated for live fire testing. Production Prove-Out Testing (PPT) will continue throughout FY2017. Logistics products will continue to be developed throughout FY2017. FY 2018 Base Plans: The USG will complete Production Prove-Out Test (PPT) and Live Fire Test and Evaluation (LFT&E). The USG will begin Production Qualification Testing (PQT) and preparations for Follow-on Operational Test and Evaluation (FOT&E). The team will continue to complete root cause and corrective actions (hardware and software) for failures found during testing. Logistics will complete technical manual development and begin conducting the logistics demonstration.					
Title: Training Device Updates Description: Development and design of training device upgrades to reflect upgrades to the vehicle. FY 2018 Base Plans: Development, design, test, and evaluation activities of training device upgrade kits.	-	-	3.300	-	3.300
Title: Abrams Lethality Engineering Change Proposal (ECP) 1B (formerly ECP 2) Description: The Abrams Lethality ECP 1B (formerly Lethality ECP 2) program consists of lethality improvements. The primary focus is the integration of 3GEN Forward Looking Infrared (FLIR) and the integration of Ammunition Data Link (ADL) for the Advanced Multi-purpose (AMP) round. Additional improvements to the target acquisition sensors consist of inclusion of color cameras and laser capabilities. Other potential improvements consist of an improved environmental control system, laser warning receiver, and vehicle smoke generation. Trade studies, analysis and technology maturation will be performed to evaluate prospective improvements, along with obsolescence mitigation, and incorporation of inbound technologies currently under development. FY 2016 Accomplishments: The ECP 1B team completed a System Requirements Review (SRR), trade studies, analysis, and technology maturation in FY16. These efforts focused on incorporating the 3rd Gen FLIR, environmental controls, Laser	15.969	22.523	60.561	-	60.561

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 330 / <i>Abrams Tank Improve Prog</i>			
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Warning Receiver (LWR), vehicle smoke, and advanced sensors. The efforts culminated in an updated system specification and a requirements compliance matrix. FY 2017 Plans: ECP 1B development engineering efforts will continue with the System Functional Review (SFR) in 4Q FY17. SFR will be followed by preliminary design activities, ensuring the design and basic system architecture are complete with technical confidence. Abrams will continue to support Ground Sensors with 3GEN Forward Looking Infrared (FLIR) integration engineering. Trade studies, analyses, and technology maturation will be performed to evaluate other potential improvements. PM Abrams will integrate the Advanced Multi-Purpose (AMP) round into the Abrams family of vehicles (FOV). FY 2018 Base Plans: ECP 1B will continue efforts toward completing a Preliminary Design Review in 4Q FY18. The primary tasks will be focused on systems engineering, design trade studies, engineering modeling and analysis, initial hardware mockups, and software development. Early hardware will be used to start Design Verification Testing (DVT). PM Abrams will continue to integrate the Advanced Multi-Purpose (AMP) round into the Abrams family of vehicles (FOV).					
Title: Program Management Office (PMO) Support Description: Program Management Office Support includes Systems Engineering and Government and Contractor salaries, travel and other support costs required to effectively manage the program. FY 2016 Accomplishments: Continued Government Systems Engineering and Program Management Office Support in FY2016. Including labor, travel, training, supplies and equipment to effectively manage the program. FY 2017 Plans: Continue Government Systems Engineering and Program Management office support in FY2017. This will include labor, training, travel, supplies, and equipment to effectively manage the program. FY 2018 Base Plans: Continue Government Systems Engineering and Program Management office support in FY2018. This will include labor, training, travel, supplies, and equipment to effectively manage the program.	8.369	11.179	12.620	-	12.620
Title: Test & Evaluation - Engineering Change Proposal (ECP) 1A	13.528	20.564	24.091	-	24.091

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 330 / <i>Abrams Tank Improve Prog</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>Description: Test and Evaluation activities includes contractor and government testing, as well as test documentation development. Contractor shakedown/proveout testing will be conducted using U.S. Army test facilities. Government development testing of prototype vehicles will evaluate vehicle performance, to include Reliability, Availability, and Maintainability testing. Early User evaluation will also be performed. Test and evaluation activities also include the testing of other platform inbound technologies, along with the development of test documentation to include Test and Evaluation Master Plans, test procedures, and reports.</p> <p>FY 2016 Accomplishments: Continued Test and Evaluation supporting vehicle-level test events and planning and development of test documentation. In 1Q FY2016, gun firing and production prove-out testing as well as Automotive/Reliability, Availability and Maintainability (RAM) testing began. Electromagnetic Interference/Electromagnetic Compatibility (EMI/EMC) Testing began in 3Q FY2016. These test and evaluation events occurred at various test sites (Aberdeen Proving Ground, Yuma Proving Ground, and White Sands Missile Range).</p> <p>FY 2017 Plans: Continue Test and Evaluation to support vehicle level test events and documentation. Continue production prove-out testing, automotive reliability, availability, and maintainability (RAM) testing, and electromagnetic interface / electromagnetic compatibility (EMI/EMC) testing. Complete gun firing in mid FY2017. In mid FY2017 begin production configuration testing in preparation for live fire testing in FY2018. These test and evaluation events will occur at various sites (Aberdeen Proving Ground, Yuma Proving Ground, and White Sands Missile Range).</p> <p>FY 2018 Base Plans: In FY18 the USG will complete ECP 1a Production Prove-Out Test (PPT) including all automotive RAM testing, and EMI/EMC testing. The USG will also conduct and complete ECP 1a Live Fire Test and Evaluation (LFT&E) and transportability testing. The USG will begin ECP 1a Production Qualification Testing (PQT) and preparations for Follow-on Operational Test and Evaluation (FOT&E). These test and evaluation events will occur at various sites (Aberdeen Proving Ground, Yuma Proving Ground, and White Sands Missile Range).</p>					
<p>Title: Survivability Enhancements</p> <p>Description: PM Abrams will integrate and test survivability, lethality, mobility, reliability, and architecture improvements on the Abrams Family of Vehicles. Force protection and survivability improvements to counter</p>	10.902	25.300	-	-	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 330 / <i>Abrams Tank Improve Prog</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
evolving threats include, but are not limited to, Active Protective Systems. Lethality improvements include, but are not limited to, cannon and ammunition upgrades.					
<i>FY 2016 Accomplishments:</i> Initiated Abrams Expedited Non Developmental Item (NDI) Active Protection System (APS) Effort. In 2Q FY2016, awarded contract to the tank OEM for non-recurring engineering to design an installation kit to supply power and bracketry to support an APS. A Government-to-Government agreement was approved and funded in 3Q FY2016.					
<i>FY 2017 Plans:</i> PM Abrams will integrate and test survivability, lethality, mobility, reliability, and architecture improvements on the Abrams Family of Vehicles. Force protection and survivability improvements to counter evolving threats include, but are not limited to, Active Protective Systems. Lethality improvements include, but are not limited to, cannon and ammunition upgrades.					
Accomplishments/Planned Programs Subtotals	73.768	88.452	108.570	-	108.570

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• Abrams Upgrade Program: <i>Abrams Upgrade Program (GA0750) WTCV</i>	-	330.000	275.000	442.800	717.800	261.500	442.149	454.200	497.000	Continuing	Continuing
• M1 Abrams Tank Mod (GA0700): <i>M1 Abrams Tank Mod (GA0700) WTCV</i>	430.939	480.166	248.826	138.700	387.526	238.500	272.200	280.467	275.000	Continuing	Continuing

Remarks

D. Acquisition Strategy
Abrams Power ECP 1A: Research & Development Contract - Sole Source, Cost Plus Incentive Fee (CPIF); ECP 1B - Research & Development Contract - Sole Source, Cost Plus Incentive Fee (CPIF)

E. Performance Metrics
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity 2040 / 7				R-1 Program Element (Number/Name) PE 0203735A / Combat Vehicle Improvement Programs				Project (Number/Name) 330 / Abrams Tank Improve Prog							
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Abrams ECP 1A	SS/CPIF	General Dynamics Land Systems : Sterling Heights, MI	312.419	15.100	Apr 2016	8.886	Feb 2017	7.998	Mar 2018	-		7.998	Continuing	Continuing	0.000
ECP 1A Training Device Upgrades	MIPR	PEO, STRI : Orlando, FL	0.000	-		-		3.300	Nov 2017	-		3.300	Continuing	Continuing	0.000
Abrams ECP 1B	SS/CPIF	General Dynamics Land Systems : Sterling Heights, MI	0.000	15.969	Dec 2015	16.530	Aug 2017	58.561	Oct 2017	-		58.561	Continuing	Continuing	0.000
Advanced Multi-Purpose (AMP) Round	SS/CPIF	General Dynamics Land Systems : Sterling Heights, MI	0.000	-		5.993	May 2017	2.000	Mar 2018	-		2.000	0.000	7.993	0.000
Survivability Enhancements	Various	US Army TARDEC; Rafael Advanced Defense Systems; General Dynamics Land Systems (GDLS) : Sterling Heights, MI	0.000	10.645	Apr 2016	21.752	Dec 2016	-		-		-	0.000	32.397	0.000
Subtotal			312.419	41.714		53.161		71.859		-		71.859	-	-	0.000
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Office (PMO)Support	MIPR	PMO Support Offices : Various	56.721	8.369	Jan 2016	11.179	Jan 2017	12.620	Jan 2018	-		12.620	Continuing	Continuing	Continuing
Program Management Office (PMO) Support - Survivability Enhancements	MIPR	PMO Support Offices : Various	0.000	0.127	Apr 2016	0.250	Dec 2016	-		-		-	0.000	0.377	0.000
Subtotal			56.721	8.496		11.429		12.620		-		12.620	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 330 / <i>Abrams Tank Improve Prog</i>
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Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Testing	MIPR	Aberdeen Proving Ground; Yuma Proving Ground; White Sands Missile Range, : Various	14.840	13.528	Jan 2016	11.423	Jan 2017	12.089	Jan 2018	-		12.089	Continuing	Continuing	Continuing
Contractor Testing	Various	Various : Various	18.674	9.900	Apr 2016	9.141	Feb 2017	12.002	Feb 2017	-		12.002	Continuing	Continuing	0.000
Government Testing - Survivability Enhancements	Various	Various : Various	0.000	0.130	Jul 2016	3.298	Apr 2017	-		-		-	0.000	3.428	0.000
Subtotal			33.514	23.558		23.862		24.091		-		24.091	-	-	-
Project Cost Totals			402.654	73.768		88.452		108.570		-		108.570	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 330 / <i>Abrams Tank Improve Prog</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
ECP 1A Component Qualification Testing																												
ECP 1A Contractor Prototype Proveout																												
ECP 1A Production Prove-Out Testing																												
ECP 1A Live Fire Test & Evaluation (LFT&E)																												
ECP 1A Production Qualification Testing (PQT)																												
ECP 1A Logistics Demo																												
ECP 1A Follow-on Test and Evaluation (FOT&E)																												
(1) ECP 1A Fielding Start Date (First Unit Equipped)																												
(2) ECP 1B System Functional Review (SFR)																												
(3) ECP 1B Development Contract Award																												
(4) ECP 1B Preliminary Design Review (PDR)																												
(5) ECP 1B Critical Design Review (CDR)																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 330 / <i>Abrams Tank Improve Prog</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
ECP 1A Component Qualification Testing	4	2014	1	2017
ECP 1A Contractor Prototype Proveout	3	2015	1	2016
ECP 1A Production Prove-Out Testing	1	2016	1	2018
ECP 1A Live Fire Test & Evaluation (LFT&E)	1	2018	4	2018
ECP 1A Production Qualification Testing (PQT)	4	2018	2	2020
ECP 1A Logistics Demo	4	2018	1	2019
ECP 1A Follow-on Test and Evaluation (FOT&E)	3	2019	1	2020
ECP 1A Fielding Start Date (First Unit Equipped)	3	2020	3	2020
ECP 1B System Functional Review (SFR)	4	2017	4	2017
ECP 1B Development Contract Award	4	2017	4	2017
ECP 1B Preliminary Design Review (PDR)	4	2018	4	2018
ECP 1B Critical Design Review (CDR)	4	2019	4	2019

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>				Project (Number/Name) 371 / <i>Bradley Improve Prog</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
371: <i>Bradley Improve Prog</i>	-	91.752	102.382	130.863	-	130.863	179.400	149.000	87.500	81.889	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The M2/M3A3 Bradley Fighting Vehicle is at or exceeds Space, Weight, and Power-Cooling (SWAP-C) limitations. To restore lost platform capability and to host other Army existing programs of record, the Bradley Fighting Vehicle program shall execute a series of Engineering Change Proposals (ECPs). ECP 1 improves vehicle's track and suspension while ECP 2 improves the power train and electrical system to enable the A3 fleet to host inbound technologies from Army program of records, including continued SINGARS integration and Handheld Manpack Small (HMS) Radios and Joint Battle Command – Platform (JBC-P). The ECPs are not intended to exceed the operational capability outlined in current system requirement documents, but rather to ensure that the existing system performance is not further degraded and that Army mission equipment packages can be integrated on the Bradley platform. ECP 2 development effort will lead to a production start in FY 2017. The Bradley M2A4 Vehicle is the combination of the M2A3 Base Vehicle with ECP 1 and ECP 2 components installed and integrated. Additionally, a follow on Engineering Change Proposal to ECP 2, ECP 2b integrates Third Generation Forward Looking Infrared (3GEN FLIR) to replace the current FLIR for increased lethality through improved target acquisition capability along with other technology upgrades and insertions (i.e. laser pointing, color camera, laser range finder, Vehicular Integration for Command, Control, Communication, Computers, Intelligence, Surveillance and, Reconnaissance/Electronic Warfare (C4ISR/EW) Interoperability (VICTORY) architecture compliance, etc). Product Manager Bradley will execute a Non Development Initiative (NDI) to develop force protection and survivability improvements to counter evolving threats to include, but not limited to Active Protection System. A separate integration effort begins in FY 2018 for an underbelly armor kit for improved survivability against blast threats.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Bradley Engineering Change Proposal (ECP) Program	42.933	43.711	21.875	-	21.875
Description: The Bradley Fighting Vehicle System (BFVS) improvements implemented through the Engineering Change Proposal (ECP) Program will focus on restoring lost platform capability to support Army inbound technologies and to facilitate integration of technologies currently in development under other existing programs of record.					
FY 2016 Accomplishments: Contractor developmental testing continued through FY 2016 in various locations. Government developmental testing began in 2Q FY 2016 at Yuma Proving Ground (YPG) and Aberdeen Proving Ground (APG) test sites. Software Qualification Testing (SQT) took place in 2Q FY 2016. Suitability evaluations incorporated analysis of Manpower and Personnel Integration (MANPRINT) domains and logistics development as part of Integrated					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 371 / <i>Bradley Improve Prog</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>Product Support (IPS) elements and was driven by the live fire (LF) analysis that occurred throughout FY 2016. Engineering will complete root cause and corrective action work as test incident reports arise.</p> <p>FY 2017 Plans: Continue system level testing at government test sites and contractor facilities. Complete final technical data package for delivery to the government in preparation for production contract award in mid FY 2017. Continue delivery of logistics support documentation and execute logistics demonstration at the contractor's facility.</p> <p>FY 2018 Base Plans: Complete system level development and support software upgrades to include integrated electronic technical manuals (IETM) development and vehicle diagnostics. Conduct a logistics demonstration at the contractor's facility.</p>					
<p>Title: Bradley Improvements</p> <p>Description: Continues Third Generation Forward Looking Infrared (3GEN FLIR) and other necessary technology integration efforts. The Bradley Family of Vehicles (BFV) will integrate underbelly armor for improved survivability against underbelly blast events. Conduct integration activities for Army directed improvements such as, but not limited to, rear view sensor system, and short range air defense (SHORAD) capability.</p> <p>FY 2016 Accomplishments: Contract development effort continued on ECP 2b (lethality improvements). Contract award is expected in 1QFY17. Continued synchronization with Project Director, Main Battle Tank Systems (PD MBTS), and Product Manager (PM) Ground Sensors. Trade studies/analysis were performed to evaluate 3GEN FLIR integration and other potential improvements, i.e. laser pointing, color camera, laser range finder, vehicle generated smoke, Vehicular Integration for Command, Control, Communication, Computers, Intelligence, Surveillance and, Reconnaissance/Electronic Warfare (C4ISR/EW) Interoperability (VICTORY) architecture compliance, environmental control system, etc.</p> <p>FY 2017 Plans: Continue developmental engineering effort for all of the technologies that are a part of ECP 2b to include the 3GEN FLIR integration into the Bradley Commander's Independent Viewer (CIV) and Improved Bradley Acquisition System (IBAS), laser pointing, laser range finder, vehicle generated smoke, environmental control system, commander's independent weapon station, rear view sensor system, laser warning receiver, and laser protection. Complete System Functionality Review (SFR) and continue working toward Preliminary Design Review (PDR). Coordinate commonality and synchronization with PD Main Battle Tank Systems, PM Ground</p>	20.061	15.670	85.155	-	85.155

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 371 / <i>Bradley Improve Prog</i>			
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Sensors, PM Close Combat Weapon Systems, and the ECP 2b Prime Contractor. Major development activities include systems requirements and functional review approval and the start of concept design which is to undergo Modeling and Simulation analysis and evaluation to support a PDR in early FY 2018. FY 2018 Base Plans: Continue developmental engineering effort for all technologies that are a part of ECP 2b to include 3GEN FLIR integration into the Bradley Commander's Independent Viewer (CIV) and Improved Bradley Acquisition System (IBAS), laser pointing, laser range finder, environmental control system, commander's independent weapon station. Complete Preliminary Design Review (PDR) and continue working toward Critical Design Review (CDR). Coordinate commonality and synchronization with PD Main Battle Tank Systems, PM Ground Sensors, PM Close Combat Weapon Systems and the ECP 2b Prime contractor. Underbelly Interim Solution (UBIS) effort begins in FY 2018 with a competitive contract award to an industry partner for an underbelly contingency kit designed to enhance the BFV force protection and vehicle survivability. Also, logistics support for UBIS will begin the development of the Maintenance Allocation Chart (MAC) and provisioning plan.					
Title: Survivability Enhancements Description: Initiate a Non Development Initiative (NDI) Active Protection System (APS) installation and characterization initiative to evaluate Bradley performance with an APS solution installed which includes developing force protection and survivability improvements to counter evolving threats to include, but not limited to Active Protection System in FY 2017. FY 2016 Accomplishments: Initiated identification of potentially suitable Active Protection Systems, engineering efforts to develop bracket and mounting provisions and obtain the system to install for characterization events. Included platform integration of software and hardware of Active Protection Systems and survivability capabilities to counter evolving threats in FY 2018. FY 2017 Plans: Initiate a Non Development Initiative (NDI) in order to develop force protection and survivability improvements to counter evolving threats to include, but not limited to Active Protection System in FY 2017. Continued development of Action Protection System and mounting provisions, install systems and perform characterization.	11.000	15.300	-	-	-
Title: Program Management Office (PMO) Support	9.305	8.916	9.448	-	9.448

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 371 / <i>Bradley Improve Prog</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>Description: Program Management Office Support includes systems engineering, government and contractor salaries, travel, training and other support costs required to effectively manage the program.</p> <p>FY 2016 Accomplishments: Continued government systems engineering and program management office support in FY 2016. This included labor, travel, training, supplies, equipment and facilities to effectively manage the program.</p> <p>FY 2017 Plans: Government program management and system engineering support costs. These funds cover the costs of government and direct support contractor salaries, travel, training, supplies, equipment and facilities to manage the issues resulting from ECP 2 testing and develop ECP 2 logistics products, execution of the initial award and engineering phases of ECP 2b.</p> <p>FY 2018 Base Plans: Continue government program management and system engineering support costs. These funds cover the costs of government and direct support contractor salaries, travel, training, supplies, equipment and facilities to manage the issues resulting from ECP 2 testing and develop ECP 2 logistics products, engineering phases of ECP 2b, and execute UBIS development activities.</p>					
<p>Title: Test & Evaluation</p> <p>Description: ECP 2 Test & Evaluation efforts support system sub-system test events and planning and development of test documentation.</p> <p>FY 2016 Accomplishments: ECP 2 Test and Evaluation supported vehicle level test events and planning and development of test documentation. Contractor developmental testing continued throughout FY 2016 in various contractor locations. Government developmental testing began in 3Q FY 2016. Automotive/Reliability, Availability and Maintainability (RAM) testing began as well as automotive performance testing to ensure ECP 2 components do not degrade the current Bradley performance. These test and evaluation events occurred at various test sites (Aberdeen Proving Ground, Yuma Proving Ground, and White Sands Missile Range). Software Qualification Testing (SQT) took place in 2Q FY 2016.</p> <p>FY 2017 Plans: Continue execution of ECP 2 testing in accordance with the OSD approved Bradley ECP Test and Evaluation Master Plan (TEMP). This includes performance and RAM testing of 5 vehicles at Yuma Test Center, 4 vehicles</p>	8.453	18.785	14.385	-	14.385

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 371 / <i>Bradley Improve Prog</i>

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
at Aberdeen Test Center, and 1 vehicle performing electromagnetic effects testing and nuclear testing at White Sands Missile Range (WSMR). The TEMP also requires cybersecurity testing on two of these prototype ECP 2 vehicles, and live fire testing on one vehicle at Aberdeen Test Center through FY 2018. Also planned is testing at Cold Regions Test Center in Alaska that will begin in 4th quarter FY 2017 and finish in FY 2018. Final live fire testing on production vehicles will be completed in FY 2019.					
<i>FY 2018 Base Plans:</i> In accordance with the OSD approved Bradley ECP Test and Evaluation Master Plan (TEMP), ECP 2 testing and evaluation completes all Reliability, Availability and Maintainability Test as well as conducts Live Fire testing to complete initial developmental testing on the program. Additional developmental testing will be completed to support the test-fix-test cycle and testing at Cold Regions Test Center in Alaska will be completed. The Logistics Demonstration will also be performed to demonstrate supportability of the platform and associated logistics materials. Detailed planning will be conducted to support operational testing that will occur in FY 2019.					
Accomplishments/Planned Programs Subtotals	91.752	102.382	130.863	-	130.863

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

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• GZ2400: <i>Bradley Program (MOD)</i>	210.042	490.033	437.851	30.000	467.851	333.000	403.872	417.000	431.946	0.000	2,753.744
• G80718: <i>Bradley Program</i>	-	-	0.000	200.000	200.000	-	-	-	-	0.000	200.000

Remarks

D. Acquisition Strategy

Product Manager Bradley will execute a series of Engineering Change Proposals (ECP) reestablishing Space, Weight, Power and Cooling (SWAP-C) to facilitate integration of technologies being developed under existing Programs of Record (POR). The proposed ECPs will restore lost capability, without exceeding operational envelopes outlined in current approved requirement documents. ECP 1 production contract was awarded in FY 2014, and began fielding in FY 2015. ECP 2 is scheduled to begin fielding in FY 2019 to address powerpack and electrical power upgrades, which will enable the vehicle to host Army directed inbound technologies with no further performance degradation to the vehicle. ECP 2 development has been executed on a sole source cost plus incentive fee contract to the current platform Original Equipment Manufacturer. Initiate studies and analysis in order to integrate Third Generation Forward Looking Infrared (3GEN FLIR) sights began in FY 2016. The 3GEN FLIR (ECP 2b) system will be developed by Project Manager, Terrestrial Sensors (PM TS) and be provided to Product Manager Bradley as a Horizontal Technology Insertion effort. Product Manager Bradley will execute a Non Development Initiative (NDI) in order to develop force protection and survivability improvements to counter evolving threats to include, but not limited to Active Protection System in FY 2018.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 371 / <i>Bradley Improve Prog</i>

<u>E. Performance Metrics</u> N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity 2040 / 7				R-1 Program Element (Number/Name) PE 0203735A / Combat Vehicle Improvement Programs				Project (Number/Name) 371 / Bradley Improve Prog							
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Bradley Modernization Program	SS/CPPIF	PMO : Warren	79.009	-		-		-		-		-	0.000	79.009	0.000
Non Recurring Engineering-ECP2	SS/FFP	L3COM : Muskegon, MI	14.660	1.035	Apr 2016	0.528	May 2017	-		-		-	Continuing	Continuing	Continuing
Non Recurring Engineering-ECP2	SS/CPPIF	BAE : Sterling Heights, MI	167.936	41.898	Jan 2016	43.183	Nov 2016	21.875	Nov 2017	-		21.875	Continuing	Continuing	Continuing
Bradley Improvement Integration - ECP2b	SS/CPPIF	BAE : Sterling Heights, MI	1.363	19.879	Jun 2016	15.670	Nov 2016	80.574	Nov 2017	-		80.574	Continuing	Continuing	Continuing
Bradley Improvement Integration - Underbelly Armor	SS/CPPIF	TBD : TBD	0.000	0.182	Jan 2016	-		4.581	Jan 2018	-		4.581	Continuing	Continuing	Continuing
Survivability Enhancements	SS/CPPIF	TBD : TBD	0.000	11.000	Oct 2016	15.300	Jan 2017	-		-		-	Continuing	Continuing	Continuing
Subtotal			262.968	73.994		74.681		107.030		-		107.030	-	-	-
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
PMO/PEO Support/OGA	MIPR	PMO/PEO : Bradley ECP Program	20.841	3.397	Dec 2015	3.076	Dec 2016	3.260	Dec 2017	-		3.260	Continuing	Continuing	Continuing
Government Engineering Support	MIPR	Various : Bradley ECP Program	32.685	5.908	Dec 2015	5.840	Dec 2016	6.188	Dec 2017	-		6.188	Continuing	Continuing	Continuing
Subtotal			53.526	9.305		8.916		9.448		-		9.448	-	-	-
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Testing	MIPR	Various : Test Sites	5.816	8.453	May 2016	18.785	Jan 2017	14.385	Dec 2017	-		14.385	Continuing	Continuing	Continuing
Subtotal			5.816	8.453		18.785		14.385		-		14.385	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army							Date: May 2017				
Appropriation/Budget Activity 2040 / 7				R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>			Project (Number/Name) 371 / <i>Bradley Improve Prog</i>				

	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	322.310	91.752	102.382	130.863	-	130.863	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 371 / <i>Bradley Improve Prog</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
	Bradley M2A4 Engineering Change Proposal (ECP) 2 Program	[Gantt bars and milestones for ECP 2 Program]																										
Contractor Vehicle Testing - ECP2	[Gantt bar]																											
Production Qualification Test (PQT) - ECP2	[Gantt bar]																											
(1) Production Contract Award - ECP2	[Milestone 1: FY 2017 Q2]																											
(2) 1st Vehicle Delivery - ECP2	[Milestone 2: FY 2019 Q2]																											
Operational Test and Evaluation - ECP2	[Gantt bar]																											
(3) First Unit Equipped (FUE) - ECP2	[Milestone 3: FY 2020 Q3]																											
Bradley M2A4 Engineering Change Proposal (ECP) 2b Program	[Gantt bars and milestones for ECP 2b Program]																											
(4) System Requirements Review - ECP2b	[Milestone 4: FY 2017 Q4]																											
(5) Preliminary Design Review - ECP2b	[Milestone 5: FY 2019 Q1]																											
(6) Critical Design Review - ECP2b	[Milestone 6: FY 2019 Q3]																											
Component Qualification Testing - ECP2b	[Gantt bar]																											
Contractor Vehicle Testing - ECP2b	[Gantt bar]																											

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 371 / <i>Bradley Improve Prog</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
Production Qualification Test (PQT) - ECP2b																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 371 / <i>Bradley Improve Prog</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Bradley M2A4 Engineering Change Proposal (ECP) 2 Program	1	2012	4	2019
Contractor Vehicle Testing - ECP2	3	2015	3	2016
Production Qualification Test (PQT) - ECP2	2	2016	2	2018
Production Contract Award - ECP2	2	2017	2	2017
1st Vehicle Delivery - ECP2	2	2019	2	2019
Operational Test and Evaluation - ECP2	4	2019	1	2020
First Unit Equipped (FUE) - ECP2	3	2020	3	2020
Bradley M2A4 Engineering Change Proposal (ECP) 2b Program	3	2016	3	2025
System Requirements Review - ECP2b	3	2017	3	2017
Preliminary Design Review - ECP2b	1	2019	1	2019
Critical Design Review - ECP2b	4	2019	4	2019
Component Qualification Testing - ECP2b	3	2020	4	2020
Contractor Vehicle Testing - ECP2b	1	2021	4	2021
Production Qualification Test (PQT) - ECP2b	1	2021	2	2023

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 431 / M113 IMPROVEMENTS
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
431: M113 IMPROVEMENTS	-	0.000	0.000	15.000	-	15.000	8.000	5.000	0.000	0.000	0.000	28.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
The M113 Improvements program is a new start effort.

A. Mission Description and Budget Item Justification
M113 improvements will develop an affordable solution for upgrading the M113s to enhance protection, survivability, mobility and power generation to support the current and future network systems. This will provide the necessary enhancements to the M113 capability for Echelons Above Brigade (EAB) units with priority to the forward deployed units and equipment sets. The Armored Multi Purpose Vehicle (AMPV) program will replace all M113 family of vehicles in Armored Brigade Combat Teams (ABCT).

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>Title: Product Development</p> <p>Description: Design, fabrication and testing of Engineering Change Proposals (ECPs).</p> <p>FY 2018 Base Plans: Government RFP development and competitive source selection planning to include the preparation of government furnished material and technical data that will support a competitively awarded contract. After award the contractor will complete Engineering Change Proposals (ECP) vehicle modifications designs, fabricate ECP vehicle modifications kits for test, provide support to testing and finalize ECPs in support of production.</p>	-	-	14.100	-	14.100
<p>Title: Government Program Management</p> <p>Description: Program Management Office Support includes Systems Engineering, support to logistics development, Government salaries, travel, training and other support costs required to effectively manage the program.</p> <p>FY 2018 Base Plans: Provide integrated program management to oversee technical development and fabrication efforts of the contractor. Provide program management to plan and oversee test efforts if test vehicles are delivered ahead of schedule.</p>	-	-	0.900	-	0.900
Accomplishments/Planned Programs Subtotals	-	-	15.000	-	15.000

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 431 / M113 IMPROVEMENTS

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• CARRIER, MOD: CARRIER, MOD GB1930 WTCV	-	-	-	-	-	23.000	50.000	50.000	50.000	0	173.000

Remarks

D. Acquisition Strategy

The Acquisition strategy will be finalized upon receipt of Department of the Army Directed Requirement with a planned competitive contract award by 3Q FY18. The Army plans to conduct a formal source selection to competitively down select to no more than two vendors. Vendor(s) will complete vehicle design and fabricate vehicle modifications for testing. Overall program schedule could be accelerated if vendor designs are mature.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity 2040 / 7				R-1 Program Element (Number/Name) PE 0203735A / Combat Vehicle Improvement Programs						Project (Number/Name) 431 / M113 IMPROVEMENTS					
Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Product Development	C/FFP	TBD : TBD	0.000	-		-		14.100	May 2018	-		14.100	0.000	14.100	0.000
Program Management Support	MIPR	TBD : TBD	0.000	-		-		0.900	Jan 2018	-		0.900	0.000	0.900	0.000
Subtotal			0.000	-		-		15.000		-		15.000	0.000	15.000	0.000
			Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	-		0.000		15.000		-		15.000	0.000	15.000	0.000

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 431 / <i>M113 IMPROVEMENTS</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
(1) RFP Release									▲																			
(2) Contract Award									▲																			

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) 431 / M113 IMPROVEMENTS
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
RFP Release	1	2018	1	2018
Contract Award	3	2018	3	2018

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017			
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>					Project (Number/Name) EE2 / <i>Stryker Improvement</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
EE2: <i>Stryker Improvement</i>	-	215.136	136.523	80.642	-	80.642	60.523	58.076	49.193	23.768	Continuing	Continuing	
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-			

Note

PE Number 0203735A/Project EE2 funds the Stryker Engineering Change Proposal (ECP) 1, Stryker Operational Needs Statement Lethality (ONS), Stryker Survivability Enhancements, and Stryker Engineering Change Proposal (ECP) 2 efforts.

A. Mission Description and Budget Item Justification

Stryker Improvement will address the development of Lethality, Survivability, Mobility, and Communication, Command and Control (C3) improvements within the Stryker Family of Vehicles (FoV). Principal development efforts include upgrades associated with the ECP 1, Operational Needs Statement Lethality (ONS), Stryker Survivability Enhancements, and ECP 2 efforts. ECP 1 power generation, suspension, and network upgrades will both restore Stryker Double-V Hull (DVH) Space, Weight, and Power-Cooling (SWaP-C) lost as a result of incorporating vehicle changes to counter threats encountered during deployment operations while allowing the future network to be hosted without further degradation in vehicle protection and mobility. The Stryker ONS Lethality effort will address an Urgent Operational Need to increase the firepower of Stryker Infantry Carrier Vehicles (ICV) within the US Army European Command (USAREUR). The ONS Lethality effort will integrate a 30mm-equipped weapon station that will provide USAREUR with precision direct firepower to overwhelm the enemy in encounter actions and suppressive fire to preserve mounted and dismounted freedom of movement. The Stryker Survivability Enhancement will address evolving threats by assessing survivability improvements, to include passive protection systems, active protection systems, and an under-armor fire capability for Stryker-equipped reconnaissance troops. The ECP 2 effort will focus on the integration of a suite of complementary Mission Equipment Package (MEP) lethality upgrades (medium caliber weapon, under armor Javelin, common masted sensor, improved target acquisition optics, and other capabilities) that will improve the suppressive fire and armored vehicle engagement capabilities across the Army's Stryker Brigade Combat Teams (SBCTs).

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Stryker ECP 1 Development (Engineering/Prototypes)	70.169	14.913	-	-	-
Description: Funding is provided for the following effort					
FY 2016 Accomplishments: ECP1 development engineering efforts, to include, prototype build completion, development and validation of Stryker Operator and Maintenance Manuals, and provisioning of ECP 1 unique parts.					
FY 2017 Plans: Continuing ECP 1 engineering efforts, to include finalization of In-Vehicle Network (IVN) design, development, validation and logistic demonstration of revisions to Stryker Operator and Maintenance Manuals, provisioning					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) EE2 / <i>Stryker Improvement</i>			
B. Accomplishments/Planned Programs (\$ in Millions)					
	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
of ECP 1 unique parts, and incorporating ECP 1 design changes resulting from deficiencies identified during prototype build and development testing.					
Title: Stryker ECP 1 Training Device Updates Description: Funding is provided for the following effort FY 2017 Plans: Development of updates to Stryker training devices resulting from ECP 1 engine, alternator, suspension, and network design changes.	-	5.980	-	-	-
Title: Stryker ECP 1 Testing Description: Funding is provided for the following effort FY 2016 Accomplishments: Began Test execution activities for the Stryker ECP 1 upgrade technologies, including tests for safety and human factors, automotive performance, Communications, Command, and Control (C3), environmental, and Live Fire testing . These tests included full-up system level live fire, reliability and maintainability, environmental performance, automotive performance and electronics testing. These events were conducted at various test sites throughout the US including Aberdeen Proving Ground (APG), Yuma Proving Ground (YPG), Cold Regions Test Center (CRTC), Tropic Regions Test Center (TRTC), Electronic Proving Ground (EPG) and White Sands Missile Range (WSMR). FY 2017 Plans: Continue test execution activities for the Stryker ECP 1 upgrade technologies, including tests for Communications, Command, and Control (C3), reliability and maintainability, electronics and information assurance testing. These events will be conducted at various test sites throughout the US including Aberdeen Proving Ground (APG), Yuma Proving Ground (YPG), Electronic Proving Ground (EPG) and White Sands Missile Range (WSMR). FY 2018 Base Plans: Continue test execution activities for the Stryker ECP 1 upgrade technologies, including tests for Communications, Command, and Control (C3) and electronics and information assurance testing. These events will be conducted at various test sites throughout the US including Yuma Proving Ground (YPG), Electronic	19.138	11.048	18.760	-	18.760

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) EE2 / <i>Stryker Improvement</i>			
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Proving Ground (EPG) and White Sands Missile Range (WSMR). Conduct Follow-on Operational Test & Evaluation (FOT&E).					
<p>Title: Stryker ECP 1 Contractor Support to Test</p> <p>Description: Funding is provided for the following effort</p> <p>FY 2016 Accomplishments: Contractor technical support (system troubleshooting, maintenance and repair of prototypes during execution of tests) to ECP 1 developmental test.</p> <p>FY 2017 Plans: Continue Contractor technical support (system troubleshooting, maintenance and repair of prototypes during execution of tests) to ECP 1 developmental test.</p> <p>FY 2018 Base Plans: Continuing Contractor technical support (system troubleshooting, maintenance and repair of prototypes during execution of tests) to ECP 1 developmental test and operational test.</p>	6.490	3.255	0.080	-	0.080
<p>Title: Stryker Operational Needs Statement Lethality Development (Engineering/Prototypes)</p> <p>Description: Funding is provided for the following effort</p> <p>FY 2017 Plans: Development engineering of the Stryker Operational Needs Statement Lethality upgrade, to include conduct of system design reviews, Bill of Material (BOM) finalization, assembly and delivery of prototypes, development and validation of the Operator's Manual and provisioning of Operational Needs Statement Lethality unique parts.</p>	-	17.967	-	-	-
<p>Title: Stryker Operational Needs Statement Lethality Testing</p> <p>Description: Funding is provided for the following effort</p> <p>FY 2017 Plans: Developmental test execution activities for the Stryker Operational Needs Statement Lethality upgrade, to include safety and performance, full-up system live fire, reliability and maintainability and electronics and information assurance testing.</p>	-	18.665	-	-	-
<p>Title: Stryker Operational Needs Statement Lethality Contractor Support to Test</p>	-	11.547	-	-	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) EE2 / <i>Stryker Improvement</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>Description: Funding is provided for the following effort</p> <p>FY 2017 Plans: Contractor support to Operational Needs Statement Lethality upgrade testing, to include system troubleshooting, maintenance, repair of prototypes during execution of tests, and Failure Analysis and Corrective Action Reporting (FACAR).</p>					
<p>Title: Survivability Enhancements</p> <p>Description: Funding is provided for the following effort</p> <p>FY 2016 Accomplishments: Began development and fabrication of the installation solution for the Expedited Active Protection System (APS), procured prototype hardware for Stryker platform countermeasure, and planning of characterization requirements.</p> <p>FY 2017 Plans: Assessment of force protection and survivability improvements, to include passive and active protection systems.</p> <p>FY 2018 Base Plans: Continue assessment of force protection and survivability improvements, to include passive and protection systems.</p>	16.800	14.400	2.133	-	2.133
<p>Title: Stryker Engineering Change Proposal (ECP) 2 Development (Engineering/Prototypes)</p> <p>Description: Funding is provided for the following effort</p> <p>FY 2017 Plans: Developmental engineering of the Engineering Change Proposal (ECP) 2 upgrade to include lethality upgrades (i.e. medium caliber weapon and under armor Javelin), obsolescence, optics improvements and network lethality enhancements.</p> <p>FY 2018 Base Plans: Continuing developmental engineering of the Engineering Change Proposal (ECP) 2 lethality upgrades to include under armor Javelin, medium caliber weapon, and improved target acquisition optics.</p>	-	19.088	50.639	-	50.639
<p>Title: Stryker Engineering Change Proposal (ECP) 2 Testing</p>	-	-	0.380	-	0.380

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017			
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) EE2 / <i>Stryker Improvement</i>				
B. Accomplishments/Planned Programs (\$ in Millions)						
		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Description: Funding is provided for the following effort						
FY 2018 Base Plans: Safety, performance, and environmental test planning and execution activities for Stryker ECP2 under armor Javelin and medium caliber upgrades.						
Title: Government Engineering and Project Management						
Description: Funding is provided for the following effort						
FY 2016 Accomplishments: Government Systems Engineering and Program Management support (labor, travel, training, supplies, and equipment) to support ECP1 development.						
FY 2017 Plans: Continuing Government Systems Engineering and Program Management support (labor, travel, training, supplies, and equipment) to support ECP 1, ONS Lethality, Survivability Enhancements, and ECP 2 development efforts. Includes execution of ECP 2 trade study, cost-benefit analysis, and Source Selection Evaluation Board (SSEB).						
FY 2018 Base Plans: Continue Government Systems Engineering and Program Management support (labor, travel, training, supplies, and equipment) to support ECP 1, ONS Lethality, Survivability Enhancements, and ECP 2 development efforts. Includes execution of an ECP 2 Source Selection Evaluation Board (SSEB).						
Accomplishments/Planned Programs Subtotals		5.039	19.660	8.650	-	8.650
		117.636	136.523	80.642	-	80.642
		FY 2016	FY 2017			
Congressional Add: Stryker Operational Needs Statement Lethality Development (Engineering/Prototypes) Congressional Add		70.146	-			
FY 2016 Accomplishments: Began Development engineering of the Stryker Operational Needs Statement Lethality upgrade, to include conduct of system design reviews, completion of purchase of prototype material, initial preparation of the source vehicles and initiation of Operator Manual development.						
Congressional Add: Stryker Operational Needs Statement Lethality Testing Congressional Add		6.410	-			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017	
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) EE2 / <i>Stryker Improvement</i>	
		FY 2016	FY 2017
FY 2016 Accomplishments: Began Developmental test activities for the Stryker Operational Needs Statement Lethality upgrade, to include weapon and ammunition qualification and purchase of associated test consumables for the remainder of test.			
Congressional Add: Stryker Operational Needs Statement Lethality Contractor Support to Test Congressional Add		16.456	-
FY 2016 Accomplishments: Developmental test activities for the Stryker Operational Needs Statement Lethality upgrade, to include weapon and ammunition qualification and purchase of associated test consumables for the remainder of the test.			
Congressional Add: Stryker Operational Needs Statement Lethality Government Engineering and Project Management Congressional Add		4.488	-
FY 2016 Accomplishments: Continued Government Systems Engineering and Program Management support (labor, travel, training, supplies, and equipment) to support Operational Needs Statement Lethality development.			
Congressional Adds Subtotals		97.500	-

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>	
• Stryker Vehicle: <i>Stryker Vehicle (G85100)</i>	175.474	71.680	-	-	-	-	-	-	-	-	Continuing	Continuing
• Stryker Modification: <i>Stryker Modification (GM0100)</i>	388.385	82.681	97.552	-	97.552	384.523	510.992	602.161	602.357	-	Continuing	Continuing
• Stryker Upgrade: <i>Stryker Upgrade (G85200)</i>	412.043	444.561	-	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

AAE approval for a 3rd DVH SBCT Brigade of 337 Exchange Vehicles was given on July 26, 2013 (funded in G85100). A successful production decision for ECP 1 was executed on July 22, 2016, which provided approval to begin 4th Brigade Double-V Hull (DVH) Engineering Change Proposal 1 production (funded in Stryker Upgrade - G85200). Stryker MOD (GM0100) is for Stryker Fleet modifications to include Operational Needs Statement Lethality production and fielding in FY16-18 and Engineering Change Proposal 1 retrofits in FY19-22 and Engineering Change Proposal 2 (ECP 2) retrofits in FY19-22.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) EE2 / <i>Stryker Improvement</i>

D. Acquisition Strategy

The Stryker Engineering Change Proposal (ECP) 1 effort will buy back the vehicle space, weight, and power margin lost due to the addition of numerous kits in response to eleven years of war (20-combat rotations & 37+ million total miles), in order to allow integration of the future network (as directed by VCSA in August 2011) without further degrading the performance of the platform. In May 2012, Stryker ECP 1 program (Phase I) was approved, permitting preliminary design and integration efforts on both the Flat Bottom (FB) and Double-V Hull (DVH) variants. In March 2013, Phase II approved upgrading the mechanical power, electrical power generation, chassis upgrades and the in-vehicle network for the DVH vehicles. Based on additional testing conducted in the summer of 2013, the decision was made to focus ECP efforts on the DVH and defer efforts on flat bottom Strykers. ECP 1 Phase II contract, awarded November 25, 2013, continues development engineering, prototype build test and evaluation. The Production decision (Phase III) will determine the production requirements of the technologies selected in Phase II.

On 2 July 2015, ASARC authorization was granted to execute the Stryker Operational Needs Statement (ONS) Lethality effort. ONS Lethality Engineering, Manufacturing, and Development (EMD) contracts for Non-Recurring Engineering (NRE) and Logistics Products Development/Test Support were awarded in Jan 2016 and May 2016, respectively (Cost Plus Incentive-Fee basis). The ONS Lethality Production/Retrofit contract was awarded in May 2016 through an Undefined Contract Action (UCA). Definitization of the Fixed Price Incentive Fee (FPIF) Production contract occurred in March 2017.

The ECP 2 effort will focus on the integration of a suite of complementary Mission Equipment Package (MEP) lethality upgrades (medium caliber weapon, under armor Javelin, common masted sensor, improved target acquisition optics, and other capabilities) that will improve the suppressive fire and armored vehicle engagement capabilities across the Army's Stryker Brigade Combat Teams (SBCTs). Army Acquisition Executive (AAE) approval to initiate the ECP2 effort was received in a 30 September 2016 Acquisition Decision Memorandum (ADM).

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) EE2 / <i>Stryker Improvement</i>
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Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Stryker ONS Lethality Project Management	MIPR	PEO GCS/TACOM : Sterling Heights, MI	0.345	4.488	Jan 2016	6.521	Jan 2017	-		-		-	2.501	13.855	0.000
Survivability Enhancements Government Engineering and Projec Management	MIPR	PEO GCS/TACOM : Various	0.000	0.161	Jan 2016	-		-		-		-	0.000	0.161	0.000
Project Management Office (PMO)	MIPR	PEO GCS/TACOM : Various	4.576	5.039	Oct 2015	13.139	Oct 2016	8.650	Oct 2017	-		8.650	26.382	57.786	0.000
Subtotal			4.921	9.688		19.660		8.650		-		8.650	28.883	71.802	0.000

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Stryker ECP 1 Development	SS/CPFF	GDLS, MI : Various	90.122	73.049	Oct 2015	14.913	Oct 2016	-		-		-	Continuing	Continuing	0.000
Stryker ECP 1 Training Device Updates	MIPR	PEO STRI, FL : Various	0.000	-		5.980	Nov 2016	-		-		-	Continuing	Continuing	0.000
Stryker ONS Lethality Development	SS/CPFF	GDLS, MI : Various	9.217	70.146	Jan 2016	17.967	Nov 2016	-		-		-	Continuing	Continuing	0.000
Stryker ECP 2 Development	C/Various	PM CSW; PM CCWS : Various	0.000	-		19.088	Jan 2017	50.639	Apr 2018	-		50.639	Continuing	Continuing	0.000
Survivability Enhancements	Various	US Army TARDEC, Various : Sterling Heights, MI	0.000	13.124	Sep 2016	14.400	Dec 2016	2.133	Oct 2017	-		2.133	Continuing	Continuing	0.000
Subtotal			99.339	156.319		72.348		52.772		-		52.772	-	-	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army											Date: May 2017				
Appropriation/Budget Activity 2040 / 7						R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>					Project (Number/Name) EE2 / <i>Stryker Improvement</i>				

Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Stryker ECP 1 Testing	MIPR	Army Test Centers : Various	6.145	19.138	Dec 2015	11.048	Dec 2016	18.760	Dec 2017	-		18.760	Continuing	Continuing	0.000
Stryker ECP 1 Contractor Support to Test	SS/CPFF	GDLS, MI : Various	14.890	6.490	Feb 2016	3.255	Dec 2016	0.080	Feb 2018	-		0.080	Continuing	Continuing	0.000
Stryker ONS Lethality Test	MIPR	Army Test Centers : Various	0.238	6.410	Feb 2016	18.665	Oct 2016	-		-		-	Continuing	Continuing	0.000
Stryker ONS Lethality Contractor Support to Test	SS/CPFF	GDLS, MI : Various	0.000	16.456	Jan 2016	11.547	Dec 2016	-		-		-	Continuing	Continuing	0.000
Stryker ECP 2 Testing	MIPR	Army Test Centers : Various	0.000	-		-		0.380	Aug 2018	-		0.380	Continuing	Continuing	0.000
Survivability Enhancements	MIPR	Army Test Centers : Various	0.000	0.635	Jan 2016	-		-		-		-	0.000	0.635	0.000
Subtotal			21.273	49.129		44.515		19.220		-		19.220	-	-	0.000
Project Cost Totals			125.533	215.136		136.523		80.642		-		80.642	-	-	0.000

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) EE2 / <i>Stryker Improvement</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
	Stryker Engineering Change Proposal (ECP) 1 (Phase II)	ECP 1 Design/Prototype/Logistics Products																										
Stryker ECP 1 Tropic Region Test																												
Stryker ECP 1 Cold Region Test																												
Stryker ECP 1 Safety/Performance/RAM Test	ECP 1 Safety/Performance/RAM Test																											
(1) Stryker ECP 1 Production Decision (Phase III)/Award																												
Stryker ECP 1 Production (Phase III)																												
(2) Stryker ECP 1 Follow-on Operational Test & Evaluation.																												
Stryker ONS Lethality Effort	ONS Design/Prototype/Logistics Products																											
(3) Stryker ONS Lethality Preliminary Design Review																												
(4) Stryker ONS Lethality Critical Design Review																												
(5) Stryker ONS Lethality Test Readiness Review																												
Stryker ONS Lethality Safety/RAM/Live Fire Test/ Ammo qualification	ONS Safety/Live Fire Test/RAM Test																											
(6) Stryker ONS Lethality Early User Test & Evaluation																												

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) EE2 / <i>Stryker Improvement</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
(1) Stryker ONS Lethality Final Assembly Decision					▲ ONS Final Assy Decision																							
Stryker ONS Lethality Production																												
Stryker Survivability Enhancements																												
Stryker ECP 2 Javelin Integration																												
Stryker ECP 2 Javelin Safety/Software/Performance Test																												
Stryker ECP 2 Javelin Retrofit																												
(2) Stryker ECP 2 Javelin First Unit Equipped (FUE)																												
Stryker ECP 2 Mod. Impr. Target Acquisition (MITAS) Upgrade Integrati																												
Stryker ECP 2 Mod. Impr. Target Acquisition (MITAS) Safety/Perf./Elec.																												
Stryker ECP 2 Medium Caliber Weapon Trade Study/Cost Benefit Analy																												
Stryker ECP 2 Medium Caliber Weapon Integration																												
Stryker ECP 2 Medium Caliber Weapon Safety/Perf./Live Fire/Electronic																												
Stryker ECP 2 Medium Caliber Weapon Production/Retrofit																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) EE2 / <i>Stryker Improvement</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Stryker Engineering Change Proposal (ECP) 1 (Phase II)	1	2014	1	2019
Stryker ECP 1 Tropic Region Test	3	2016	1	2017
Stryker ECP 1 Cold Region Test	1	2016	3	2016
Stryker ECP 1 Safety/Performance/RAM Test	4	2015	3	2018
Stryker ECP 1 Production Decision (Phase III)/Award	4	2016	4	2016
Stryker ECP 1 Production (Phase III)	4	2017	4	2020
Stryker ECP 1 Follow-on Operational Test & Evaluation.	4	2018	4	2018
Stryker ONS Lethality Effort	1	2016	2	2018
Stryker ONS Lethality Preliminary Design Review	2	2016	2	2016
Stryker ONS Lethality Critical Design Review	3	2016	3	2016
Stryker ONS Lethality Test Readiness Review	1	2017	1	2017
Stryker ONS Lethality Safety/RAM/Live Fire Test/ Ammo qualification	2	2016	2	2018
Stryker ONS Lethality Early User Test & Evaluation	2	2018	2	2018
Stryker ONS Lethality Final Assembly Decision	3	2017	3	2017
Stryker ONS Lethality Production	4	2017	3	2018
Stryker Survivability Enhancements	1	2017	4	2018
Stryker ECP 2 Javelin Integration	2	2017	3	2019
Stryker ECP 2 Javelin Safety/Software/Performance Test	4	2018	3	2019
Stryker ECP 2 Javelin Retrofit	2	2019	4	2026
Stryker ECP 2 Javelin First Unit Equipped (FUE)	3	2020	3	2020
Stryker ECP 2 Mod. Impr. Target Acquisition (MITAS) Upgrade Integration	4	2017	4	2022
Stryker ECP 2 Mod. Impr. Target Acquisition (MITAS) Safety/Perf./Elec. Test	1	2022	4	2022

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) EE2 / <i>Stryker Improvement</i>

Events	Start		End	
	Quarter	Year	Quarter	Year
Stryker ECP 2 Medium Caliber Weapon Trade Study/Cost Benefit Analysis/SSEB	3	2017	4	2018
Stryker ECP 2 Medium Caliber Weapon Integration	3	2018	4	2021
Stryker ECP 2 Medium Caliber Weapon Safety/Perf./Live Fire/Electronics Testing	1	2019	1	2023
Stryker ECP 2 Medium Caliber Weapon Production/Retrofit	4	2020	4	2026

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>				Project (Number/Name) FD8 / <i>Light Armored Vehicle Improvement</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
FD8: <i>Light Armored Vehicle Improvement</i>	-	1.520	0.000	3.100	-	3.100	0.000	0.000	0.000	0.000	0.000	4.620
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Light Armored Vehicle improvement program will design, test and modify two Light Armored Vehicles (LAV-25A2s) for Low Velocity Air Drop (LVAD) to inform operational concepts for Infantry Brigade Combat Teams (IBCT) in support of Global Response Force early entry operations. This will directly support the expeditionary maneuver excursion that will be conducted by the XVIII Airborne Corps in FY17-18.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Government Engineering and Project Management	1.520	-	3.100	-	3.100
Description: Funding is provided for the following effort					
FY 2016 Accomplishments: Initiated and continued the design phase of developing LAV25 modification kits to support Low Velocity Air Drop (LVAD) capability.					
FY 2018 Base Plans: The Army plans to use 6 LAV-25A2s in a training excursion to inform operational concepts for Airborne Infantry Brigade Combat Teams in support of Global Response Force early entry operation and to determine airdrop feasibility. XVIII Airborne Corps will have an opportunity to assess operational employment of LAV-25A2s, develop tactics, techniques and procedures and assess the air drop feasibility through air certification testing. The Army plans to determine whether or not to field additional LAV-25A2s to XVIII Airborne Corps based on results of the excursion and air drop testing.					
In FY2018 the Army will complete air certification testing to determine LAV-25A2 airdrop feasibility. If the excursion is successful and the Army decides to field additional vehicles it is anticipated that additional modifications and testing will be required to address upgrades to survivability, mobility, integrate Army communications equipment and add obsolescence upgrades for commonality with USMC fielded systems.					
Accomplishments/Planned Programs Subtotals	1.520	-	3.100	-	3.100

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203735A / <i>Combat Vehicle Improvement Programs</i>	Project (Number/Name) FD8 / <i>Light Armored Vehicle Improvement</i>

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

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>					R-1 Program Element (Number/Name) PE 0203740A / <i>Maneuver Control System</i>							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	14.864	4.031	6.639	-	6.639	4.047	0.171	0.174	0.000	Continuing	Continuing
484: <i>Maneuver Control System</i>	-	14.864	4.031	6.639	-	6.639	4.047	0.171	0.174	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

Tactical Mission Command is a suite of products and services that provide commanders and their staff executive decision making capability in a collaborative environment. The suite of products currently in development consist of Command Web (CW), Tactical Services Infrastructure (TSI), and an Army Voice Communication System (WAVE). TMC satisfies requirements and capabilities identified in the MCS 6.4 Capability Production Document. The overarching capability includes a user-defined Common Operating Picture (COP) with integrated Command and Control (C2) and Situational Awareness (SA), map-centric collaboration, Army Mission Command Systems (and others) enabling system interoperability, data management, and enterprise services. TMC contributes to Mission Command (MC) Convergence for commanders and staff to effectively conduct collaborative mission planning and execution across a range of operations and spectrum of conflict. Legacy products supported by this Budget Item include Command Post of the Future (CPOF) and Battle Command Common Services (BCCS).

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	15.408	4.031	6.435	-	6.435
Current President's Budget	14.864	4.031	6.639	-	6.639
Total Adjustments	-0.544	0.000	0.204	-	0.204
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.544	-			
• Adjustments to Budget Years	0.000	0.000	0.204	-	0.204

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203740A / <i>Maneuver Control System</i>				Project (Number/Name) 484 / <i>Maneuver Control System</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
484: <i>Maneuver Control System</i>	-	14.864	4.031	6.639	-	6.639	4.047	0.171	0.174	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Tactical Mission Command (TMC) is a portfolio of products and services that enable commanders and their staff with collaborative environment, planning tools, and Common Operation Picture (COP) management and other maneuver functional tools. The overarching capability includes above platform level user-defined COP with integrated Command and Control (C2) and Situational Awareness (SA), map-centric collaboration, Army Mission Command System and other enabling system interoperability, data management and enterprise services. Products include:

Command Web is a set of modular software widgets served up over the web providing engineering functionality. Improved supportability and ease-of-use in robust network environments.

Tactical Server Infrastructure (TSI) provides the network available services critical to ensuring system and software can transmit the network effectively. Additionally, TSI serves as the hosting platform for many other enabling software systems, as well as multiple Warfighter Functional Area Applications (WFAs) such as Intel, Air Missile Defense Workstations and Fires gateway, providing efficiencies in the Command Post via decreased size, weight and power.

WAVE is the voice of the internet protocol common voice solution for the CPOF portfolio of programs. It provides real-time voice interoperability between radios, intercom and other previously fielded technologies in support of the Commander's update briefing and other Mission Command tasks.

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

	FY 2016	FY 2017	FY 2018
Title: Tactical Applications (TacApps)	9.209	-	-
Description: Implementation of essential warfighting functions that incorporate a common look and feel to application based capabilities leveraging common services and infrastructure which are COE/CPCE compliant. Provides real time rich collaboration across echelons that can run on both client and tablet			
FY 2016 Accomplishments: COE CPCE compliant solution set encompassing the capabilities of CW, CTV, CPOF, & Logistic Widgets with in a seamless suite. Enhance ease of use and admin simplification			
Title: BCCS / TSI software development / integration	-	2.544	-
FY 2017 Plans: Finalize development of TSI v.1 ensuring system is fully capable of supporting TMC portfolio of products			
Title: Command Web Development	0.441	0.549	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203740A / <i>Maneuver Control System</i>	Project (Number/Name) 484 / <i>Maneuver Control System</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>Description: Command Web provides modular software widgets served up over the web providing engineering functionality. Improved supportability and ease-of-use in robust network environments (compliant w/COE guidance)</p> <p>FY 2016 Accomplishments: developed patches required to meet Net ready Key Performance Parameters (KPPs)</p> <p>FY 2017 Plans: Fixes that may be realized during Operational Test</p>				
<p>Title: Program Management Office</p> <p>Description: Codification of program operational requirements into discrete technical packages for development, testing, deployment, and support over the systems lifecycle.</p> <p>FY 2016 Accomplishments: Codification of program operational requirements into discrete technical packages for development, testing, deployment, and support over the systems lifecycle</p> <p>FY 2017 Plans: Codification of program operational requirements into discrete technical packages for development, testing, deployment, and support over the systems lifecycle</p> <p>FY 2018 Plans: Codification of program operational requirements into discrete technical packages for development, testing, deployment, and support over the systems lifecycle</p>		2.198	0.320	0.639
<p>Title: Test and Evaluation</p> <p>Description: Encompasses formal test (operational assessment/test, joint certification, interoperability, and information assurance) and informal testing such as acceptance testing and risk reduction testing.</p> <p>FY 2016 Accomplishments: Formal test (Joint certification, interoperability, and information assurance) and informal testing such as acceptance testing and risk reduction testing.</p> <p>FY 2017 Plans: Formal test (Joint certification, interoperability, and information assurance) and informal testing such as acceptance testing and risk reduction testing. CTSF integration testing for CPOF</p> <p>FY 2018 Plans:</p>		3.016	0.018	0.512

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203740A / <i>Maneuver Control System</i>	Project (Number/Name) 484 / <i>Maneuver Control System</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Formal test (Joint certification, interoperability, and information assurance) and informal testing such as acceptance testing and risk reduction testing.			
Title: WAVE MIP / Development / Intergration	-	0.600	5.488
Description: Developing and integrating voice over IP solutions into the CPOF portfolio of programs. It provides real-time voice interoperability between radios,			
FY 2017 Plans: Integrate VOIP into TMC products, ensure MIP coalition software in compatible with current TMC products			
FY 2018 Plans: Finalize integration of WAVE (VOIP) with TMC portfolio of products.			
Accomplishments/Planned Programs Subtotals	14.864	4.031	6.639

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• Funding: <i>BA9320 Maneuver Control System (MCS)</i>	125.443	151.318	132.572	-	132.572	69.909	58.180	60.996	59.776	Continuing	Continuing
• SPARES: <i>BS9710 MCS Spares Procurement</i>	0.626	0.593	4.869	-	4.869	-	-	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy
In accordance with the Training and Doctrine Command (TRADOC) requirements document approved in 2008, Maneuver Control System Capabilities Production Document, software capability will be developed in 3-year increments in support of Common Operating Environment (COE) Guidance designed to deploy specified Mission Command Essential Capabilities to operating force commanders and their integrated battle staffs. This strategy accounts for subsequent Army directives and continued migration to the Army COE; designed to optimize opportunities for improved interoperability. The products developed under this funding line are an integral part of the Army Mission Command System of Systems.

E. Performance Metrics
N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>					R-1 Program Element (Number/Name) PE 0203743A / <i>155MM Self-Propelled Howitzer Improvements</i>							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	40.784	-	40.784	42.137	35.391	23.472	0.000	0.000	141.784
FF9: <i>PIM Improvement Program</i>	-	0.000	0.000	40.784	-	40.784	42.137	35.391	23.472	0.000	0.000	141.784

Note

The PIM improvement program is a new start effort.

A. Mission Description and Budget Item Justification

<u>B. Program Change Summary (\$ in Millions)</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	40.784	-	40.784
Total Adjustments	0.000	0.000	40.784	-	40.784
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other Adjustments 1	0.000	0.000	40.784	-	40.784

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203743A / 155MM Self-Propelled Howitzer Improvements	Project (Number/Name) FF9 / PIM Improvement Program
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
FF9: PIM Improvement Program	-	0.000	0.000	40.784	-	40.784	42.137	35.391	23.472	0.000	0.000	141.784
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The current Paladin Integrated Management (PIM) is an ACAT1C Acquisition program. The PIM improvement program is intended to address the current Howitzer capability gap based on a capability needs assessment performed by the user community to restore indirect fires support overmatch to the US Army. This effort will evaluate developing technologies to determine which configuration will add optimal value to the Army. This effort may include but is not limited to the integration of a new cannon, gun mount, gun drive systems, fire control systems and autoloader into the M109A7 Howitzer. Analysis will be required to evaluate the impact of the new cannon technology on current platform chassis, cab, suspension, mobility, and electronic architecture. This evaluation will be the foundation for this Engineering Change Proposal (ECP) and further inform the level of effort needed to integrate this capability into the current SPHS. This program is a new start in FY18.

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

	FY 2016	FY 2017	FY 2018
Title: PIM Improvement Program	-	-	40.784
Description: Funding is provided for the following efforts:			
FY 2018 Plans: Will conduct a Cost Benefit Analysis (CBA) comparing several different packages of upgrades for the M109A7. Each upgrade package will be evaluated for cost, technology readiness and added performance. At the conclusion of the CBA the Army will be better informed to choose a path which can be sole source with the current vendor, open competition, or continue with government development through Engineering Manufacturing Development (EMD). This work effort is to pursue Objective Indirect Fire Range Requirement in the current M109 FOV Capability Production Document (CPD). The effort will address increased range requirements from a holistic development process. Program will focus on gun mount, breech, tube, and fire control. It will be designed around M109A7 objective requirements for range. It is intended to address capability gaps as identified by the Army Chief of Staff.			
Accomplishments/Planned Programs Subtotals	-	-	40.784

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

N/A

Remarks

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203743A / 155MM Self-Propelled Howitzer Improvements	Project (Number/Name) FF9 / PIM Improvement Program

D. Acquisition Strategy

PdM Self Propelled Howitzer will conduct a Cost Benefit Analysis (CBA) comparing several different packages of upgrades for the M109A7. Each upgrade package will be evaluated for cost, technology readiness and added performance. At the conclusion of the CBA the Army will be better informed to choose a path which can be sole source with the current vendor, open competition, or continue with government development through Engineering Manufacturing Development (EMD).

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 7				PE 0203743A / 155MM Self-Propelled Howitzer Improvements				FF9 / PIM Improvement Program							
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
PIM Improvement Program	C/TBD	To Be Determined : To Be Determined	0.000	-		-		38.784	Jun 2018	-		38.784	0.000	38.784	0.000
Subtotal			0.000	-		-		38.784		-		38.784	0.000	38.784	0.000
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
PMO/PEO Support	Various	PM/PEO PIM : Picatinny	0.000	-		-		2.000	Dec 2017	-		2.000	0.000	2.000	0.000
Subtotal			0.000	-		-		2.000		-		2.000	0.000	2.000	0.000
Project Cost Totals			0.000	-		0.000		40.784		-		40.784	0.000	40.784	0.000
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203743A / 155MM Self-Propelled Howitzer Improvements	Project (Number/Name) FF9 / PIM Improvement Program
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
	[Gantt Chart Area]																											
TEMP Development	[Red shaded area]																											
Engineering & Manufacturing Development (EMD)	[Blue bar from FY 2018 Q4 to FY 2022 Q4]																											
Systems Engineering Plan (SEP)	[Blue bar in FY 2017 Q4]																											
Preliminary Design Review (PDR)	[Blue bar in FY 2019 Q2]																											
Critical Design Review (CDR)	[Blue bar in FY 2020 Q3]																											
(1) CPD Complete	[Blue triangle in FY 2017 Q2]																											
Acquisition Development Start	[Blue bar in FY 2018 Q2]																											
TDP Development	[Blue bar from FY 2018 Q4 to FY 2020 Q2]																											
Prototype Build	[Blue bar from FY 2020 Q1 to FY 2020 Q4]																											
Life Cycle Sustainment Plan (LCSP) Complete	[Blue bar in FY 2020 Q4]																											
Test	[Blue bar from FY 2021 Q1 to FY 2022 Q4]																											
System Verification Review (SVR)	[Blue bar in FY 2022 Q4]																											

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203743A / 155MM Self-Propelled Howitzer Improvements	Project (Number/Name) FF9 / PIM Improvement Program

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
TEMP Development	1	2020	3	2020
Engineering & Manufacturing Development (EMD)	3	2018	1	2024
Systems Engineering Plan (SEP)	4	2017	4	2017
Preliminary Design Review (PDR)	2	2019	2	2019
Critical Design Review (CDR)	2	2020	2	2020
CPD Complete	1	2017	1	2017
Acquisition Development Start	2	2018	3	2018
TDP Development	4	2018	2	2020
Prototype Build	4	2019	3	2020
Life Cycle Sustainment Plan (LCSP) Complete	3	2020	3	2020
Test	4	2020	1	2025
System Verification Review (SVR)	4	2022	4	2022

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0203744A / Aircraft Modifications/Product Improvement Programs
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	35.793	39.358	-	39.358	18.488	6.962	4.575	5.475	Continuing	Continuing
EB6: MQ-1C Gray Eagle MODS	-	0.000	35.793	39.358	-	39.358	18.488	6.962	4.575	5.475	Continuing	Continuing

A. Mission Description and Budget Item Justification

The MQ-1C Gray Eagle provides the Army with an extended range, multi-purpose (ERMP) unmanned aircraft system (UAS); capable of executing reconnaissance, security, attack, and intelligence collection missions in the range of military operations (ROMO). Sensors/payloads include an Electro-Optical/Infrared/Laser Designator (EO/IR/LD), Synthetic Aperture Radar/Moving Target Indicator (SAR/MTI), Signals Intelligence (SIGINT), and Hellfire missiles; providing a near all-weather mission capability. MQ-1C Gray Eagle is a dedicated, assured, multi-mission Unmanned Aircraft System (UAS) fielded to all Army Divisions, Intelligence and Security Command and Army Special Operations Command in support of the commander's warfighting priorities.

The MQ-1C Gray Eagle Modification/Product Improvement Program (PIP) funding is required for the implementation of the Alternate Munition integration, Global Positioning System (GPS) Denied, an electronic warfare capability, Universal Ground Control Station (UGCS) improvements, and Ground Based Sense And Avoid (GBSAA) Block II.

The Fiscal Year (FY) 2018 Aircraft Modification/Product Improvement funding of \$39.358 million will support the development required to integrate Alternate Munition, GPS Denied, and UGCS Improvements into the MQ-1C Gray Eagle product. GBSAA Research, Development, Test, and Evaluation (RDTE) will provide development, integration and testing for Block II. This moves the GBSAA display into the UGCS to provide information to the aircraft operator to include maneuver recommendations necessary to avoid intruder aircraft. Adds capabilities to minimize operator workload and combines two operator screens onto one display to shrink footprint. Block II decreases operational and sustainment costs, operator workload, hardware/software costs, increases system safety, and provides full materiel release for soldier operation.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.000	35.793	39.579	-	39.579
Current President's Budget	0.000	35.793	39.358	-	39.358
Total Adjustments	0.000	0.000	-0.221	-	-0.221
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other Adjustments 1	0.000	0.000	-0.221	-	-0.221

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0203744A / <i>Aircraft Modifications/Product Improvement Programs</i>	
<u>Change Summary Explanation</u> N/A		

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203744A / Aircraft Modifications/ Product Improvement Programs				Project (Number/Name) EB6 / MQ-1C Gray Eagle MODS			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EB6: MQ-1C Gray Eagle MODS	-	0.000	35.793	39.358	-	39.358	18.488	6.962	4.575	5.475	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The MQ-1C Gray Eagle provides the Army with an extended range, multi-purpose (ERMP) unmanned aircraft system (UAS); capable of executing reconnaissance, security, attack, and intelligence collection missions in the range of military operations (ROMO). Sensors/payloads include an Electro-Optical/Infrared/Laser Designator (EO/IR/LD), Synthetic Aperture Radar/Moving Target Indicator (SAR/MTI), Signals Intelligence (SIGINT), and HELLFIRE missiles; providing a near all-weather mission capability. MQ-1C Gray Eagle is a dedicated, assured, multi-mission Unmanned Aircraft System (UAS) fielded to all Army Divisions, Intelligence and Security Command and Army Special Operations Command in support of the commander's warfighting priorities.

The MQ-1C Gray Eagle Modification/Product Improvement Program (PIP) funding is required for the implementation of the Alternate Munition capability, Global Positioning System (GPS) Denied which is an electronic warfare capability, Universal Ground Control Station (UGCS) improvements, and Ground Based Sense And Avoid (GBSAA) Block II.

The Fiscal Year (FY) 2018 Aircraft Modification/Product Improvement funding of \$39.358 million will support the development required to integrate Alternate Munition, GPS Denied, and UGCS Improvements for the MQ-1C Gray Eagle product. GBSAA RDTE will provide development, integration and testing for Block II. Moving the GBSAA display into the UGCS provides the aircraft operator real-time information for evasive maneuvers. Funding supports additional features to minimize operator workload and combines two operator screens onto one display to decrease logistic footprint. Block II decreases operational and sustainment costs, operator workload, hardware/software costs, increases system safety, and provides full materiel release for soldier operation.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Global Positioning System (GPS) Denied	-	2.741	4.313	-	4.313
Description: GPS Denied					
FY 2017 Plans: Funding supports development of an electronic warfare capability and a capability to continue operations during periods of GPS outage as well as the ability to identify GPS jammer position will provide a significant combat multiplier to the Warfighter.					
FY 2018 Base Plans: Funding supports continued development of an electronic warfare capability that provides the system the ability to continue operations during periods of GPS outage as well as the ability to identify GPS jammer					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017			
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203744A / Aircraft Modifications/ Product Improvement Programs	Project (Number/Name) EB6 / MQ-1C Gray Eagle MODS				
B. Accomplishments/Planned Programs (\$ in Millions)						
		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
position location. The funding will enable the MQ-1C Gray Eagle to implement all levels of electro-optical countermeasures that will be compatible with other tactical UAS's.						
Title: Universal Ground Control Station (UGCS) Improvement						
Description: UGCS Improvement						
FY 2017 Plans: Development of UGCS Improvement - Funding supports development of Hardware, Software and documentation improvements based on Follow-On Test & Evaluation (FOTE) findings.						
FY 2018 Base Plans: Funding will be used to continue the implementation, training, and documentation updates to correct FOT&E findings and maintain the Net Ready KPP for the MQ-1C Gray Eagle UGCS.						
		-	7.825	9.235	-	9.235
Title: Alternate Munition Integration						
Description: Alternate Munition Integration						
FY 2017 Plans: Development of Alternate Munition Integration - Funding supports implementation of software changes and documentation/training that provides the ability of Soldiers to operate and maintain the MQ-1C system with Alternate Munition and Hellfire missiles.						
FY 2018 Base Plans: Development of software changes, training, and documentation, ground/flight tests, environmental testing, Electromagnetic Environmental Effects (E3) testing, production prove-out tests, and live-fire tests. This capability will provide reduced collateral damage during weapons engagement, increase munitions inventory without affecting flight endurance, reducing enemy engagement costs and potentially reduce advanced audible and visual signatures.						
		-	11.973	9.180	-	9.180
Title: Ground Base Sense and Avoid (GBSAA) Block II						
Description: GBSAA Block II						
FY 2017 Plans:						
		-	12.851	8.330	-	8.330

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203744A / Aircraft Modifications/ Product Improvement Programs	Project (Number/Name) EB6 / MQ-1C Gray Eagle MODS

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Development and Integration for Block II to provide GBSAA display moved to Ground Control Station (GCS). Maneuver Recommendation to Aircraft Operator (AO). FY 2018 Base Plans: Funding supports the development and Integration for Block II to provide GBSAA display moved to Ground Control Station (GCS). Maneuver Recommendation to Aircraft Operator (AO).					
Title: Ground Base Sense and Avoid (GBSAA) Test Block II Description: Ground Base Sense and Avoid (GBSAA) Test Block II FY 2017 Plans: Test Block II. Additional capabilities for functionality and software cyber security upgrades.	-	0.403	-	-	-
Title: Survivability FY 2018 Base Plans: Funding for Electronic Attack (EA) survivability requirements for the MQ-1C Gray Eagle will be used to assess vulnerabilities of the current datalink. The Joint Software Integration Lab (JSIL) will be funded to research and provide a Datalink Vulnerabilities Improvement Assessment. The prime contractor, General Atomics, will be funded to provide survivability solutions for both software and hardware features.	-	-	8.300	-	8.300
Accomplishments/Planned Programs Subtotals	-	35.793	39.358	-	39.358

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• MQ-1 UAV (A00005) - Base APA: MQ-1 Unmanned Aircraft Vehicle (UAV)	-	185.388	30.205	87.300	117.505	-	-	-	-	0.000	302.893
• MQ-1 UAV (A00002) - Base APA: MQ-1C Gray Eagle Modifications	-	-	74.291	-	74.291	104.240	58.724	24.662	-	Continuing	Continuing
• MQ-1 UAV (375219) - RDTE: MQ-1C Gray Eagle - Army UAV (MIP)	22.285	-	9.574	-	9.574	-	-	-	-	0	31.859
Remarks											

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203744A / Aircraft Modifications/ Product Improvement Programs	Project (Number/Name) EB6 / MQ-1C Gray Eagle MODS

D. Acquisition Strategy

An Extended Range Multi-Purpose (ERMP) Operational Requirement Document (ORD) was approved by the Joint Requirement Oversight Council (JROC) 6 Apr 2005. Milestone B occurred on 20 Apr 2005, and the System Development and Demonstration contract was awarded 8 Aug 2005, as a result of a competitive solicitation which included a vendor system capabilities demonstration. A Capabilities Production Document (CPD) was approved 14 Mar 2009. MQ-1C Gray Eagle completed FOTE 12 Jun 2015.

The RDTE funded elements for GPS Denied, UGCS Improvements and Alternate Munition Integration addressed in this submission are planned for award on the Gray Eagle Engineering Services contract as a Sub-Engineering Services Memorandum (SESM) task order, and as Military Interdepartmental Purchase Requisitions (MIPRs) to various other Government Agencies. The purpose of the SESMs is to mature the respective designs to a level that Engineering Change Requests (ECR) are submitted to the Government via the Configuration Control Board (CCB). Following successful completion of the SESM and CCB approval, a contract modification to retrofit and/or cut-in the respective engineering change will be awarded on the appropriate Performance Based Logistics (PBL) or Production contract. The RDTE funded element for GBSAA Block II addressed in this submission are planned for award on various contracts and MIPR actions to other government agencies.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203744A / Aircraft Modifications/ Product Improvement Programs	Project (Number/Name) EB6 / MQ-1C Gray Eagle MODS
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Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Global Positioning System (GPS) Denied	SS/CPFF	General Atomics/ ASI : San Diego, CA	0.000	-		2.577	Jan 2017	4.313	Jan 2018	-		4.313	Continuing	Continuing	0.000
Universal Ground Control Station (UGCS) Improvements	SS/CPFF	General Atomics/ ASI : San Diego, CA	0.000	-		7.356	Jan 2017	9.235	Jan 2018	-		9.235	Continuing	Continuing	0.000
Alternate Munition Integration	MIPR	Various : Various	0.000	-		11.214	Jan 2017	9.180	Jan 2018	-		9.180	Continuing	Continuing	0.000
Ground Base Sense and Avoid Block II	SS/CPFF	Various : Various	0.000	-		12.080	Oct 2016	8.330	Oct 2017	-		8.330	Continuing	Continuing	0.000
Survivability	SS/CPIF	GA-ASI : Poway, CA	0.000	-		-		8.300	Jan 2018	-		8.300	Continuing	Continuing	0.000
Subtotal			0.000	-		33.227		39.358		-		39.358	-	-	0.000

Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 - MQ-1	MIPR	Various : Various	0.000	-		1.392	Mar 2017	-		-		-	0	1.392	0
Engineering Support - GBSAA	MIPR	Various : Various	0.000	-		0.795	Mar 2017	-		-		-	0	0.795	0
Subtotal			0.000	-		2.187		-		-		-	0.000	2.187	0.000

Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Development Testing and Software Testing Block II - GBSAA	MIPR	Various : Various	0.000	-		0.379	Mar 2017	-		-		-	0.000	0.379	0.000
Subtotal			0.000	-		0.379		-		-		-	0.000	0.379	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army							Date: May 2017						
Appropriation/Budget Activity 2040 / 7				R-1 Program Element (Number/Name) PE 0203744A / Aircraft Modifications/ Product Improvement Programs				Project (Number/Name) EB6 / MQ-1C Gray Eagle MODS					
	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	-		35.793		39.358		-		39.358	-	-	0.000

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203744A / Aircraft Modifications/ Product Improvement Programs	Project (Number/Name) EB6 / MQ-1C Gray Eagle MODS
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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 - GBSAA					EMD - GBSAA																							
Alternate Munition Integration									Alternate Munition Integration																			
Universal Ground Control Station Improvements									UGCS Improvements																			
Global Positioning System Denied									GPS																			
Engineering and Software Development - MQ-1 Gray Eagle									ESD-GE																			
Engineering and Software Development - GBSAA									EMD - GBSAA																			
Training Development and Software/System Testing - MQ-1 Gray Eagle									DTST-GE																			
(1) Critical Design Review - GBSAA									▲ CDR-GBSAA																			
Training Development and Software/System Testing- GBSAA									DTST-GBSAA																			
Material Release - GBSAA									MR-GBSAA																			
Survivability													FUE - GBSAA															
(2) First Unit Equipped - GBSAA																	▲ FUE - GBSAA											

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203744A / Aircraft Modifications/ Product Improvement Programs	Project (Number/Name) EB6 / MQ-1C Gray Eagle MODS

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Engineering and Manufacturing Development - GBSAA	1	2017	3	2017
Alternate Munition Integration	2	2017	4	2018
Universal Ground Control Station Improvements	2	2017	4	2019
Global Positioning System Denied	2	2017	4	2021
Engineering and Software Development - MQ-1 Gray Eagle	2	2017	4	2021
Engineering and Software Development - GBSAA	2	2017	2	2018
Training Development and Software/System Testing - MQ-1 Gray Eagle	3	2017	4	2019
Critical Design Review - GBSAA	4	2017	4	2017
Training Development and Software/System Testing- GBSAA	1	2018	4	2018
Materiel Release - GBSAA	3	2018	4	2018
Survivability	1	2019	4	2024
First Unit Equipped - GBSAA	4	2019	4	2019

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0203752A / Aircraft Engine Component Improvement Program
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.349	0.259	0.145	-	0.145	0.148	0.146	0.000	0.000	0.000	1.047
106: A/C Compon Improv Prog	-	0.349	0.259	0.145	-	0.145	0.148	0.146	0.000	0.000	0.000	1.047

A. Mission Description and Budget Item Justification

Aircraft Engine Component Improvement Program (CIP) develops, tests, and qualifies improvements to aircraft engine components to correct service-revealed deficiencies, improve flight safety, enhance readiness and reduce operating and support (O&S) costs. In addition, CIP provides the test vehicles for the testing and qualification efforts required as a part of the Army's Critical Safety Item (CSI) program. Non-program specific Auxiliary Power Unit (APU) as well as Unmanned Aerial Vehicle (UAV) safety and readiness issues are also addressed under this Program Element.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.364	0.259	0.145	-	0.145
Current President's Budget	0.349	0.259	0.145	-	0.145
Total Adjustments	-0.015	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.015	-			
• SBIR/STTR Transfer	-	-			

Change Summary Explanation

Fiscal Year (FY) 16 decrease of \$0.015M reflects adjustment to actual funding.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203752A / Aircraft Engine Component Improvement Program	Project (Number/Name) 106 / A/C Compon Improv Prog
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
106: A/C Compon Improv Prog	-	0.349	0.259	0.145	-	0.145	0.148	0.146	0.000	0.000	0.000	1.047
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Aircraft Engine Component Improvement Program (CIP) develops, tests, and qualifies improvements to aircraft engine components to correct service-revealed deficiencies, improve flight safety, enhance readiness and reduce operating and support (O&S) costs. In addition, CIP provides the test vehicles for the testing and qualification efforts required as a part of the Army's Critical Safety Item (CSI) program. Non-program specific Auxiliary Power Unit (APU) as well as Unmanned Aerial Vehicle (UAV) safety and readiness issues are also addressed under this Program Element (PE).

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

	FY 2016	FY 2017	FY 2018
<p>Title: T700 Engine</p> <p>Description: T700 funding is used to address flight safety and readiness problems that arise in the field. This includes programs to improving durability and reliability while reducing cost of ownership.</p> <p>FY 2016 Accomplishments: Updated engine drawings to add the latest CSI requirements.</p> <p>FY 2017 Plans: Update engine drawings to add the latest CSI requirements.</p>	0.050	0.039	-
<p>Title: UAV Engine</p> <p>Description: UAV Gray Eagle Engine Investigation at U.S. Army Research Laboratory (ARL) Vehicle Technology Directorate (VTD) at Aberdeen Proving Ground, MD. Provide research to support airworthiness, reliability and performance improvements of UAV engines. Investigate and research the technology challenges (i.e. engine performance, engine durability, engine life, and engine modifications) for reliable engine operation using JP-8 fuel and readily available MIL-spec lubricants.</p> <p>FY 2016 Accomplishments: Continued to research improvements to address service related deficiencies to improve safety and reduce O&S costs.</p> <p>FY 2017 Plans: Continue to research improvements to address service related deficiencies to improve safety and reduce O&S costs.</p> <p>FY 2018 Plans:</p>	0.201	0.130	0.085

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203752A / Aircraft Engine Component Improvement Program	Project (Number/Name) 106 / A/C Compon Improv Prog

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Will continue to research improvements to address service related deficiencies to improve safety and reduce O&S Costs.			
Title: In-House Support	0.098	0.090	0.060
Description: In-house support for the CIP engineers. Contracting support for CIP contracts.			
FY 2016 Accomplishments: Provided in-house support for the CIP engineers and contracting support for CIP contracts.			
FY 2017 Plans: Continue to provide in-house support for the CIP engineers and contracting support for CIP contracts.			
FY 2018 Plans: Will continue to provide in-house engineering support for engine CIP programs.			
Accomplishments/Planned Programs Subtotals	0.349	0.259	0.145

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
Improved designs will be implemented via Engineering Change Proposal (ECP) and follow-on procurement or modification to a production contract to introduce the improved hardware.

E. Performance Metrics
N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0203758A / Digitization
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	4.188	6.483	4.803	-	4.803	6.384	6.090	5.716	5.637	Continuing	Continuing
374: HOR Battlefield Digitizn	-	4.188	6.483	4.803	-	4.803	6.384	6.090	5.716	5.637	Continuing	Continuing

A. Mission Description and Budget Item Justification

Horizontal Battlefield Digitization is a strategy that allows warfighters, from the individual soldier and platform to echelons above corps, to share critical situation awareness (SA) and command and control (C2) information. It conducts analysis and evaluation of new information technologies, concepts, and applications of integrated management activities. Digital information technologies to acquire, exchange, and employ data throughout the operational environment, are used to provide an operational picture for leaders. This timely sharing of information significantly improves the ability to quickly make decisions, synchronize forces and fires, and increase the operational tempo. The major efforts included in the program element are: 1) Integration and synchronization of the Army's interoperability efforts; between joint and multi-national forces, combat material, and training efforts. 2) Systems engineering and integration of hardware and software from a System of Systems (SOS) perspective. 3) Develop Army Equipping Enterprise System (AE2S) integration of the Force Development Investment Information System (FDIIS), Army Flow Model (AFM), and Force Development Knowledge Center (FDKC) programs into a single integrated system.

Digitization efforts are in support of the Army Equipping Strategy, National Defense Authorization Act 804, and OSD reports to Congress.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	4.361	6.483	6.328	-	6.328
Current President's Budget	4.188	6.483	4.803	-	4.803
Total Adjustments	-0.173	0.000	-1.525	-	-1.525
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.173	-			
• Adjustments to Budget Years	0.000	0.000	-1.525	-	-1.525

Change Summary Explanation

FY 2016 Funding was reduced by (.173) million and transferred to in support of SBIR/STTR.
 FY 2018 reduction \$1.525 million realigned to meet higher priorities.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203758A / Digitization				Project (Number/Name) 374 / HOR Battlefield Digitizn			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
374: HOR Battlefield Digitizn	-	4.188	6.483	4.803	-	4.803	6.384	6.090	5.716	5.637	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project funds the Army Equipping Enterprise System (AE2S) continued development and integration of the Force Development Investment Information System (FDIIS), Army Flow Model (AFM), and the Force Development Knowledge Center (FDKC) into an improved, single system. Continued development of the suite of the AE2S applications is necessary to create and improve workflow efficiencies amongst various organizations and data base systems, Active and Reserve Component equipment transparency reporting requirements, and Active and Reserve equipment fielding plans to the Solider according to the Army Force Generation (ARFORGEN). Additionally, this program element funds various Federally Funded Research and Development Center (FFRDC) projects that provide system engineering expertise to provide unbiased advice, formulate course of actions, analyze programs and make technical support and process recommendations to create efficiencies and improve systems. Specifically, these FFRDC projects support Army Mission Command and network architecture (operational and systems) development, technical and policy document review in support of planning and acquisition, network and joint integration and interoperability evaluations and assessments, program and database analysis, independent technical analysis, special studies, and acquisition process improvement. In accordance with the National Defense Authorization Act (NDAA) 804 and support of the Office of the Secretary of Defense's (OSD) report to Congress, the Army is poised to implement an incremental approach to software development and hardware/software capability integration. This process will improve effectiveness in the identification, assessment and acquisition of capability solutions for the Army

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

	FY 2016	FY 2017	FY 2018
Title: Interoperability and Integration	0.349	1.054	0.824
Description: Funds are to be used for the following efforts			
FY 2016 Accomplishments: FFRDC contractor shall conduct independent analyses of Army, joint, and multinational interfaces, adherence to standards, implementation profiles and interoperability baselines			
FY 2017 Plans: FFRDC contractor shall conduct independent analyses of Army, joint, and multinational interfaces, adherence to standards, implementation profiles and interoperability baselines			
FY 2018 Plans: FFRDC contractor shall conduct independent analyses of Army, joint, and multinational interfaces, adherence to standards, implementation profiles and interoperability baselines			
Title: Operational Capability Analysis and Evaluation	0.294	1.114	0.871
Description: Funds are to be used for the following efforts			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203758A / Digitization	Project (Number/Name) 374 / HOR Battlefield Digitizn

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
<p><i>FY 2016 Accomplishments:</i> FFRDC contractor shall conduct iterative capability analyses and assessments consistent with CJCSI 3170 (JCIDS) and 6212 (Net Readiness) to ensure Army and joint program technical and operational requirements are consistent. Efforts support army and joint initiatives.</p> <p><i>FY 2017 Plans:</i> FFRDC contractor shall conduct iterative capability analyses and assessments consistent with CJCSI 3170 (JCIDS) and 6212 (Net Readiness) to ensure Army and joint program technical and operational requirements are consistent. Efforts support army and joint initiatives.</p> <p><i>FY 2018 Plans:</i> FFRDC contractor shall conduct iterative capability analyses and assessments consistent with CJCSI 3170 (JCIDS) and 6212 (Net Readiness) to ensure Army and joint program technical and operational requirements are consistent. Efforts support army and joint initiatives.</p>			
<p><i>Title:</i> Systems Architecture Development</p> <p><i>Description:</i> Funds are to be used for the following efforts</p> <p><i>FY 2016 Accomplishments:</i> FFRDC contractor shall conduct broad concept studies with emphasis on interoperability and joint/coalition operations.</p> <p><i>FY 2017 Plans:</i> FFRDC contractor shall conduct broad concept studies with emphasis on interoperability and joint/coalition operations.</p> <p><i>FY 2018 Plans:</i> FFRDC contractor shall conduct broad concept studies with emphasis on interoperability and joint/coalition operations.</p>	0.404	0.910	0.711
<p><i>Title:</i> AE2S Software</p> <p><i>Description:</i> Procures AE2S software integration and enhancements for the single program language, single platform system that incorporates FDIIS, CEaVa, COP and AFM.</p> <p><i>FY 2016 Accomplishments:</i> Integrate existing code-base for FDIIS, AFM and FDKC to reduce overall cost and maintenance footprint and incorporate the development of new applications to satisfy Long-Range Investment Requirements Analysis (LIRA), Sustainment Program Evaluation Group (SS PEG), and Equipping PEG (EE PEG) Manpower.</p> <p><i>FY 2017 Plans:</i></p>	2.303	1.958	1.267

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203758A / Digitization	Project (Number/Name) 374 / HOR Battlefield Digitizn		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>Integrate existing code-base for FDIIS, AFM and FDKC to reduce overall cost and maintenance footprint and incorporate the development of new applications to satisfy Long-Range Investment Requirements Analysis (LIRA), Sustainment Program Evaluation Group (SS PEG), and Equipping PEG (EE PEG) Manpower.</p> <p>FY 2018 Plans: Integrate existing code-base for FDIIS, AFM and FDKC to reduce overall cost and maintenance footprint and incorporate the development of new applications to satisfy Long-Range Investment Requirements Analysis (LIRA), Sustainment Program Evaluation Group (SS PEG), and Equipping PEG (EE PEG) Manpower.</p>				
<p>Title: Technical Reviews and Technical Performance Analysis</p> <p>Description: Funds are to be used for the following efforts</p> <p>FY 2016 Accomplishments: FFRDC contractor shall provide technology maturity assessments and prepare technical recommendations in support of Army Transformation and specific technologies of interest to G8. Test and evaluate network systems and infrastructure modeling and simulations.</p> <p>FY 2017 Plans: FFRDC contractor shall provide technology maturity assessments and prepare technical recommendations in support of Army Transformation and specific technologies of interest to G8. Test and evaluate network systems and infrastructure modeling and simulations.</p> <p>FY 2018 Plans: FFRDC contractor shall provide technology maturity assessments and prepare technical recommendations in support of Army Transformation and specific technologies of interest to G8. Test and evaluate network systems and infrastructure modeling and simulations.</p>		0.473	0.909	0.710
<p>Title: Academic Research</p> <p>Description: Apply university academic and research resources to the integration of Army complex modeling, simulation, and training in support of modernized forces.</p> <p>FY 2016 Accomplishments: Apply university academic and research resources to the integration of Army complex modeling, simulation, and training in support of modernized forces.</p> <p>FY 2017 Plans:</p>		0.365	0.538	0.420

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203758A / <i>Digitization</i>	Project (Number/Name) 374 / <i>HOR Battlefield Digitizn</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Will apply university academic and research resources to the integration of Army complex modeling, simulation, and training in support of modernized forces.			
<i>FY 2018 Plans:</i> Will apply university academic and research resources to the integration of Army complex modeling, simulation, and training in support of modernized forces.			
Accomplishments/Planned Programs Subtotals	4.188	6.483	4.803

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

N/A

Remarks

D. Acquisition Strategy

The AE2S development will be done through either a competitive Cost Plus or Fixed Price Incentive contracts that will deliver capabilities in increments, recognizing up front the need for future improvements. The objective of the strategy is to develop and optimize system capabilities while reducing risk and streamlining business and engineering processes.

FFRDC requirements will be accomplished by competitive contract.

Other efforts will be accomplished by various contract methods and types.

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0203801A / Missile/Air Defense Product Improvement Program
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	3.029	53.722	2.723	8.450	11.173	1.661	1.302	1.304	0.130	Continuing	Continuing
038: Avenger PIP	-	3.029	7.722	2.723	-	2.723	1.661	1.302	1.304	0.130	Continuing	Continuing
DT5: Stinger Product Improvement	-	0.000	46.000	0.000	8.450	8.450	0.000	0.000	0.000	0.000	0.000	54.450

A. Mission Description and Budget Item Justification

The Avenger Air Defense System is a lightweight, ground-to-air missile and gun weapon system mounted on a High Mobility Multi-purpose Wheeled Vehicle. The Avenger's mission is to protect fixed critical assets and Corps/Echelons above Corps Maneuver forces from Unmanned Aircraft Systems (UAS), Cruise Missiles (CM), and Fixed Wing and Rotary Wing aircraft. Avenger provides day/night adverse weather operations, shoot on the move capability, rapid target engagement, and remote firing capability.

Funding provided for the Avenger PIP ensures that Avenger is viable and sustainable through the end of program life. The Avenger Modification – Service Life Extension Program (MOD-SLEP) keeps Avenger sustainable and relevant until replaced by the Indirect Fire Protection Capability Increment 2- Intercept (IFPC Inc 2-I) in the Fiscal Year (FY) 31 timeframe.

The Stinger Block I missile is an advanced, fire-and-forget, short-range, man-portable, air defense weapon system. Stinger's mission is to provide the force with low-altitude air defense against fixed and rotary wing aircraft, unmanned aircraft systems (UAS) and cruise missiles (CM). Stinger is deployable from the shoulder or from a variety of platforms to include vehicles, helicopters and UAS. The missile is delivered as a certified round and requires no field testing or maintenance.

A SHORAD "shoot off" in 4QFY17 will evaluate industry solutions for mitigating the maneuver SHORAD capability gap. The intent is to determine which industry products that the Army could rapidly field to maneuver units between FY19-25.

Funding provided for the Stinger PIP addresses obsolescence, completes design, development, test and integration of a Proximity Fuse (PROX) into the existing Stinger Block I missile.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0203801A / <i>Missile/Air Defense Product Improvement Program</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	3.154	5.122	2.209	-	2.209
Current President's Budget	3.029	53.722	2.723	8.450	11.173
Total Adjustments	-0.125	48.600	0.514	8.450	8.964
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.125	-			
• Adjustments to Budget Years	0.000	0.000	0.514	8.450	8.964
• Amended FY2017	0.000	48.600	0.000	-	0.000

Change Summary Explanation

The increase of \$2.6M in FY17 Avenger Product Improvement Program (PIP) (Project 038) funding completes integration, testing, Information Assurance certification, and Materiel Release of the Mode 5 Identification Friend or Foe (IFF) as part of the existing Avenger Modification - Service Life Extension Program (MOD-SLEP). The increase of \$46M for Stinger PIP (Project DT5) addresses obsolescence and design improvements to the Stinger missile, including the Man Portable Air Defense System (MANPADS) configuration. Developmental improvements include increased detection range, visual identification, and night operations capability. In addition, this funding supports a Short Range Air Defense (SHORAD) "shoot off" in 4QFY17 to evaluate industry solutions for mitigating the maneuver SHORAD capability gap.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203801A / <i>Missile/Air Defense Product Improvement Program</i>				Project (Number/Name) 038 / <i>Avenger PIP</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
038: <i>Avenger PIP</i>	-	3.029	7.722	2.723	-	2.723	1.661	1.302	1.304	0.130	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Avenger Air Defense System is a lightweight, ground-to-air missile and gun weapon system mounted on a High Mobility Multi-purpose Wheeled Vehicle. The Avenger's mission is to protect fixed critical assets and Corps/Echelons above Corps Maneuver forces from Unmanned Aircraft Systems (UAS), Cruise Missiles (CM), and Fixed Wing and Rotary Wing aircraft. Avenger provides day/night adverse weather operations, shoot on the move capability, rapid target engagement, and remote firing capability. Avenger can be air dropped, lifted by helicopter and is air transportable. The system employs up to eight Stinger missiles to counter aerial threats and a M3P gun for close-in ground and air threats. The gunner can visually track targets through use of a Forward Looking Infrared Receiver (FLIR) that can detect and track targets during the day and at night. An on-board laser range finder provides range. An IFF system aids in the identification of friendly aircraft in order to minimize the potential for fratricide. The Avenger fleet has 170 systems that are equipped with a digital Slew-to-Cue (STC) capability to speed target detection and engagement. Forward Area Air Defense (FAAD) Command Control and Intelligence System (C2I) passes radar target information to the Avenger for display. The operator can then select a target for engagement from the display, which will automatically slew the turret and place the target in the gunner's FLIR field of view.

FY2018 Base dollars in the amount of \$2.723 million provides funding to ensure the Avenger is viable and sustainable through the end of its program life. The Avenger Modification – Service Life Extension Program (MOD-SLEP) keeps Avenger sustainable and relevant until replaced by the Indirect Fire Protection Capability Increment 2- Intercept (IFPC Inc 2-I) in the Fiscal Year (FY) 31 timeframe. The Avenger Fire Control Computer (AFCC), vehicle internal communication (VIC) system and the IFF will undergo upgrades to meet Information Assurance (IA) and operational requirements.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Avenger Modification	3.029	7.722	2.723	-	2.723
Description: Finish development activities for platform integration, software upgrades, and capability enhancements. Develop and execute test requirements and conduct limited contractor and government testing. Perform technical assessments, concept studies, cost reduction, risk reduction and development documentation.					
FY 2016 Accomplishments: Continued the performance engineering design and development activities for platform integration, software upgrades, and capability enhancements. Developed and execute test requirements and conducted limited contractor and government testing on developing modernization parts. Performed technical assessments, concept studies, cost reduction, risk reduction and development documentation.					
FY 2017 Plans:					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203801A / <i>Missile/Air Defense Product Improvement Program</i>	Project (Number/Name) 038 / <i>Avenger PIP</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Finish development activities for platform integration, software upgrades, and capability enhancements. Develop and execute test requirements and conduct limited contractor and government testing on developing modernization parts. Perform technical assessments, concept studies, cost reduction, risk reduction and development documentation. Increase testing activities on integration studies to ensure compatibility. FY 2018 Base Plans: Execute test requirements and conduct limited contractor and government testing. Perform technical assessments, concept studies, cost reduction, and risk reduction. The Army Interoperability Certification (AIC) testing ensures that Avenger can properly interface, with other systems, and execute its mission.					
Accomplishments/Planned Programs Subtotals	3.029	7.722	2.723	-	2.723

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• PE 0605456: <i>PE 0605456A, Proj PA3, PAC-3/MSE Missiles</i>	2.201	-	-	-	-	-	-	-	-	0	2.201
• PE 0604319A: <i>PE 0604319A, Proj DU3, IFPC2 (FY12 PE0603305A IFPC II - Intercept)</i>	149.222	-	31.303	-	31.303	52.604	239.305	259.804	316.104	Continuing	Continuing
• PE 0605457A: <i>PE 0605457A, Proj S40, Army Integrated Air and Missile Defense (AIAMD)</i>	222.074	278.811	336.420	-	336.420	290.250	190.600	117.470	64.510	Continuing	Continuing
• PE 0604820A: <i>PE 0604820A, Proj E10, Sentinel</i>	11.821	15.983	25.968	-	25.968	31.761	51.897	72.562	81.351	Continuing	Continuing
• PE 0604741A: <i>PE 0604741A, Proj 126, 146, 149; Air Defense C2I Eng Dev</i>	33.619	61.532	28.726	-	28.726	28.320	14.638	8.674	-	Continuing	Continuing
• PE 0605052: <i>PE 0605052A, Proj EY7, IFPC2 (Realigned from 0604319A, DU3)</i>	-	83.995	175.069	-	175.069	149.506	52.300	24.700	-	0	485.570
• SSN C53101: <i>SSN C53101, MSE Missile</i>	514.946	702.201	459.040	-	459.040	499.915	540.669	523.413	524.934	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203801A / <i>Missile/Air Defense Product Improvement Program</i>	Project (Number/Name) 038 / <i>Avenger PIP</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• PE 0205456A: <i>PE 0205456A, Proj EF9; System Integration and Test</i>	61.653	73.417	78.926	-	78.926	80.314	109.222	112.614	123.007	Continuing	Continuing
• PE 0604114A: <i>PE 0604114A, Proj EX2; Lower Tier Air and Missile Defense (LTAMD) Capability</i>	-	35.132	76.728	-	76.728	67.088	83.195	141.185	142.000	Continuing	Continuing
• SSN C50016: <i>SSN C50016, Lower Tier Air and Missile Defense (AMD)</i>	130.275	-	126.470	-	126.470	140.826	125.161	144.234	119.282	Continuing	Continuing
• SSN C62002: <i>SSN C62002; IFPC Inc 2-I Block 1 Missile</i>	-	19.319	57.742	-	57.742	31.641	191.830	315.025	277.500	Continuing	Continuing
• SSN C62001: <i>SSN C62001, IFPC Inc 2-I Block 1 System</i>	-	-	-	-	-	157.406	144.740	100.400	14.600	Continuing	Continuing
• SSN C62004: <i>SSN C62004, IFPC Inc 2-I Block 2 Missile</i>	-	-	-	-	-	-	-	-	12.300	Continuing	Continuing
• PE 0605457A: <i>PE 0605457A, Proj DU4; Advanced Electronic Protection Enhancements AEPE</i>	-	-	23.165	-	23.165	25.010	26.719	26.218	26.500	Continuing	Continuing
• SSN BZ5075: <i>SSN BZ5075, IAMD Battle Command System</i>	20.917	204.969	282.502	-	282.502	-	274.494	375.026	513.464	Continuing	Continuing
• SSN AD50700: <i>SSN AD50700; AIR & MSL Defense Planning & Control Sys</i>	28.176	126.539	26.635	24.100	50.735	17.960	6.366	32.397	-	0	262.173

Remarks
This program is an integral part of the Army Air and Missile Defense Modernization strategy.

D. Acquisition Strategy
The Avenger Product Improvement Program modifies Avenger and ensures that it is viable and sustainable through the FY31, filling a capability gap to counter Unmanned Aircraft Systems (UAS), Cruise Missiles (CM), and Fixed Wing and Rotary Wing aircraft. This capability will be permanently filled by the Indirect Fire Protection Capability Increment 2 - Intercept (IFPC Inc 2-I). The Avenger Fire Control Computer (AFCC), vehicle internal communication (VIC) system and the IFF will undergo upgrades to meet Information Assurance (IA) and operational requirements.

E. Performance Metrics
N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203801A / <i>Missile/Air Defense Product Improvement Program</i>				Project (Number/Name) DT5 / <i>Stinger Product Improvement</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
DT5: <i>Stinger Product Improvement</i>	-	0.000	46.000	0.000	8.450	8.450	0.000	0.000	0.000	0.000	0.000	54.450
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Stinger Block I missile is an advanced, fire-and-forget, short-range, man-portable, air defense weapon system. Stinger's mission is to provide the force with low-altitude air defense against fixed and rotary wing aircraft, Unmanned Aircraft Systems (UAS) and cruise missiles (CM). Stinger is deployable from the shoulder or from a variety of platforms to include vehicles, helicopters and UAS. The missile is delivered as a certified round and requires no field testing or maintenance.

The addition of a PROX to the current Block I configuration will improve system effectiveness against the evolving UAS threat. UAS defense is a requirement of the Operational Requirements Document (ORD) for the Stinger Guided Missile System and validated by the Deputy Chief of Staff, G-3/5/7, Current and Future Warfighting Capabilities Division (DAMO-CIC) in a memo dated 28 May 2013.

A SHORAD "shoot off" in 4QFY17 will evaluate industry solutions for mitigating the maneuver SHORAD capability gap. The intent is to determine which industry products that the Army could rapidly field to maneuver units between FY19-25.

FY2018 OCO dollars in the amount of \$8.450 million support the continuation of design, development, test, and integration of a proximity fuse into the existing Stinger Block I missile.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Proximity Fuze (PROX) Development and Integration	-	-	0.000	8.450	8.450
Description: These funds will be used to continue the design, development, test and integration of a PROX fuze into the existing Stinger Block I missiles.					
FY 2018 Base Plans: There are no base dollars					
FY 2018 OCO Plans: \$8.45M continues the design, development, test and integration of a PROX fuze into the existing Stinger Block I missiles.					
Title: SHORAD Shoot Off	-	20.000	-	-	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203801A / <i>Missile/Air Defense Product Improvement Program</i>	Project (Number/Name) DT5 / <i>Stinger Product Improvement</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>Description: This effort funds SHORAD Shoot Off in 4QFY17</p> <p>FY 2017 Plans: \$20M supports the conduct of a SHORAD “shoot off” in 4QFY17 to assess industry solutions for mitigating the maneuver SHORAD capability gap. The intent is to evaluate industry products that the Army could rapidly field to maneuver units between FY19-25. Candidate solutions must demonstrate sufficient mobility and survivability to support Armored and Stryker Brigade Combat Team operations. Funding supports the integration and testing of non-developmental items into technical solutions. The majority of funding will pay for test support activities including government and contract labor, targets, range support, and transportation of government furnished equipment. The assessment will take place in September 2017 at White Sands Missile Range, New Mexico.</p>					
<p>Title: Obsolescence and Improvements</p> <p>Description: This effort funds the obsolescence and improvements of Stinger Block I missile.</p> <p>FY 2017 Plans: \$26M addresses obsolescence and design improvements to the Stinger missile, including the Man Portable Air Defense System (MANPADS) configuration. Funding addresses obsolescence issues in the Seeker Dual-Detector Assembly (UV Diodes), Application Specific Integrated Circuit (ASIC), Roll Frequency Sensor (RFS), and the Electronics Assembly. These assemblies face Diminishing Manufacturing Sources and Material Shortages (DMSMS) and exponentially higher costs due to legacy materials and processes. This obsolescence mitigation will allow to Army to increase Stinger reliability and effectiveness while reducing costs as it dramatically increases the number of Stinger missiles inducted into the Service Life Extension Program. Developmental improvements include increased detection range, visual identification, and night operations capability.</p>	-	26.000	-	-	-
Accomplishments/Planned Programs Subtotals	-	46.000	0.000	8.450	8.450

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• SSNC21300: SSN C21300, Stinger Blk I Upgrades	2.216	-	63.090	28.000	91.090	66.213	72.220	1.470	3.100	0.000	236.309
Remarks											

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203801A / <i>Missile/Air Defense Product Improvement Program</i>	Project (Number/Name) DT5 / <i>Stinger Product Improvement</i>

D. Acquisition Strategy

In Fiscal Year (FY) 12 the Stinger Based Systems (SBS) Product Office utilized Picatinny Arsenal to award a PROX development contract for the design, development, test and integration into existing Stinger Block I missiles. The PROX will improve system effectiveness against the evolving Unmanned Aircraft System (UAS) threat.

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	49.191	8.571	5.000	-	5.000	15.000	15.000	15.000	15.000	0.000	122.762
045: Hellfire Prod Imp Prog	-	5.165	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.165
788: ATACMS PIP	-	0.000	0.000	5.000	-	5.000	15.000	15.000	15.000	15.000	0.000	65.000
DZ9: ATACMS Mods	-	44.026	7.491	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	51.517
VT9: Lethal Miniature Aerial Missile System (LMAMS)	-	0.000	1.080	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.080

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.

788: ATACMS Product Improvement Program (PIP) focuses on safety, cost reduction, reliability, deficiency corrections, standardization, and new or improved operational capabilities. FY18 Base funds in the amount of \$5.000 million supports operational testing, corrections of identified deficiencies, and fielding support activities for a Height-of-Burst capability via proximity sensor.

DZ9: ATACMS Mods effort will not build any new missiles or add to the overall inventory. Block (BLK) I/IA ATACMS currently have warheads that are non-compliant with the 2008 Department of Defense (DoD) policy on cluster munitions (CM). Starting with a BLK I/IA missile, this modification effort will integrate, test, and qualify an ATACMS configuration to include a policy compliant warhead, obsolescence refresh, and re-grained rocket motors. Performance of a characterization effort will include qualification and flight testing to assess ATACMS performance with inclusion of a proximity sensor. Additional efforts include launcher updates to enable firing of the new ATACMS configuration. There is no FY18 funding.

VT9: Lethal Miniature Aerial Missile System (LMAMS) develops, integrates, and tests the Switchblade Multi-Pack Launcher (MPL). Multi-Pack Launcher provides the capability to launch up to 6 Switchblade missiles remotely in a Force Protection Environment. The mission for the MPL is to be placed in a Forward Operating Base (FOB) in a constant ready-to-use state to enable Soldiers to remain in the safety of a building while launching Switchblade missiles. There is no FY18 funding.

045: Hellfire Prod Imp Prog integrates the Longbow 7A missile, which provides increased seeker capability to acquire and attack a wider variety of targets, and integrates a blast fragmentation sleeve and proximity fuse to increase lethality onto the MQ-1 Gray Eagle Unmanned Aerial Vehicle (UAV). In addition, this program supports the integration with missile technical and software support from both the Federal government and the Longbow prime contractor and the upgrade of a limited number of Longbow missiles for integration testing. There is no FY18 funding.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0203802A / <i>Other Missile Product Improvement Programs</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	35.951	7.491	0.000	-	0.000
Current President's Budget	49.191	8.571	5.000	-	5.000
Total Adjustments	13.240	1.080	5.000	-	5.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	5.165	-			
• SBIR/STTR Transfer	-1.425	-			
• Adjustments to Budget Years	0.000	0.000	5.000	-	5.000
• Amended FY2017	0.000	1.080	0.000	-	0.000
• Other Adjustments 1	9.500	0.000	0.000	-	0.000

Change Summary Explanation

FY 2016 funding change due to actual year end correction.
 FY 2017 funding change is due to the Development/Integration and Testing of the LMAMS Multi-Pack Launcher.
 FY 2018 funding change due to incorporation of PIP initiatives to include operational testing of a Height-of-Burst capability.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs	Project (Number/Name) 045 / Hellfire Prod Imp Prog
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
045: Hellfire Prod Imp Prog	-	5.165	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.165
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Hellfire Prod Imp Prog integrates the Longbow 7A missile, which provides increased seeker capability to acquire and attack a wider variety of targets, and integrates a blast fragmentation sleeve and proximity fuse to increase lethality onto the MQ-1 Gray Eagle Unmanned Aerial Vehicle (UAV). In addition, this program supports the integration with missile technical and software support from both the Federal government and the Longbow prime contractor and the upgrade of a limited number of Longbow missiles for integration testing.

There is no FY18 funding.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Integration and Simulation efforts of HELLFIRE Longbow Missile onto the Gray Eagle Platform	5.165	-	-	-	-
Description: Hellfire Prod Imp Prog integrates the Longbow 7A missile, which provides increased seeker capability to acquire and attack a wider variety of targets, and integrates a blast fragmentation sleeve and proximity fuse to increase lethality onto the MQ-1 Gray Eagle Unmanned Aerial Vehicle (UAV). In addition, this program supports the integration with missile technical and software support from both the Federal government and the Longbow prime contractor and the upgrade of a limited number of Longbow missiles for integration testing.					
FY 2016 Accomplishments: Began and continue to integrate the HELLFIRE Longbow Missile onto the Gray Eagle Unmanned Ariel Vehicle system.					
Accomplishments/Planned Programs Subtotals	5.165	-	-	-	-

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

N/A

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs	Project (Number/Name) 045 / Hellfire Prod Imp Prog

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs	Project (Number/Name) 788 / ATACMS PIP
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
788: ATACMS PIP	-	0.000	0.000	5.000	-	5.000	15.000	15.000	15.000	15.000	0.000	65.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

ATACMS Product Improvement Program (PIP) focuses on safety, cost reduction, reliability, deficiency corrections, standardization, and new or improved operational capabilities. FY18 Base funds in the amount of \$5.000 million supports operational testing, corrections of identified deficiencies, and fielding support activities for a Height-of-Burst capability via proximity sensor. (FY19 thru FY22 funds will focus on Height-of-Burst, GPS M-Code, Insensitive Munitions and other evolving capabilities.)

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Product Improvement Program (PIP) Activities	-	-	5.000	-	5.000
Description: PIP focuses on safety, cost reduction, reliability, deficiency corrections, standardization, and new or improved operational capabilities for ATACMS.					
FY 2018 Base Plans: Develop Test & Evaluation Master Plan (TEMP) for Height-of-Burst capability, conduct OT assuming existing ATACMS test quantities are sufficient, and initiate activities for production cut-in and fielding.					
Accomplishments/Planned Programs Subtotals	-	-	5.000	-	5.000

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

N/A

Remarks

D. Acquisition Strategy

After successful OT and DOT&E approval is received for the height-of-burst capability, a proximity sensor will be inserted into the ongoing ATACMS SLEP production. Future improvements, such as M-code and other capabilities, will be inserted into future production once those technologies are matured, tested, and approved for fielding.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs	Project (Number/Name) DZ9 / ATACMS Mods
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
DZ9: ATACMS Mods	-	44.026	7.491	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	51.517
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Army Tactical Missile System (ATACMS) is the United States (U.S.) Army's primary 24/7, all-weather, and surface-to-surface artillery precision missile used by current and future Combatant Commanders to shape the battlefield with long-range fires against hard and soft stationary targets in open, complex, and urban environments. This effort will not build any new missiles or add to the overall inventory. Block (BLK) I/IA ATACMS currently have warheads that are non-compliant with the 2008 Department of Defense (DoD) policy on cluster munitions (CM). Starting with a BLK I/IA missile, this modification effort will integrate, test, and qualify an ATACMS configuration to include a policy compliant warhead, obsolescence refresh, and re-grained rocket motors. Performance of a characterization effort will include qualification and flight testing to assess ATACMS performance with inclusion of a proximity sensor. Additional efforts include launcher updates to enable firing of the new ATACMS configuration.

There is no FY18 funding.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Conduct Development Engineering, Design Component Testing, and Performance Analysis.	44.026	7.491	-	-	-
Description: Develop and qualify obsolescence updates, build-up of flight test missiles, perform component and system flight testing, and characterize proximity sensor performance.					
FY 2016 Accomplishments: Completion of component hardware build up and integration into completed missiles. Performance Analysis to include ground and flight testing.					
FY 2017 Plans: Completion of the ground and flight testing					
Accomplishments/Planned Programs Subtotals	44.026	7.491	-	-	-

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

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• ATACMS MODS: ATACMS MODS (CA6700)	20.119	150.043	62.668	114.168	176.836	0.217	-	-	-	0.000	347.215

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / <i>Other Missile Product Improvement Programs</i>	Project (Number/Name) DZ9 / <i>ATACMS Mods</i>

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

D. Acquisition Strategy

The ATACMS MOD program will qualify a new configuration needed to support follow-on production in order to maintain critical inventory levels. Lockheed Martin Missile and Fire Control (LMMFC) will integrate and test ATACMS MOD under a Cost Plus Fixed Fee (CPFF) contract.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs				Project (Number/Name) VT9 / Lethal Miniature Aerial Missile System (LMAMS)			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
VT9: Lethal Miniature Aerial Missile System (LMAMS)	-	0.000	1.080	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.080
Quantity of RDT&E Articles	-	-	3	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

VT9: Lethal Miniature Aerial Missile System (LMAMS) develops, integrates, and tests the Switchblade Multi-Pack Launcher (MPL). Multi-Pack Launcher provides the capability to launch up to 6 Switchblade missiles remotely in a Force Protection Environment. The mission for the MPL is to be placed in a Forward Operating Base (FOB) in a constant ready-to-use state to enable Soldiers to remain in the safety of a building while launching Switchblade missiles.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Develop, Integrate and Test the LMAMS Multi-Pack Launcher	-	1.080	-	-	-
Description: Development, Integration, and Testing of the Multi-Pack Launcher (MPL). Multi-Pack Launcher provides the capability to launch up to 6 Switchblades remotely in a Force Protection Environment.					
FY 2017 Plans: Product Development, Integration Qualification, and Safety Test Planning/Preparation.					
Accomplishments/Planned Programs Subtotals	-	1.080	-	-	-

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

N/A

Remarks

D. Acquisition Strategy

All contractor funds are planned to be awarded via sole source contract to Aerovironment. Remaining funding is planned for CCWS Program Management costs, test facility costs, range costs, and test support personnel.

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0203808A / <i>TRACTOR CARD</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	34.686	20.333	37.883	-	37.883	34.050	21.871	19.005	19.234	Continuing	Continuing
DS1: <i>TRACTOR BARN</i>	-	0.000	0.000	12.000	-	12.000	13.000	0.000	0.000	0.000	Continuing	Continuing
DS2: <i>Tractor Puma</i>	-	18.138	4.335	10.532	-	10.532	5.432	3.000	0.000	0.000	Continuing	Continuing
E11: <i>DELL</i>	-	16.548	15.998	15.351	-	15.351	15.618	18.871	19.005	19.234	Continuing	Continuing

A. Mission Description and Budget Item Justification

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

B. Program Change Summary (\$ in Millions)

	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>
Previous President's Budget	34.686	20.333	37.659	-	37.659
Current President's Budget	34.686	20.333	37.883	-	37.883
Total Adjustments	0.000	0.000	0.224	-	0.224
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	0.224	-	0.224

Change Summary Explanation

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

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203808A / TRACTOR CARD				Project (Number/Name) DS1 / TRACTOR BARN			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
DS1: TRACTOR BARN	-	0.000	0.000	12.000	-	12.000	13.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203808A / TRACTOR CARD				Project (Number/Name) DS2 / Tractor Puma			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
DS2: Tractor Puma	-	18.138	4.335	10.532	-	10.532	5.432	3.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203808A / <i>TRACTOR CARD</i>				Project (Number/Name) E11 / <i>DELL</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
E11: <i>DELL</i>	-	16.548	15.998	15.351	-	15.351	15.618	18.871	19.005	19.234	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The details for 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: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0205402A / <i>Integrated Base Defense - Operational System Dev</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	10.324	3.450	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	13.774
EF2: <i>Integrated Base Defense</i>	-	10.324	3.450	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	13.774

Note

No FY 2018 funding request. PE0205402A has now been realigned into two separate PEs for Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E) and Integrated Ground Security, Surveillance and Response Capability (IGSSR-C). Beginning in FY 2017 Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E) funding is now under PE0605033A Project EQ3. Beginning in FY 2017 Integrated Ground Security, Surveillance and Response Capability (IGSSR-C) funding is now under PE0605029A Project EQ2.

A. Mission Description and Budget Item Justification

GBOSS-E: Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E) will replace the interim Persistent Surveillance System-Ground (PSS-G) Increment 1 towers with improved persistent surveillance capabilities and will provide network integration and better mobility utilizing modular configurations. GBOSS-E will replace obsolete, quick reaction capability (QRC) surveillance and force protections systems utilizing modular configurations: Medium variant (mid sensor height) for small to medium size base, and Heavy variant (high level sensor height) for large contingency base camps. GBOSS-E will operate in a stand-alone mode or as part of an integrated network utilizing government owned software, be easily operated and maintained, and be rugged enough to support employment in expeditionary operations worldwide.

IGSSR-C: The Integrated Ground Security, Surveillance and Response Capability (IGSSR-C) is an Automated Information System (AIS) program. IGSSR-C has a requirement to provide a layered approach to integrate sensors, sensor systems and unmanned systems with automated fusion capabilities. The system will provide a Force Protection (FP) Common Operational Picture (COP) capability for CONUS fixed, OCONUS semi-fixed or expeditionary elements in all Operating Environments (OE). This capability will enable rapid decision analysis, speed the response process as well as increase information dissemination horizontally and vertically along the chain of command and with outside supporting organizations. IGSSR-C is a software centric fusion engine that connects legacy and emerging FP systems, legacy Chemical, Biological, Radiological, and Nuclear (CBRN), unmanned systems, biometric identification and forensic data systems. The desired end state is to achieve interoperability and COP with current and emerging FP systems used by Joint Forces, Department of Defense (DoD) agencies and multi-national forces.

Integrated Base Defense (IBD): The purpose of IBD Kitting is to harvest and refurbish physical security and Force Protection (FP) Non-Standard Equipment (NS-E) and package them into integrated and interoperable IBD Capabilities. IBD provides integration of software and analytical capability to support the integration of systems in the field. IBD employs an enterprise approach to enable IBD capabilities across the operational spectrum by leveraging interoperability efforts in support of the Integrated Unit, Base and Installation Protection (IUBIP) framework. In support of JUONS 0540 to address the Vehicle Borne Improvised Explosive Device (VBIED) threat. Additional capabilities are being developed and integrated to the current Force Protection structure.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0205402A / <i>Integrated Base Defense - Operational System Dev</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	10.750	0.000	0.000	-	0.000
Current President's Budget	10.324	3.450	0.000	-	0.000
Total Adjustments	-0.426	3.450	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.426	-			
• Adjustments to Budget Years	0.000	3.450	0.000	-	0.000

Change Summary Explanation

FY 2017 increase is in support of JUONS 0540 to address the Vehicle Borne Improvised Explosive Device (VBIED) threat. Additional capabilities are being developed and integrated to the current Force Protection structure.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205402A / <i>Integrated Base Defense - Operational System Dev</i>	Project (Number/Name) EF2 / <i>Integrated Base Defense</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EF2: <i>Integrated Base Defense</i>	-	10.324	3.450	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	13.774
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

No FY 2018 funding request. Beginning in FY 2017 Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E) funding is now under PE0605033A Project EQ3. Beginning in FY 2017 Integrated Ground Security, Surveillance and Response Capability (IGSSR-C) funding is now under PE0605029A Project EQ2.

A. Mission Description and Budget Item Justification

GBOSS-E: Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E) will replace the interim Persistent Surveillance System-Ground (PSS-G) Increment 1 towers with improved persistent surveillance capabilities and will provide network integration and better mobility utilizing modular configurations. GBOSS-E will replace obsolete, quick reaction capability (QRC) surveillance and force protections systems utilizing modular configurations: Medium variant (mid sensor height) for small to medium size base, and Heavy variant (high level sensor height) for large contingency base camps. GBOSS-E will operate in a stand-alone mode or as part of an integrated network utilizing government owned software, be easily operated and maintained, and be rugged enough to support employment in expeditionary operations worldwide.

IGSSR-C: The Integrated Ground Security, Surveillance and Response Capability (IGSSR-C) is an Automated Information System (AIS) program. IGSSR-C has a requirement to provide a layered approach to integrate sensors, sensor systems and unmanned systems with automated fusion capabilities. The system will provide a Force Protection (FP) Common Operational Picture (COP) capability for CONUS fixed, OCONUS semi-fixed or expeditionary elements in all Operating Environments (OE). This capability will enable rapid decision analysis, speed the response process as well as increase information dissemination horizontally and vertically along the chain of command and with outside supporting organizations. IGSSR-C is a software centric fusion engine that connects legacy and emerging FP systems, legacy Chemical, Biological, Radiological, and Nuclear (CBRN), unmanned systems, biometric identification and forensic data systems. The desired end state is to achieve interoperability and COP with current and emerging FP systems used by Joint Forces, Department of Defense (DoD) agencies and multi-national forces.

Integrated Base Defense (IBD): The purpose of IBD Kitting is to harvest and refurbish physical security and FP Non-Standard Equipment and package them into integrated and interoperable IBD Capabilities. IBD provides integration of software and analytical capability to support the integration of systems in the field. IBD employs an enterprise approach to enable IBD capabilities across the operational spectrum by leveraging interoperability efforts in support of the Integrated Unit, Base and Installation Protection framework.

No FY 2018 funding request.

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

	FY 2016	FY 2017	FY 2018
Title: IBD Test and Evaluation	0.719	1.600	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205402A / <i>Integrated Base Defense - Operational System Dev</i>	Project (Number/Name) EF2 / <i>Integrated Base Defense</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>Description: Test and Evaluation of Integrated Base Defense Software Development Efforts in support if Integrated Base Defense Kitting.</p> <p>FY 2016 Accomplishments: Test and Evaluation of Integrated Base Defense Software Development Efforts in support if Integrated Base Defense Kitting.</p> <p>FY 2017 Plans: Test and Evaluation of Integrated Base Defense Software Development Efforts in support if Integrated Base Defense Kitting.</p>				
<p>Title: IBD Architecture and Software Development</p> <p>Description: Integrated Base Defense Architecture and Software Development</p> <p>FY 2016 Accomplishments: Integrated Base Defense Architecture and Software Development in support of Integrated Base Defense Kitting.</p> <p>FY 2017 Plans: Integrated Base Defense Architecture and Software Development in support of Integrated Base Defense Kitting.</p>		0.590	1.000	-
<p>Title: IBD Engineering and Management Services</p> <p>Description: Engineering and Managment Services in support of Integrated Base Defense Software Development Efforts for Integrated Base Defense Kitting.</p> <p>FY 2016 Accomplishments: Engineering and Management Services in Support of Integrated Base Defense Software Development and Initial Packaging Efforts for Integrated Base Defense Kitting.</p> <p>FY 2017 Plans: Engineering and Management Services in Support of Integrated Base Defense Software Development and Initial Packaging Efforts for Integrated Base Defense Kitting.</p>		0.132	0.100	-
<p>Title: IBD Design and Build</p> <p>FY 2017 Plans: Complete the build out of the third Intelligent Remote Imaging Spectrometer - Ground (IRIS-G) sensor system to be used under a UMR.</p>		-	0.750	-
<p>Title: G-BOSS(E) Design and Build</p>		5.507	-	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205402A / <i>Integrated Base Defense - Operational System Dev</i>	Project (Number/Name) EF2 / <i>Integrated Base Defense</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Description: G-BOSS(E) design and builds prototype tower systems.			
FY 2016 Accomplishments: ompletes initial design and begins development of tower prototypes to support developmental testing activities			
Title: IGSSR-C Design and Development	3.376	-	-
Description: IGSSR-C design efforts and integration activities.			
FY 2016 Accomplishments: Completes the initial Design and Development of the IGSSR-C Architecture, Software Framework and Core Capabilities and initiates IGSSR-C integration efforts.			
Accomplishments/Planned Programs Subtotals	10.324	3.450	-

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• G-BOSS(E) (M90212): <i>G-BOSS(E) (M90212)</i>	-	26.572	-	-	-	3.668	3.668	3.668	3.668	Continuing	Continuing
• IGSSR-C (M90106): <i>IGSSR-C (M90106)</i>	-	-	-	-	-	1.249	4.684	2.955	5.664	Continuing	Continuing
• G-BOSS(E) (0605033A): <i>GOSS(E) (0605033A)</i>	-	5.032	5.207	-	5.207	3.529	-	-	-	0	13.768
• IGSSR-C (0605029A): <i>IGSSR-C (0605029A)</i>	-	4.980	4.418	-	4.418	1.324	-	-	-	0	10.722

Remarks

D. Acquisition Strategy

Ground-Based Operational Surveillance System (Expeditionary) (G-BOSS(E)) will replace the interim Persistent Surveillance System – Ground (PSS-G) Increment 1 towers with improved persistent surveillance capabilities along with network integration and better mobility utilizing modular configurations. The G-BOSS(E) Capability Design Document (CDD) was approved May 2014. In FY 2014, the Department of Defense (DoD) Physical Security Enterprise and Analysis Group (PSEAG) provided funds to conduct pre-milestone B activities. G-BOSS(E) received an approved Materiel Development Decision (MDD) from the Milestone Decision Authority (MDA) on 4 December 2015. Pending successful Milestone B decision in FY 2017, the existing United States Marine Corps (USMC) tower's design (Ground Based Operational Surveillance System) (GBOSS) will be leveraged and modified to meet the Army's G-BOSS(E) program requirements. The acquisition strategy for G-BOSS(E) was

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205402A / <i>Integrated Base Defense - Operational System Dev</i>	Project (Number/Name) EF2 / <i>Integrated Base Defense</i>
<p>signed by the Milestone Decision Authority (MDA) on 11 December 2016, which approved plans to leverage the Naval Surface Warfare Center (NSWC) at Crane, Indiana and the Night Vision and Electronic Sensors Directorate (NVESD), Fort Belvoir, Virginia to provide system design, development, and integration support, as well as a Technical Data Package (TDP) to support future procurements. Milestone C is planned for FY 2020 to align G-BOSS(E), IGSSR-C, and Tactical Security System (TSS) in order to gain programmatic efficiencies.</p> <p>The Integrated Ground Security, Surveillance and Response Capability (IGSSR-C) provides a layered approach to integrate sensors, sensor systems and unmanned systems. The IGSSR-C Capability Design Document (CDD) was approved September 2013. IGSSR-C is made up of a suite of software that achieves integration, fusion and interoperability in support of the Army Acquisition Executive's Common Operating Environment (COE) Command Post Compute Environment (CPCE) and Sensor CE efforts. In FY 2014, the Department of Defense (DoD) Physical Security Enterprise and Analysis Group (PSEAG) provided funds to conduct pre-milestone B activities. IGSSR-C received an approved Materiel Development Decision (MDD) from the Milestone Decision Authority (MDA) on 4 December 2015. The acquisition strategy for IGSSR-C was signed by the MDA on 5 December 2016, which approved plans to leverage the Night Vision and Electronic Sensors Directorate (NVESD), Fort Belvoir, Virginia to develop, integrate and test the Initial Capability (IC). No production activities are planned for FY 2017. Milestone C is planned for FY 2020 to align Ground-Based Operational Surveillance System (Expeditionary) (G-BOSS(E)), Tactical Security System (TSS) and Integrated Ground Security, Surveillance and Response Capability (IGSSR-C) in order to gain programmatic efficiencies.</p> <p>The IBD acquisition strategy is to leverage existing IBD-related government organizations and to competitively award multiple contracts in support of IBD objectives for the development of holistic IBD architectures and products to support interoperability of fielded and emerging IBD-related systems.</p> <p>FY17 funding supports IBD Kitting and JUONS 0540. Product Manager Force Protection Systems is overseeing the integration of both Commercial Off The Shelf and Government developed technologies that will address the identified capability gap to the existing Force Protection structure.</p> <p>E. Performance Metrics N/A</p>		

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0205410A / Materials Handling Equipment
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.386	0.124	1.582	-	1.582	1.480	0.752	0.771	0.699	0.000	5.794
EE9: Material Handling Equipment - Advance Development	-	0.386	0.124	1.582	-	1.582	1.480	0.752	0.771	0.699	0.000	5.794

A. Mission Description and Budget Item Justification

This program element supports component development and Material Handling Equipment (MHE) prototyping, and stays abreast of emerging and available technologies to be integrated into military MHE to address identified capability gaps and warfighter objectives. This project enables the development of selected technologies and transition to system integration and development or production of MHE products. MHE includes Rough Terrain Forklifts, Rough Terrain Container Handlers (RTCH) and Cranes, as well as ancillary MHE equipment, to support distribution of critical supplies in the theater of operations.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.402	0.124	1.405	-	1.405
Current President's Budget	0.386	0.124	1.582	-	1.582
Total Adjustments	-0.016	0.000	0.177	-	0.177
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.016	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	0.177	-	0.177

Change Summary Explanation

Funding realigned from 603804A Project G14

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0205410A / <i>Materials Handling Equipment</i>				Project (Number/Name) EE9 / <i>Material Handling Equipment - Advance Development</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EE9: <i>Material Handling Equipment - Advance Development</i>	-	0.386	0.124	1.582	-	1.582	1.480	0.752	0.771	0.699	0.000	5.794
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports component development and Material Handling Equipment (MHE) prototyping and stays abreast of emerging and available technologies to be integrated into military MHE to address identified capability gaps and warfighter objectives. This project enables the development of selected technologies and transition to system integration and development or production of MHE products. MHE includes Rough Terrain Forklifts, Rough Terrain Container Handlers (RTCH) and Cranes, as well as ancillary MHE equipment, to support distribution of critical supplies in the theater of operations.

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

	FY 2016	FY 2017	FY 2018
<p>Title: Material Handling Equipment (MHE) Enhancement</p> <p>Description: Integrate and demonstrate Commercial-off-the-Shelf (COTS) technologies to enhance Material Handling Equipment (MHE) operations. System technologies will include obstacle detection, electronic control systems, electric-hydraulic controls, driveline control technology, and work tool automation.</p> <p>FY 2016 Accomplishments: Started the effort to develop and integrate an Automated Material Handling Technology (AMHT) kit for the Army's ATLAS II 10,000 pound capability forklift. This includes the hardware and software necessary for the vehicle to conduct its missions both autonomously and semi-autonomously, and to demonstrate the AMHT kit through a series of tests and obstacle courses that were developed from the vehicle's performance specification and were designed to imitate its mission profile.</p> <p>FY 2018 Plans: Integrate Commercial-off-the-Shelf (COTS) obstacle detectors, similar to collision sensors, to increase situational awareness of MHE operator. Integrate COTS controllers, similar to gaming devices to enable MHE operator to control machine from outside the cab. Research the integration and replacement of levers with joysticks for improved operator efficiency. Research steering and driving control devices which will allow semi or full autonomous control. Research and integrate COTS technology such as self-aligning forks and boom extension for telescoping boom forklift.</p>	0.340	-	0.647
<p>Title: Operational Energy Technologies</p> <p>Description: Evaluate emerging technologies that can improve machine productivity and efficiency. Baseline fuel efficiency, engine management, efficient lubricants and hydraulic technologies.</p>	-	-	0.050

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205410A / <i>Materials Handling Equipment</i>	Project (Number/Name) EE9 / <i>Material Handling Equipment - Advance Development</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
<p><i>FY 2018 Plans:</i> Instrument up to three vehicle types (Light Capacity Rough Terrain Forklift, Rough Terrain Container Handler, and All Terrain Lifting Army System), and monitor fuel consumption during operations. Build duty cycle profiles for the classes of equipment and identify areas of inefficiency and language to include in future procurements.</p>			
<p><i>Title:</i> System Engineering/Program Management</p> <p><i>Description:</i> Fund for Material Handling Equipment System Engineering and Program Management.</p> <p><i>FY 2016 Accomplishments:</i> Provided funding for Material Handling Equipment System Engineering and Program Management.</p> <p><i>FY 2017 Plans:</i> Funding provided for Material Handling Equipment System Engineering and Program Management</p> <p><i>FY 2018 Plans:</i> Provide funding for Material Handling Equipment System Engineering and Program Management.</p>	0.046	0.124	0.211
<p><i>Title:</i> Driver Assist</p> <p><i>Description:</i> Research and demonstrate technologies which would enhance operation such as the inclusion of cameras, collision sensors, and lifting aids.</p> <p><i>FY 2018 Plans:</i> Integrate COTS cameras, similar to backup cameras, to increase situational awareness of MHE operator. Integrate COTS collision warning sensors to increase situational awareness of MHE operator. Integrate discrete lifting aids to assist rough terrain forklifts with non-pallet lift missions.</p>	-	-	0.674
Accomplishments/Planned Programs Subtotals	0.386	0.124	1.582

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 5K Light Capacity Rough Terrain: <i>5K LIGHT CAPABILITY ROUGH TERRAIN (LCRT) FORKLIFT G41002</i>	27.982	3.153	9.000	-	9.000	17.937	18.297	19.721	20.345	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205410A / <i>Materials Handling Equipment</i>	Project (Number/Name) EE9 / <i>Material Handling Equipment - Advance Development</i>
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• MA4501: <i>Modification Of In-Svc Equipment (OPA-3) Const. Equipment</i>	3.207	4.785	5.172	-	5.172	3.233	6.366	3.889	4.000	Continuing	Continuing
• MA4501: <i>Modification Of In-Svc Equipment (OPA-3) MHE</i>	0.182	0.180	0.143	-	0.143	0.143	0.246	0.253	0.264	Continuing	Continuing

Remarks

D. Acquisition Strategy

Procure prototype component items for engineering tests and demonstrations with subject matter experts. Conduct trades between cost and improved maintainability and environmental risk reduction. Process engineering change proposals, update technical manuals and training materials, and prepare supporting acquisition documents and data to procure new training aids.

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0205412A / Environmental Quality Technology - Operational System Dev
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	0.195	-	0.195	0.202	0.203	0.206	0.213	0.000	1.019
EE6: Environmental Information Tech Modernization	-	0.000	0.000	0.195	-	0.195	0.202	0.203	0.206	0.213	0.000	1.019

A. Mission Description and Budget Item Justification

This project funds the modernization of the Environmental Information Technology Management (EITM) program which includes support for Knowledge Based Corporate Reporting system (KBCRS) and Defense Environmental Network Information Exchange (DENIX).

B. Program Change Summary (\$ in Millions)

	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	0.195	-	0.195
Total Adjustments	0.000	0.000	0.195	-	0.195
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	0.195	-	0.195

Change Summary Explanation

This is a New Start Program in FY 2018.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0205412A / <i>Environmental Quality Technology - Operational System Dev</i>				Project (Number/Name) EE6 / <i>Environmental Information Tech Modernization</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EE6: <i>Environmental Information Tech Modernization</i>	-	0.000	0.000	0.195	-	0.195	0.202	0.203	0.206	0.213	0.000	1.019
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Environmental Information Technology Management (EITM) program includes support for Knowledge Based Corporate Reporting system (KBCRS) and Defense Environmental Network Information Exchange (DENIX). This request for research, development, test and evaluation (RDTE) is to enhance DENIX and KBCRS systems to a net-centric all services transactional system of record and reporting tool set. This also includes upgrades to incorporate new security and other information technology requirements.

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

	FY 2016	FY 2017	FY 2018
Title: Environmental Information Tech Modernization	-	-	0.195
Description: Conducts system enhancements as required to meet data management requirements for the Knowledge Based Corporate Reporting System and the Defense Environmental Network Information Exchange.			
FY 2018 Plans: Award new contract to further develop system			
Accomplishments/Planned Programs Subtotals	-	-	0.195

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

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• 0603779A: <i>Environmental Restoration Tech Validation (04E)</i>	8.464	7.785	10.456	-	10.456	11.727	11.403	11.512	10.781	0.000	72.128

Remarks

D. Acquisition Strategy

The Environmental Information Technology Management (EITM) Program is an Office of the Secretary of Defense sponsored program that was assigned to the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health as the Department of Defense (DoD) Executive Agent by the Under Secretary of Defense for Acquisition, Technology and Logistics in 2001. The DoD Directive 4715.1E defined EITM mission is to ensure efficient use of enterprise environment, safety and occupational health (ESOH) corporate information management processes by providing and sustaining requirement-driven ESOH corporate data management, Congressional-reporting and public outreach tools to the DoD, and other DoD stakeholders. Funding provided for this program will allow EITM to develop a Deputy

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205412A / <i>Environmental Quality Technology - Operational System Dev</i>	Project (Number/Name) EE6 / <i>Environmental Information Tech Modernization</i>
<p>Under Secretary of Defense for Installations and Environment directed Chemical Management Enterprise Information Integration capability that will allow Army net-centric hazardous material and ESOH 2.0 NetCentric data management capabilities per the Secretary of the Army Directive 2009-03 "Army Data Management" and DoD Directive 8320.2 "Data Sharing in a Net-Centric Department of Defense." Prior to funding being committed, Army and DoD environmental information technology stakeholders meet to determine which high priority EITM interface requirements need upgrades to incorporate new security and other information technology requirements.</p>		
E. Performance Metrics N/A		

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0205456A / Lower Tier Air and Missile Defense (AMD) System
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	61.653	73.417	78.926	-	78.926	80.314	109.222	112.614	123.007	Continuing	Continuing
EF9: System Integration and Test	-	61.653	73.417	78.926	-	78.926	80.314	109.222	112.614	123.007	Continuing	Continuing

A. Mission Description and Budget Item Justification

The PATRIOT system includes a family of hardware, software, interceptors (PAC-2, Guidance Enhanced Missiles, PAC-3 and PAC-3 Missile Segment Enhancement) and Ground Support Equipment. As software and hardware improvements are developed, there is a continuing need for system level modeling, simulation, integration and testing. Modeling and Simulation (M&S) allow for performance assessment against all threats that would not be possible in flight tests due to cost, target and range constraints. Flight testing is periodically required for validation of the Modeling and Simulation as well as satisfying Army Test and Evaluation Command/Director, Operational Test and Evaluation (ATEC/DOTE) requirements of segment improvements.

PATRIOT is an integral part of the overall Air and Missile Defense (AMD) Architecture and enables the incremental fielding of the system capability for Army Air and Missile Defense Battalions.

Funding provides authority to identify, analyze, design and test materiel solutions to counter cybersecurity and electronic warfare shortcomings to all elements of the Patriot Air Defense Weapon System.

FY2018 base dollars in the amount of \$78.926 million continues program development with the integration of missile and ground system software and hardware in support of complete Post Deployment Build-8.1 (PDB-8.1). Continues the testing program to support the Test and Evaluation Master Plan (TEMP) and system testing/analysis long lead activities for PDB-8.1 Development Test and Evaluation (DTE) and Initial Operational Test & Evaluation (IOT&E).

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	64.159	69.417	79.562	-	79.562
Current President's Budget	61.653	73.417	78.926	-	78.926
Total Adjustments	-2.506	4.000	-0.636	-	-0.636
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.506	-			
• Adjustments to Budget Years	0.000	0.000	-0.636	-	-0.636

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0205456A / <i>Lower Tier Air and Missile Defense (AMD) System</i>
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• Amended FY2017	0.000	4.000	0.000	-	0.000
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Change Summary Explanation

This increase requests an additional \$4M from the PB17 request to fund the modification of PATRIOT operational test target trajectory to better replicate advanced and evolving threats.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0205456A / Lower Tier Air and Missile Defense (AMD) System				Project (Number/Name) EF9 / System Integration and Test			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EF9: System Integration and Test	-	61.653	73.417	78.926	-	78.926	80.314	109.222	112.614	123.007	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The PATRIOT system includes a family of hardware, software, interceptors (PAC-2, Guidance Enhanced Missiles, PAC-3 and PAC-3 Missile Segment Enhancement) and Ground Support Equipment. As software and hardware improvements are developed, there is a continuing need for system level modeling, simulation, integration and testing. Modeling and Simulation allows for performance assessment against all threats that would not be possible in flight tests due to cost, target, and range constraints. Flight testing is periodically required for validation of Modeling and Simulation as well as satisfying ATEC/DOTE requirements of segment improvements.

PATRIOT is an integral part of the overall Air and Missile Defense (AMD) Architecture and enables the incremental fielding of the system capability for Army Air and Missile Defense Battalions.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Program Development, Integration, and Support	25.428	31.794	32.629	-	32.629
Description: Funding is provided for the following effort:					
FY 2016 Accomplishments:					
-Continued program development.					
-Continued integration of missile and ground system hardware and software in support of PDB-8 activities.					
-Began PDB-8.05 program development activities.					
FY 2017 Plans:					
-Continues program development which includes PATRIOT program modeling and simulation (M&S) laboratory infrastructure maintenance as well as the conduct of M&S for hardware/software capability improvements.					
-Continues integration of missile and ground system hardware and software to complete PDB-8 activities.					
-Continues with PDB-8.0.5 activities which include Advanced Electronic Protection (EP) improvements and Mission Tailoring Threat Data Base maintenance.					
FY 2018 Base Plans:					
-Continues program development.					
-Continues integration of missile and ground system hardware and software to complete PDB-8.1 activities.					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205456A / Lower Tier Air and Missile Defense (AMD) System	Project (Number/Name) EF9 / System Integration and Test

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
-Continues with PDB-8.1 activities which include Advanced EP improvements and Mission Tailoring Threat Data Base maintenance.					
Title: Testing, Targets, Modeling and Simulation	36.225	41.623	46.297	-	46.297
Description: Funding is provided for the following effort:					
FY 2016 Accomplishments: -Continued testing program to include utilization of targets/threat simulators and modeling efforts. -Continued test activities to support the TEMP. -Continued system testing/analysis for PDB-8 DTE and Initial Operational Test & Evaluation (IOT&E).					
FY 2017 Plans: -Continues the testing program to include utilization of targets/threat simulators, flight simulator and modeling efforts. -Continues test activities to support the TEMP. -Continues system testing/analysis for PDB-8/8.05 DTE and IOT&E.					
FY 2018 Base Plans: -Continues the testing program to include utilization of targets/threat simulators, flight simulator and modeling efforts. -Continues test activities to support the TEMP. -Continues system testing/analysis for PDB-8.1 DTE and IOT&E. -Continues PATRIOT program M&S laboratory infrastructure maintenance as well as the conduct of M&S for hardware/software capability improvements.					
Accomplishments/Planned Programs Subtotals	61.653	73.417	78.926	-	78.926

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• PE 0605456A, Project	2.201	-	-	-	-	-	-	-	-	0.000	2.201
PA3: PE 0605456A, Project											
PA3 PAC-3/MSE Missile											
• SSN C53101: SSN C53101 MSE Missile	514.946	702.201	459.040	-	459.040	499.915	540.669	523.413	524.934	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205456A / Lower Tier Air and Missile Defense (AMD) System	Project (Number/Name) EF9 / System Integration and Test
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• SSN C50016: SSN C50016, Lower-Tier Air and Missile Defense (AMD)	130.275	126.470	140.826	-	140.826	125.161	144.243	119.282	121.825	Continuing	Continuing
• PE 0604319A, Project DU3, IFPC2: PE 0604319A, Project DU3, IFPC2 (FY12 PE 0603305A IFPC II - Intercept)	149.222	-	31.303	-	31.303	52.604	239.305	259.804	316.104	Continuing	Continuing
• SSN C62002: SSN C62002, IFPC Inc 2-I Block 1 System	-	19.319	57.742	-	57.742	31.641	191.830	315.025	277.500	Continuing	Continuing
• SSN C62001: SSN C62001, IFPC Inc 2-I Block 1 Missile	-	-	-	-	-	157.406	144.740	100.400	14.600	Continuing	Continuing
• PE0604820A, Project E10: PE0604820A, Project E10 SENTINEL	11.821	15.983	32.968	-	32.968	31.761	51.897	72.562	81.351	Continuing	Continuing
• PE 0605457A, Project S40: PE 0605457A, Project S40, Army Integrated Air and Missile Defense (AIAMD)	222.074	272.811	336.420	-	336.420	290.250	190.600	117.470	64.510	Continuing	Continuing
• SSN BZ5075: SSN BZ5075, IAMD Battle Command System (IBCS)	20.917	204.969	-	-	-	-	274.494	375.026	513.464	Continuing	Continuing
• PE0604741A, Project 146, 149: PE0604741A, Project 146, 149; Air Defense C21 Eng Dev	33.619	61.532	28.726	-	28.726	28.320	14.638	8.674	-	0	175.509
• SSN AD5070: SSN AD5070 Air & Missile Defense Planning & Control Sys	28.176	126.539	26.635	24.100	50.735	17.960	6.366	32.397	-	0	262.173
• PE 0202429A: PE 0202429A Proj EP8, JLENS COCOM EXERCISE	10.171	45.482	6.749	-	6.749	0.001	-	-	-	0	62.403
• PE 0604114A: PE 0604114A Proj EX2; Lower Tier Air Missile Defense (LTAMD) Capability	-	35.132	76.728	-	76.728	67.088	83.195	114.185	142.000	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205456A / Lower Tier Air and Missile Defense (AMD) System	Project (Number/Name) EF9 / System Integration and Test

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

Line Item	FY 2016	FY 2017	FY 2018	FY 2018	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Cost To	
			Base	OCO	Total					Complete	Total Cost
• SSN C62004: SSN C62004, IFPC Inc 2-1 Block 2 Missile	-	-	-	-	-	-	-	-	12.300	Continuing	Continuing
• PE 0605052A: PE 0605052A, EY7; IFPC Increment 2 - Block 1	-	83.995	155.169	-	155.169	133.406	52.300	24.700	-	Continuing	Continuing

Remarks

This program is an integral part of the Army Integrated Air and Missile Defense (IAMD) architecture.

D. Acquisition Strategy

The ongoing design and developmental activities enable modeling and simulation infrastructure maintenance and upgrades coupled with end to end testing of the Lower Tier architecture against the evolving threat as an element of an integrated Air and Missile Defense system. This strategy minimizes technological risks and provides a means of enhancing system capability through planned upgrades of deployed systems. Lower Tier system development efforts enable further improvement of system capabilities against emerging and reactive threats. Developing, fabricating and testing hit to kill surface to air missile and associated ground support equipment provides essential increases in battle space, accuracy, lethality and firepower to counter and destroy evolving air defense threats. These state of the art capabilities and enhancements require ongoing demonstration through a series of flight tests and modeling and simulation activities.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205456A / Lower Tier Air and Missile Defense (AMD) System	Project (Number/Name) EF9 / System Integration and Test
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Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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	MIPR	Various : Huntsville, Alabama	1.150	1.158	Dec 2015	0.964	Dec 2016	1.156	Dec 2017	-		1.156	Continuing	Continuing	0.000
PAC-3 Product Office	RO	Project Office : Huntsville, AL	0.165	1.100	Oct 2015	1.051	Oct 2016	1.188	Oct 2017	-		1.188	Continuing	Continuing	0.000
Subtotal			1.315	2.258		2.015		2.344		-		2.344	-	-	0.000

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Integration MSE LMMFC	Various	Lockheed Martin Missiles and Fire Control (LMMFC) : Dallas, Texas	0.000	12.300	Feb 2016	16.641	Feb 2017	15.456	Feb 2018	-		15.456	Continuing	Continuing	0.000
MSE/PAC-3 Raytheon	Various	Raytheon : Waltham, Massachusetts	4.450	3.800	Jan 2016	4.569	Feb 2017	5.598	Jan 2018	-		5.598	Continuing	Continuing	0.000
SETA Contracts	Various	Multiple : Multiple	3.083	1.850	Feb 2016	0.889	Feb 2017	1.069	Feb 2018	-		1.069	Continuing	Continuing	0.000
U.S. Other Government Agencies (OGAs)	MIPR	Various : Huntsville, Alabama	4.310	5.220	Dec 2015	7.680	Dec 2016	7.677	Dec 2017	-		7.677	Continuing	Continuing	0.000
Subtotal			11.843	23.170		29.779		29.800		-		29.800	-	-	0.000

Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Targets/Threats Simulators	MIPR	Various : Huntsville, Alabama	25.345	22.188	Feb 2016	30.345	Feb 2017	33.637	Feb 2018	-		33.637	Continuing	Continuing	0.000
Modeling and Simulation	MIPR	Various : Huntsville, Alabama	3.724	3.000	Jan 2016	3.065	Jan 2017	3.685	Jan 2018	-		3.685	Continuing	Continuing	0.000
Contractor T&E	Various	Multiple : Multiple	8.425	4.952	Feb 2016	1.625	Feb 2017	1.953	Feb 2018	-		1.953	Continuing	Continuing	0.000
Other T&E funding	MIPR	Various : WSMR, NM	3.550	2.585	May 2016	2.822	May 2017	3.190	May 2018	-		3.190	Continuing	Continuing	0.000

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205456A / Lower Tier Air and Missile Defense (AMD) System	Project (Number/Name) EF9 / System Integration and Test
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
PATRIOT System Testing, Integration and Evaluation																												
Program Development, Integration, and Support																												
Testing, Targets, Modeling and Simulation																												
PDB-8.0.5 Agile Build																												
PDB-8 Fielding																												
(1) PDB-8 IOC									▲																			

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205456A / <i>Lower Tier Air and Missile Defense (AMD) System</i>	Project (Number/Name) EF9 / <i>System Integration and Test</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
PATRIOT System Testing, Integration and Evaluation	1	2015	4	2022
Program Development, Integration, and Support	1	2015	4	2022
Testing, Targets, Modeling and Simulation	1	2015	4	2022
PDB-8.0.5 Agile Build	2	2016	4	2022
PDB-8 Fielding	2	2018	4	2022
PDB-8 IOC	2	2018	2	2018

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0205778A / Guided Multiple-Launch Rocket System (GMLRS)
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	36.032	38.044	102.807	-	102.807	164.015	131.354	51.665	65.561	Continuing	Continuing
EG2: GMLRS Alternative Warheads	-	0.306	0.000	0.000	-	0.000	0.000	11.700	14.700	24.700	0.000	51.406
EG3: Guided MLRS	-	35.726	38.044	102.807	-	102.807	164.015	119.654	36.965	40.861	Continuing	Continuing

A. Mission Description and Budget Item Justification

Projects EG2/EG3. GMLRS rockets are surface-to-surface artillery rockets fired from the Multiple Launch Rocket System (MLRS) and High Mobility Artillery Rocket System (HIMARS) launchers. GMLRS rockets provide 24/7, all-weather precision fires to engage both area and point targets at short, medium, and long ranges.

The GMLRS Program consists of three separate increments: GMLRS Dual Purpose Improved Conventional Munition (DPICM) cluster munition to engage area or imprecisely located targets; GMLRS Unitary utilizes a 200 pound high explosive warhead to engage point targets with limited collateral damage; and GMLRS Alternative Warhead (AW) which has been developed as a non-cluster munition to replace GMLRS DPICM. GMLRS DPICM Production was terminated in response to the June 2008 Department of Defense (DoD) Cluster Munitions Policy. GMLRS Unitary is currently in full rate production. GMLRS AW entered full rate production in FY 2015. The GMLRS AW rocket is 90% common with the Unitary variant.

The first increment was GMLRS DPICM. The second increment is GMLRS Unitary. The third increment is GMLRS AW. The fourth increment evolved into the Long Range Precision Fires (LRPF) program under a separate program element.

The GMLRS program will continue to leverage ongoing Science & Technology (S&T) efforts to extend range and increase survivability. The GMLRS extended range effort will be approximately 85% common with Increments 2 and 3. It will extend the current GMLRS capability to 150 km and allow for potential future growth capability in the payload section.

The FY2018 dollars in the amount of \$102.807 million will complete the testing and qualification of the Insensitive Munitions Propulsion System (IMPS); continue qualification of key rocket obsolescence upgrades (including the M-Code compliant NAVSTRIKE-M upgrade); evaluate rocket pod improvements; and initiate the design, qualification and testing of an extended range variant of the GMLRS.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0205778A / <i>Guided Multiple-Launch Rocket System (GMLRS)</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	36.727	22.044	30.177	-	30.177
Current President's Budget	36.032	38.044	102.807	-	102.807
Total Adjustments	-0.695	16.000	72.630	-	72.630
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.695	-			
• Adjustments to Budget Years	0.000	0.000	-5.670	-	-5.670
• PDM Directed	0.000	0.000	41.700	-	41.700
• AIAMD Funding Moves	0.000	0.000	36.600	-	36.600
• Amended FY2017	0.000	16.000	0.000	-	0.000

Change Summary Explanation

FY 2016 funding change due to SBIR/STTR transfer. FY 2017 funding was increased by \$16.000 million in support of the M-Code effort. FY 2018 funding was reduced by -\$5.670 million to account for the availability of prior year execution balances. FY 2018 funding was increased by \$78.300 million in support of the GMLRS extended range effort.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0205778A / <i>Guided Multiple-Launch Rocket System (GMLRS)</i>				Project (Number/Name) EG2 / <i>GMLRS Alternative Warheads</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EG2: <i>GMLRS Alternative Warheads</i>	-	0.306	0.000	0.000	-	0.000	0.000	11.700	14.700	24.700	0.000	51.406
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The United States (U.S.) Army funded the development of the Guided Multiple Launch Rocket System (GMLRS) Alternative Warhead (AW) increment under the EG2 - GMLRS AW project code. GMLRS AW has been developed as a non-cluster munition to replace GMLRS Dual Purpose Improved Conventional Munitions (DPICM) and service the same area and imprecisely-located targets. GMLRS DPICM Production was terminated in response to the June 2008 Department of Defense (DoD) Cluster Munitions Policy.

GMLRS AW successfully completed the combined Milestone C (MS C) and Full Rate Production (FRP) decision review on 8 April 2015. Initial Operational Capability (IOC) quantity of 54 pods delivered in September 2016. Full Materiel Release occurred in November 2016. The acquisition strategy is to procure AW as part of the annual GMLRS FRP contract.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Conduct Development Engineering, Design Component Testing, and Performance Analysis.	0.306	-	-	-	-
Description: Funding is provided for the following effort					
FY 2016 Accomplishments: Completed test reports and performance assessments.					
Accomplishments/Planned Programs Subtotals	0.306	-	-	-	-

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

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• GMLRS (C64400): <i>GMLRS (C64400)</i>	251.060	402.579	273.445	189.544	462.989	180.409	319.623	268.534	358.795	Continuing	Continuing
• Guided MLRS (EG3): <i>Guided MLRS (EG3)</i>	35.726	38.044	102.807	-	102.807	164.015	119.654	36.965	40.861	Continuing	Continuing
• GMLRS MOD (C57701): <i>GMLRS MOD (C57701)</i>	5.321	0.395	0.531	-	0.531	0.269	15.530	53.182	101.854	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205778A / <i>Guided Multiple-Launch Rocket System (GMLRS)</i>	Project (Number/Name) EG2 / <i>GMLRS Alternative Warheads</i>

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks
GMLRS procurement funding includes C65404 and C65406.

D. Acquisition Strategy
GMLRS AW is currently in Full Rate Production.

E. Performance Metrics
N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0205778A / <i>Guided Multiple-Launch Rocket System (GMLRS)</i>				Project (Number/Name) EG3 / <i>Guided MLRS</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EG3: <i>Guided MLRS</i>	-	35.726	38.044	102.807	-	102.807	164.015	119.654	36.965	40.861	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The United States (U.S.) Army continues to explore ways to enhance Guided Multiple Launch Rocket System (GMLRS) rockets and common components and to mitigate obsolescence issues under the Guided MLRS project code. The Army is requesting funding for the following GMLRS Research, Development, Test and Evaluation (RDT&E) activities: (1) evaluation of enhanced operational capabilities to provide more flexibility across the target set to include increased range, flight performance, and end-game optimization; (2) investigation of potential life cycle cost savings through obsolescence initiatives; (3) development of enhancements to the Multiple Launch Rocket System (MLRS) common test equipment; (4) evaluation and development of technologies to enhance overall product performance and survivability; and (5) Insensitive Munitions (IM) compliance.

The FY2018 dollars in the amount of \$102.807 million will complete the testing and qualification of the Insensitive Munitions Propulsion System (IMPS); continue qualification of key rocket obsolescence upgrades (including the M-Code compliant NAVSTRIKE-M upgrade); evaluate rocket pod improvements; and initiate the design, qualification and testing of an extended range variant of the GMLRS.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Assess and improve GMLRS rockets.	2.409	3.192	4.104	-	4.104
Description: Funding is provided for the following effort					
FY 2016 Accomplishments: Continued to assess and evaluate improvements in rocket reliability, increased range, reduced collateral damage, effectiveness, and pod enhancement studies.					
FY 2017 Plans: Continue to assess and evaluate improvements in rocket reliability, increased range, collateral damage, effectiveness, and pod enhancements.					
FY 2018 Base Plans: Investigate and assess methods to increase range performance and rocket effectiveness. Evaluate rocket pod improvements, assess rocket reliability, and reduce collateral damage.					
Title: Conduct qualification and testing for Insensitive Munitions (IM) Propulsion System (IMPS).	22.951	13.827	10.404	-	10.404

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205778A / <i>Guided Multiple-Launch Rocket System (GMLRS)</i>	Project (Number/Name) EG3 / <i>Guided MLRS</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>Description: Funding is provided for the following effort</p> <p>FY 2016 Accomplishments: Continued System Integration Testing and Stockpile-to-Target-Sequence test efforts. Supported the qualification of a second Insensitive Munitions Propulsion System (IMPS) source (supported both component/system System Requirements Reviews (SRRs), Preliminary Design Reviews (PDRs), Critical Design Reviews (CDRs), procured approximately 125 Ignition Safety Devices (ISDs) and 60-90 IM rocket motors, paid for the component assembly and component level qualification testing, supported component/rocket integration, system level integration tests, and eventually flight tests).</p> <p>FY 2017 Plans: Propulsion system ground/flight tests.</p> <p>FY 2018 Base Plans: Complete system ground/flight testing and Insensitive Munition Propulsion System (IMPS) qualification.</p>					
<p>Title: Investigate obsolescence cost/cost reduction opportunities/second source suppliers/survivability.</p> <p>Description: Funding is provided for the following effort (The NAVSTRIKE GPS Receiver provides tightly coupled GPS/INS integration. Rockwell Collins has stopped producing the NAVSTRIKE 3.3).</p> <p>FY 2016 Accomplishments: Initiated design and qualification of NAVSTRIKE 3.7 obsolescence upgrade.</p> <p>FY 2017 Plans: Continue qualification of NAVSTRIKE 3.7 obsolescence upgrade.</p> <p>FY 2018 Base Plans: Design and qualification of M-Code compliant NAVSTRIKE-M upgrade. System level integration and qualification of side-mounted proximity sensor.</p>	1.549	18.505	7.417	-	7.417
<p>Title: Conduct System Test and Evaluation activities.</p> <p>Description: Funding is provided for the following effort</p> <p>FY 2016 Accomplishments:</p>	8.817	2.520	2.590	-	2.590

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205778A / <i>Guided Multiple-Launch Rocket System (GMLRS)</i>	Project (Number/Name) EG3 / <i>Guided MLRS</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Continued configuration definition and ground testing for the GMLRS IM Rocket Motor and Ignition Safety Device. FY 2017 Plans: Continue configuration ground control testing for the GMLRS IM RM and ISD. FY 2018 Base Plans: Ground/Flight testing of side-mounted proximity sensor.					
Title: Qualification and integration of the GMLRS extended range effort. Description: Funding is provided for the following effort FY 2018 Base Plans: Define system performance requirements, select component suppliers, conduct facilitization planning, conduct preliminary design review, and conduct a flight demonstration.	-	-	78.292	-	78.292
Accomplishments/Planned Programs Subtotals	35.726	38.044	102.807	-	102.807

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• GMLRS (C64400): <i>GMLRS (C64400)</i>	251.060	402.579	273.445	189.544	462.989	180.409	319.623	268.534	358.795	Continuing	Continuing
• GMLRS Alternative Warheads (EG2): <i>GMLRS Alternative Warheads (EG2)</i>	0.306	-	-	-	-	-	11.700	14.700	24.700	Continuing	Continuing
• GMLRS MOD (C57701): <i>GMLRS MOD (C57701)</i>	5.321	0.395	0.531	-	0.531	0.269	15.530	53.182	101.854	Continuing	Continuing

Remarks
GMLRS Procurement funding includes C65404 and C65406.

D. Acquisition Strategy
Project EG3 is intended to support, investigate, and develop alternative material changes to improve the GMLRS family of munitions as they are identified by the material developer or combat developer. This project also supports IM activities to improve the overall posture of the system down to component level. Two Insensitive Munition Propulsion Systems (Rocket Motor and Ignition Safety Device) suppliers will complete design and qualification, and the IMPS will be integrated into the GMLRS

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205778A / Guided Multiple-Launch Rocket System (GMLRS)	Project (Number/Name) EG3 / Guided MLRS

rocket. Design, development, and qualification of a side-mounted proximity sensor will provide a cost reduction initiative and improved area munition lethality. The GMLRS extended range effort will be a 36 month development and qualification effort leveraging existing contract vehicles where practicable.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205778A / Guided Multiple-Launch Rocket System (GMLRS)	Project (Number/Name) EG3 / Guided MLRS
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Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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	MIPR	PFRMS Project Office, : RSA	0.050	2.104	Oct 2015	2.721	Oct 2016	5.425	Oct 2017	-		5.425	Continuing	Continuing	Continuing
Subtotal			0.050	2.104		2.721		5.425		-		5.425	-	-	-

Remarks
PFRMS-Precision Fires Rocket and Missile Systems; RSA-Redstone Arsenal, Alabama

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Unitary Contracts/Multiple	SS/FPIF	LMMFCS : Dallas, TX	8.998	8.287	Jan 2016	18.976	Jan 2017	8.629	Jan 2018	-		8.629	Continuing	Continuing	Continuing
IM Qualification Contracts/ Multiple	C/FPIF	Orbital ATK, Aerojet Rocketdyne : Rocket Center, WV; Bristow, VA	0.000	16.518	Jan 2016	13.827	Jan 2017	10.404	Jan 2018	-		10.404	0.000	40.749	0.000
GMLRS Extended Range	SS/TBD	TBD : TBD	0.000	-		-		75.759	Jan 2018	-		75.759	Continuing	Continuing	Continuing
Subtotal			8.998	24.805		32.803		94.792		-		94.792	-	-	-

Remarks
SS/FPIF-Sole Source/Fixed-Price Incentive Firm; LMMFCS - Lockheed Martin Missile and Fire Control System; TX - Texas; C/FPIF - Competitive/Fixed-Price Incentive Firm; WV - West Virginia; VA - Virginia; TBD - To Be Determined

Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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	MIPR	WSMR, : NM	1.989	8.817	Oct 2015	2.520	Oct 2016	2.590	Oct 2017	-		2.590	Continuing	Continuing	Continuing
Subtotal			1.989	8.817		2.520		2.590		-		2.590	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205778A / <i>Guided Multiple-Launch Rocket System (GMLRS)</i>	Project (Number/Name) EG3 / <i>Guided MLRS</i>
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Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
WSMR, NM-White Sands Missile Range, New Mexico

	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	11.037	35.726	38.044	102.807	-	102.807	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205778A / <i>Guided Multiple-Launch Rocket System (GMLRS)</i>	Project (Number/Name) EG3 / <i>Guided MLRS</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
Assess and improve GMLRS rockets																												
Obsolescence/Cost Reduction Opportunities and Second Source Suppl																												
NAVSTRIKE 3.7 Qualification																												
M-Code/NAVSTRIKE-M Qualification																												
System Qual and testing of Side Mounted Proximity Sensor																												
Conduct qualification and testing for IMPS program																												
Conduct System Test and Evaluation activities																												
Qualification and Integration of GMLRS extended range effort																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0205778A / <i>Guided Multiple-Launch Rocket System (GMLRS)</i>	Project (Number/Name) EG3 / <i>Guided MLRS</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Assess and improve GMLRS rockets	1	2015	4	2022
Obsolescence/Cost Reduction Opportunities and Second Source Suppliers	1	2015	4	2022
NAVSTRIKE 3.7 Qualification	1	2016	2	2017
M-Code/NAVSTRIKE-M Qualification	3	2018	4	2020
System Qual and testing of Side Mounted Proximity Sensor	1	2018	3	2018
Conduct qualification and testing for IMPS program	1	2015	3	2018
Conduct System Test and Evaluation activities	4	2015	3	2018
Qualification and Integration of GMLRS extended range effort	2	2018	1	2021

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0208053A / Joint Tactical Ground System
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	28.015	12.649	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	40.664
635: Joint Tact Grd Station-P3I(MIP)	-	28.015	12.649	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	40.664

Note
 Funding moved from PE 0208053A to PE 1208053A as directed by OSD to track Space Programs

A. Mission Description and Budget Item Justification

The Joint Tactical Ground Station (JTAGS) is a post-production, ACAT III program and is designated as a DoD Space Program. JTAGS provides missile warning message data for the Air and Missile Defense (AMD) architecture and improves performance for Integrated Air and Missile Defense Fire Control Systems/Composite Army Air and Missile Defense Brigades.

JTAGS Block I system is a transportable information processing system, receiving and processing in-theater, direct down-linked data from Defense Support Program (DSP) and other Infrared (IR) satellites. JTAGS disseminates near real time warning, alerting, and cueing information on ballistic missile launches and other tactical events of interest throughout the theater using existing communication networks, providing critical support to Combatant Commanders in their Areas of Responsibility (AOR). Four OCONUS deployed JTAGS units constitute DoD's only in-theater system providing space-based missile warning. The fifth CONUS system is being used as an institutional trainer but is available as a deployable asset. JTAGS is designated as the in-theater element of the United States Strategic Command's Theater Event System (TES), supporting all Theater Missile Defense pillars, affording the shortest sensor to shooter connectivity.

The JTAGS Program Element (PE) supports development and test to meet JTAGS ORD thresholds using improved sensors and algorithms as Pre-Planned Product Improvements (P3I). The P3I Improvements will upgrade JTAGS to a new Block II configuration for operation with the next generation of Space Based Infrared System (SBIRS) satellites, and will improve warning tactical parameters and timeliness. JTAGS Block II is on contract for a two-Phase development effort. JTAGS Block II Phase 2 activities are broken into three spirals to expedite getting critical capabilities fielded sooner. JTAGS P3I Block II Phase 1 and Block II Phase 2 Spiral 1 efforts are included under PE 0208053A. JROC-Memos 197-12 and 113-13 supports the need to develop and field JTAGS Block II capabilities as soon as possible

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0208053A / <i>Joint Tactical Ground System</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	20.515	12.649	10.130	-	10.130
Current President's Budget	28.015	12.649	0.000	-	0.000
Total Adjustments	7.500	0.000	-10.130	-	-10.130
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	7.500	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	-10.130	-	-10.130

Change Summary Explanation

FY18 funding was realigned from PE 0208053A to PE 1208053A to provide greater transparency of OSD Space Programs.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0208053A / Joint Tactical Ground System				Project (Number/Name) 635 / Joint Tact Grd Station-P3I(MIP)			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
635: Joint Tact Grd Station-P3I(MIP)	-	28.015	12.649	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	40.664
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Joint Tactical Ground Station (JTAGS) is a post-production, ACAT III program and is designated as a DoD Space Program. JTAGS provides missile warning message data for the Air and Missile Defense (AMD) architecture and improves performance for Integrated Air and Missile Defense Fire Control Systems/Composite Army Air and Missile Defense Brigades.

JTAGS Block I system is a transportable information processing system, receiving and processing in-theater, direct down-linked data from Defense Support Program (DSP) and other Infrared (IR) satellites. JTAGS disseminates near real time warning, alerting, and cueing information on ballistic missile launches and other tactical events of interest throughout the theater using existing communication networks, providing critical support to Combatant Commanders in their Areas of Responsibility (AOR). Four OCONUS deployed JTAGS units constitute DoD's only in-theater system providing space-based missile warning. The fifth CONUS system is being used as an institutional trainer but is available as a deployable asset. JTAGS is designated as the in-theater element of the United States Strategic Command's Theater Event System (TES), supporting all Theater Missile Defense pillars, affording the shortest sensor to shooter connectivity.

The JTAGS Program Element (PE) supports development and test to meet JTAGS ORD thresholds using improved sensors and algorithms as Pre-Planned Product Improvements (P3I). The P3I Improvements will upgrade JTAGS to a new Block II configuration for operation with the next generation of Space Based Infrared System (SBIRS) satellites, and will improve warning tactical parameters and timeliness. JTAGS Block II is on contract for a two-Phase development effort. JTAGS Block II Phase 2 activities are broken into three spirals to expedite getting critical capabilities fielded sooner. JTAGS Block II Phase 1 and Block II Phase 2 Spiral 1 efforts are included under PE 0208053A. JROC-Memos 197-12 and 113-13 supports the need to develop and field JTAGS Block II capabilities as soon as possible

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

	FY 2016	FY 2017	FY 2018
Title: JTAGS Test and Evaluation Support	1.413	1.778	-
Description: Funding is provided for the following effort			
FY 2016 Accomplishments: JTAGS P3I Block II Phase 1 Testing			
FY 2017 Plans: JTAGS Block 2 Phase 2 Testing			
Title: JTAGS P3I Block II Phase 1 Development	15.502	-	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0208053A / <i>Joint Tactical Ground System</i>	Project (Number/Name) 635 / <i>Joint Tact Grd Station-P3I(MIP)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Description: Funding is provided for the completion of development in de-sheltering systems, upgrading hardware/software and meeting Information Assurance compliance requirements.			
FY 2016 Accomplishments: Completion of JTAGS Block II Phase 1 Development			
Title: JTAGS P3I Block II Phase 2 Development	11.100	10.871	-
Description: JTAGS Block II Phase 2 activities include a three spiral approach which will provide stereo SBIRS GEO starrer sensor data and Net Centric capabilities, per JROC Memos 197-12 and 113-13.			
FY 2016 Accomplishments: Begin Development of JTAGS Block II Phase 2 Spiral 1 (stereo SBIRS GEO starrer sensor data capabilities)			
FY 2017 Plans: Development of Phase 2 Spiral 1 (Stereo SBIRS GEO starrer)/Spiral 2 capabilities (Cobra Brass and Walkers)			
Accomplishments/Planned Programs Subtotals	28.015	12.649	-

C. Other Program Funding Summary (\$ in Millions)												
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>	
• SSN BZ8420000: SSN <i>BZ8401, Joint Tactical Ground Station (JTAGS)</i>	9.325	4.417	-	-	-	5.434	-	-	-	-	Continuing	Continuing
• OSDPE 1208053A: <i>Joint Tact Grd Station - P3I (MIP)</i>	-	-	10.228	-	10.228	11.594	10.851	11.131	12.843	Continuing	Continuing	

Remarks

D. Acquisition Strategy
Under this program element, critical improvements will be developed making maximum use of Non-Developmental Items (NDI)/Commercial Off-The-Shelf (COTS) components. After design and integration, the system will be subject to thorough developmental and validation/verification testing to verify performance, operational effectiveness and suitability. P3I Improvements will upgrade JTAGS to a new Block II configuration for operation with the next generation of Space Based Infrared System (SBIRS) satellites, improving warning tactical parameters and timeliness. JTAGS Block II is on contract for a two-Phase development effort. JTAGS Block II Phase 2, is further divided into three spirals to facilitate delivering critical capabilities to the fielded units faster. JTAGS Block II Phase 1 and JTAGS Block II Phase 2 Spiral 1 efforts will be completed under PE 0208053A. JROC-Memos 197-12 and 113-13 direct fielding of JTAGS Block II capabilities as soon as possible.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0208053A / <i>Joint Tactical Ground System</i>	Project (Number/Name) 635 / <i>Joint Tact Grd Station-P3I(MIP)</i>

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0303028A / Security and Intelligence Activities
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	13.156	11.619	13.807	-	13.807	13.407	14.143	14.387	14.785	Continuing	Continuing
FG2: Counterintelligence & Human Intel Modernization	-	0.000	0.000	1.825	-	1.825	1.262	1.756	1.756	1.775	Continuing	Continuing
H13: Information Dominance Center (IDC) - Tiara	-	13.156	11.619	11.982	-	11.982	12.145	12.387	12.631	13.010	Continuing	Continuing

A. Mission Description and Budget Item Justification

The U.S. Army Intelligence and Security Command's (INSCOM) RDTE program provides the Army with low-density, high-demand, extremely advanced offensive cyberspace technologies designed to degrade, deny, disrupt, or destroy adversary Command, Control, Communications, Computers and Intelligence (C4I) and shape the operational warfighting environment in order to create conditions favorable to the application of other elements of national power.

INSCOM conducts RDTE of offensive Cyberspace technologies in direct support of the full range of missions called for in the National Defense Strategy, Comprehensive National Cyber-Security Initiative, National Security Strategy, National Defense Guidance, National Security Presidential Directive (NSPD)-38, NSPD-54 and Homeland Security Presidential Directive (HSPD)-23.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	6.998	11.619	11.915	-	11.915
Current President's Budget	13.156	11.619	13.807	-	13.807
Total Adjustments	6.158	0.000	1.892	-	1.892
• Congressional General Reductions	-	-	-	-	-
• Congressional Directed Reductions	-5.370	-	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	-	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-	-	-	-	-
• SBIR/STTR Transfer	-	-	-	-	-
• Adjustments to Budget Years	11.528	0.000	1.892	-	1.892

Change Summary Explanation

FY 2018 Base funding in the amount of \$1.892 million was increased in support of New Start Project FG2 Counterintelligence & Human Intel Modernization.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303028A / Security and Intelligence Activities				Project (Number/Name) FG2 / Counterintelligence & Human Intel Modernization			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
FG2: Counterintelligence & Human Intel Modernization	-	0.000	0.000	1.825	-	1.825	1.262	1.756	1.756	1.775	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FG2: Counterintelligence & Human Intel Modernization is a New Start in FY 2018.

A. Mission Description and Budget Item Justification

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

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

	FY 2016	FY 2017	FY 2018
Title: Classified	-	-	1.825
Description: Classified			
FY 2018 Plans: Classified			
Accomplishments/Planned Programs Subtotals	-	-	1.825

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

N/A

Remarks

D. Acquisition Strategy

Classified

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303028A / Security and Intelligence Activities				Project (Number/Name) H13 / Information Dominance Center (IDC) - Tiara			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
H13: Information Dominance Center (IDC) - Tiara	-	13.156	11.619	11.982	-	11.982	12.145	12.387	12.631	13.010	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

INSCOM's RDTE program provides the Army with low-density, high-demand, extremely advanced offensive cyberspace technologies designed to degrade, deny, disrupt, or destroy adversary C4I and shape the operational warfighting environment in order to create conditions favorable to the application of other elements of national power.

INSCOM conducts RDTE of offensive Cyberspace technologies in direct support of the full range of missions called for in the National Defense Strategy, Comprehensive National Cyber-Security Initiative, National Security Strategy, National Defense Guidance, NSPD-38, NSPD-54 and HSPD-23.

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

	FY 2016	FY 2017	FY 2018
Title: Cyberspace technologies	13.156	11.619	11.982
Description: INSCOM's RDTE program provides the Army with low-density, high-demand, extremely advanced offensive cyberspace technologies designed to degrade, deny, disrupt, or destroy adversary C4I and shape the operational warfighting environment in order to create conditions favorable to the application of other elements of national power.			
FY 2016 Accomplishments: Develop and support leading-edge Cyberspace technologies designed to exploit, degrade, deny, disrupt, or destroy threat command, control, communications, computers and intelligence (C4I) cyber systems to enable commanders in shaping the operational warfighting environment in order to create conditions favorable to the application of other elements of national power. Support the development of offensive Cyberspace technologies in direct support of the full range of missions called for in the National Defense Strategy, Comprehensive National Cyber-Security Initiative, National Security Strategy, National Defense Guidance, Defense Cyber Strategy, Presidential Policy Directive (PPD) 20, National Security Presidential Directive (NSPD) 54, Homeland Defense Presidential Directive (HSPD) 23, and The Army Operating Concept.			
FY 2017 Plans: Continue to develop and support leading-edge Cyberspace technologies designed to exploit, degrade, deny, disrupt, or destroy threat command, control, communications, computers and intelligence (C4I) cyber systems to enable commanders in shaping the operational warfighting environment in order to create conditions favorable to the application of other elements of national power. Support the development of offensive Cyberspace technologies in direct support of the full range of missions called for in the National Defense Strategy, Comprehensive National Cyber-Security Initiative, National Security Strategy, National Defense			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303028A / <i>Security and Intelligence Activities</i>	Project (Number/Name) H13 / <i>Information Dominance Center (IDC) - Tiara</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Guidance, Defense Cyber Strategy, Presidential Policy Directive (PPD) 20, National Security Presidential Directive (NSPD) 54, Homeland Defense Presidential Directive (HSPD) 23, and The Army Operating Concept.			
<i>FY 2018 Plans:</i> Continue to develop and support leading-edge Cyberspace technologies designed to exploit, degrade, deny, disrupt, or destroy threat command, control, communications, computers and intelligence (C4I) cyber systems to enable commanders in shaping the operational warfighting environment in order to create conditions favorable to the application of other elements of national power. Support the development of offensive Cyberspace technologies in direct support of the full range of missions called for in the National Defense Strategy, Comprehensive National Cyber-Security Initiative, National Security Strategy, National Defense Guidance, Defense Cyber Strategy, Presidential Policy Directive (PPD) 20, National Security Presidential Directive (NSPD) 54, Homeland Defense Presidential Directive (HSPD) 23, and The Army Operating Concept.			
Accomplishments/Planned Programs Subtotals	13.156	11.619	11.982

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

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity 2040 / 7				R-1 Program Element (Number/Name) PE 0303028A / Security and Intelligence Activities				Project (Number/Name) H13 / Information Dominance Center (IDC) - Tiara							
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Mobile Objects/ PHAEDRUS	Various	TBD : TBD	47.003	13.156		11.619		11.982		-		11.982	Continuing	Continuing	Continuing
Subtotal			47.003	13.156		11.619		11.982		-		11.982	-	-	-
			Prior Years	FY 2016	FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals			47.003	13.156		11.619		11.982		-	11.982	-	-	-	
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303028A / <i>Security and Intelligence Activities</i>	Project (Number/Name) H13 / <i>Information Dominance Center (IDC) - Tiara</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
IP-Based Cyber Operations Platforms	IP-Based Cyber Operations Platforms																											
Aerial/Ground-Based Cyber Operations Platforms	Aerial/Ground-Based Cyber Operations Platforms																											
Remote Access Capabilities	Remote Access Capabilities																											
Close Access Capabilities	Close Access Capabilities																											
Platform C2 and Visualization Capabilities	Platform C2 and Visualization Capabilities																											
Testing and Evaluation Support of Cyberspace RDTE Capabilities	Testing and Evaluation Support of Cyberspace RDTE Capabilities																											

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303028A / <i>Security and Intelligence Activities</i>	Project (Number/Name) H13 / <i>Information Dominance Center (IDC) - Tiara</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IP-Based Cyber Operations Platforms	1	2016	1	2018
Aerial/Ground-Based Cyber Operations Platforms	1	2016	1	2018
Remote Access Capabilities	1	2016	1	2018
Close Access Capabilities	1	2016	1	2018
Platform C2 and Visualization Capabilities	1	2016	1	2018
Testing and Evaluation Support of Cyberspace RDTE Capabilities	1	2016	1	2018

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	31.032	38.280	132.438	-	132.438	90.008	53.033	22.848	20.752	Continuing	Continuing
491: <i>Information Assurance Development</i>	-	18.401	7.431	10.194	-	10.194	8.872	9.303	9.884	7.600	Continuing	Continuing
501: <i>Army Key Mgt System</i>	-	1.851	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.851
DV4: <i>Key Management Infrastructure (KMI)</i>	-	1.930	4.699	4.696	-	4.696	3.261	2.930	3.319	3.415	Continuing	Continuing
DV5: <i>Crypto Modernization (Crypto Mod)</i>	-	8.850	21.565	27.047	-	27.047	25.847	24.843	8.599	8.666	Continuing	Continuing
ET9: <i>Embedded Crypto Modernization (CRYPTO MOD)</i>	-	0.000	4.585	88.949	-	88.949	51.057	14.974	0.000	0.000	0.000	159.565
FF8: <i>Unit Activity Monitoring (UAM)</i>	-	0.000	0.000	1.552	-	1.552	0.971	0.983	1.046	1.071	0.000	5.623

A. Mission Description and Budget Item Justification

Information Assurance Development supports the implementation of the National Security Agency (NSA) developed Communications Security (COMSEC) technologies within the Army by providing COMSEC system capabilities through encryption, trusted software or standard operating procedures, and integrating these mechanisms into specific systems in support of securing the Army Tactical and Enterprise Networks. This entails architecture studies, system integration and testing, developing installation kits, and certification and accreditation of Automation Information Systems. The program assesses, develops and integrates Cyber Security (CS)/COMSEC tools (hardware and software) which provide protection for fixed infrastructure post, camp and station networks as well as tactical networks. The cited work is consistent with Strategic Planning Guidance and the Army Modernization and Strategy Plan.

Information Assurance Development funding Implements and establishes functional and technical boundaries of cryptographic, key management and Information Assurance (IA) capabilities In Coordination With (ICW) the NSA, the Defense Information Systems Agency (DISA), and Joint Services, to secure National Security Systems (NSS), and National Security Information (NSI). Technical evaluations assess the security, operational effectiveness and network interoperability of advanced concept technologies to develop policies, standards, and fundamental building blocks for Army COMSEC capabilities that reduce the risk of future material solutions that could underperform and disrupt classified operations. Develop and publish the Cryptographic Modernization strategy to identify, standardize, and govern the insertion of CS capabilities to bridge operational gaps and support the Department of Defense (DoD) and NSA mandated requirements to enhance network capacity while providing for secure information exchange of voice, video, and data IAW the Army Network Campaign Plan. This will be accomplished by interoperability evaluation, standards testing, and CS , System of System Network Vulnerability Assessments (SoS NVA) for Army Capability Sets for CS/COMSEC capabilities that provide protections for tactical and fixed infrastructure post, camp, and station networks.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	
<p>The Defensive Cyberspace Operations (DCO) program provides initial capabilities that enable passive and active cyberspace defense operations to preserve friendly cyberspace capabilities and protect data, networks, net-centric capabilities, and other designated systems. Big Data Pilot provides an advanced analytics capability capable of ingesting structured, semi-structured, and unstructured data from multiple data sources (e.g., Joint Regional Security Stacks (JRSS), intrusion detection systems, intrusion prevention systems, network device log files, trouble tickets, firewalls, proxies, web and applications server log files, etc) and proves situational awareness of cyberspace battlefield. It provides the computer network defense provider with common analytic platform which informs and reduces risk associated with future material solutions and forms a blueprint for future Big Data Analytics. Big Data (analysis-of-all DoD Information Network sensor data) provides two optimized and accredited clusters deployed in support of JRSS and Defense Research and Engineering Network (DREN) with a tools suite accessible to Cyber Mission Forces via secure remote access. The Army's DCO activities are a construct of active cyberspace defenses which provide synchronized, real-time capability to discover, detect, analyze, and mitigate threats to and vulnerability of DoD networks and systems.</p> <p>The Army Key Management System (AKMS) is the Army's implementation of the NSA Electronic Key Management System (EKMS) program automating the functions of COMSEC electronic key management, control, planning, and distribution. AKMS supports the Army's ability to communicate and distribute data on the Army's tactical and strategic networks by limiting adversarial access to, and reducing the vulnerability of, Army Command, Control, Communications, Computers, Intelligence (C4I) systems. The AKMS System of Systems (SoS) systems components are the Local COMSEC Management Software (LCMS), Automated Communications Engineering Software (ACES) and Simple Key Loader (SKL). The NSA EKMS program is being replaced by the NSA Key Management Infrastructure (KMI) Program. The transition of the legacy EKMS LCMS to the modern KMI Management Client (MGC) Nodes began in FY12 and must be completed by the EKMS Tier 2 sunset date of December 2017. AKMS supports the transition to Army Key Management Infrastructure (AKMI).</p> <p>The AKMI is the Army's implementation of the NSA KMI ACAT IAM program. AKMI supports DoD Global Information Grid (GIG) Net Centric and Cryptographic Modernization Initiatives (CMI) and supports emerging requirements transitioned from the AKMS. AKMI automates the functions of COMSEC electronic key management, control, planning, and distribution. AKMI supports the Army's ability to communicate and distribute data on the Army's tactical and strategic networks by limiting adversarial access to, and reducing the vulnerability of, Army Command, Control, Communications, Computers, Intelligence (C4I) systems. The AKMI Program includes the MGC nodes, ACES and Next Generation Load Device (NGLD) Family of devices to include the NGLD Small, Medium and Large. AKMI provides an integrated, operational environment that brings essential key management functions in-band. Objective AKMI will leverage NSA KMI program to provide secure software provisioning, will support legacy and modern ECU's, simplifies all aspects of key provisioning and ECU management with traceability to individuals, expands operations to DoD unclassified networks, North Atlantic Treaty Organization (NATO) and Coalition users, automates manual business processes to increase Soldier efficiency, transforms key delivery from manual to an automate enterprise service and will provide an Over the Network Keying (OTNK) capability to support CMI.</p> <p>The Crypto Modernization program supports using NSA developed COMSEC technologies within the Army providing encryption, trusted software, or standard operating procedures, and integrating these mechanisms into specified systems in support of securing the Army Tactical and Enterprise Network. This entails architecture studies, system integration and testing, developing installation kits, and certification and accreditation of Automation Information Systems. The program assesses, develops and integrates emerging CS/COMSEC tools (hardware and software) which provide protection for fixed infrastructure post, camp, and station networks as well as tactical networks. The cited work is consistent with Strategic Planning Guidance and the Army Modernization and Strategy Plan.</p>		

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>
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Embedded Cryptographic Modernization Initiative (ECMI) is an upgrade activity that will ensure enduring Army radios remain secure by operating with modern cryptographic algorithms and keys. Tactical radios using embedded cryptographic systems will no longer be able to communicate securely after cease key dates documented in the Chairman of the Joint Chiefs Staff instruction (CJCSI) 6510. In order to ensure Warfighters continue to have secured communications (i.e., encrypted data and voice), Army tactical radios are required to modernize their cryptographic capabilities by implementing modern algorithms. If cease key dates are not met, the Army will be forced to communicate at risk.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	31.154	38.280	70.554	-	70.554
Current President's Budget	31.032	38.280	132.438	-	132.438
Total Adjustments	-0.122	0.000	61.884	-	61.884
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.227	-			
• Adjustments to Budget Years	1.105	0.000	61.884	-	61.884

Change Summary Explanation

FY16 increase to project 491 supports Defensive Cyber Pilot efforts.

In FY18 the following net adjustments were made:

Crypto Modernization (DV5): Decrease of \$1.390 million based on requirement adjustment.

Embedded Crypto Modernization (ET9): Increase of \$61.693 million for embedded crypto modernization in Army radios.

Information Assurance (491): Increase of \$.102 million based on requirement adjustment.

Key Management Infrastructure (DV4): Decrease of \$.860 million based on requirement adjustment.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>				Project (Number/Name) 491 / <i>Information Assurance Development</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
491: <i>Information Assurance Development</i>	-	18.401	7.431	10.194	-	10.194	8.872	9.303	9.884	7.600	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

PE 0303140A, project 491 includes funding for the Army CIO/G6, Project Lead (PL) Network Enablers (Net E), and Project Lead (PL) Enterprise Services (ES).

A. Mission Description and Budget Item Justification

This program supports the implementation of National Security Agency (NSA) developed Communications Security (COMSEC) technologies within the Army by providing COMSEC system capabilities through encryption, trusted software, or standard operating procedures; integrating these mechanisms into specified systems in support of securing the Army Tactical and Enterprise Network.

This entails architecture studies, system integration and testing, developing, installation kits, and certification and accreditation of Automation Information Systems. The program assesses, develops and integrates Cyber Security (CS)/COMSEC tools (hardware and software) which provide protection for fixed infrastructure post, camps and station networks as well as tactical networks. The cited work is consistent with Strategic Planning Guidance and the Army Modernization Strategy Plan.

Implement, establish functional and technical boundaries of cryptographic, key management and Information Assurance (IA) capabilities In Coordination With (ICW) the NSA, the Defense Information Systems Agency (DISA), and Joint Services, to secure National Security Systems (NSS), and National Security Information (NSI). Technical evaluations assess the security, operational effectiveness and network interoperability of advanced concept technologies to develop policies, standards, and fundamental building blocks for Army COMSEC capabilities that reduce the risk of future materiel solutions that could underperform and disrupt classified operations.

Develop and publish the Cryptographic Modernization strategy to identify, standardize, and govern the insertion of IA capabilities that will bridge operational gaps and support the DoD and NSA mandated requirements to enhance network capacity while providing secure information exchange of voice, video, and data IAW the Army Network Campaign Plan. This will be accomplished by interoperability evaluation, standards testing, and CS System of System Network Vulnerability Assessments (SoS NVA) Army Capability Sets for CS/COMSEC capabilities that provide protections for the tactical and fixed infrastructure post, camps, and station networks.

The Defensive Cyberspace Operations (DCO) program provides initial capabilities that enable passive and active cyberspace defense operations to preserve friendly cyberspace capabilities and protect data, networks, net-centric capabilities, and other designated systems. Big Data Pilot provides an advanced analytics capability capable of ingesting structured, semi-structured, and unstructured data from multiple data sources (e.g., Joint Regional Security Stacks (JRSS), intrusion detection systems, intrusion prevention systems, network device log files, trouble tickets, firewalls, proxies, web and applications server log files, etc) and provides situational awareness of the cyberspace battlefield. It provides the computer network defense provider with a common analytic platform which informs and reduces risk associated with future materiel solutions and forms a blueprint for future Big Data Analytics. Big Data (analysis-of-all DoD Information Network sensor data) provides two optimized and accredited clusters deployed in support of JRSS and Defense Research and Engineering Network (DREN) with a tools suite accessible to Cyber Mission Forces via

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) 491 / <i>Information Assurance Development</i>		
secure remote access. The Army's DCO activities are a construct of active cyberspace defenses which provide synchronized, real-time capability to discover, detect, analyze, and mitigate threats to and vulnerability of DoD networks and systems.				
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>Title: Assessing emerging COMSEC hardware and software systems and products (PL Net E)</p> <p>Description: Conduct research and analyses as well as basic testing for meeting specific focused goals that will enhance the functions and support of cryptographic systems improving the security and usability of the Army tactical and strategic networks. (PL Net E)</p> <p>FY 2016 Accomplishments: Conducted testing of candidate small tactical In-line Network Encryption (INE) solutions and emerging secure wireless solutions. (PL Net E)</p> <p>FY 2017 Plans: As the Army implements new network technology, Secure Voice (SV) and In-line Network Encryption (INE) devices must be identified and tested for effectiveness and suitability. Key areas of investigation include cyber security, interoperability, and standards compliance. (PL Net E)</p> <p>FY 2018 Plans: As the Army implements new network technology, Secure Voice (SV) and In-line Network Encryption (INE) devices must continue to be identified and tested for effectiveness and suitability. Key areas of investigation include cyber security, interoperability, and standards compliance. (PL Net E)</p>		1.074	1.170	1.466
<p>Title: The Defensive Cyberspace Operations (DCO) - Big Data Pilot (PL ES-CYBER)</p> <p>Description: Bridge Big Data efforts into the DCO program and deploy additional Big Data Analytics platforms to FY15 JRSS sites. Assess alternative solution architecture/design and Develop, Test, Accredite, and Implement Rapid Deployable Kit (RDK) 2.X. (PL ES-CYBER)</p> <p>FY 2016 Accomplishments: Big Data Pilot cyber funding encompasses beta testing and a validation plan that will be incorporated with the pilot effort. Includes expanded DCO and Cyberspace Situational Awareness program requirements. Candidate deployment locations based on FY15 JRSS site activations. (PL ES-CYBER)</p>		9.725	-	-
<p>Title: Oversight and implementation guidance of emerging Cryptographic and CS capabilities to ensure interoperability to maintain compliance with DoD, NSA, and Army policies and regulations. (CIO/G6)</p> <p>Description: The program provides oversight and guidance for technical research and evaluation of Cryptographic Modernization (CM) and Key Management (KM) capabilities to ensure IA compliance and interoperability. This effort improves operational</p>		7.602	6.261	8.728

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) 491 / <i>Information Assurance Development</i>

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

	FY 2016	FY 2017	FY 2018
<p>effectiveness, ensures efficient implementation, and enhances network performance by deploying standardized COMSEC capabilities that are interoperable and supportable in Army, coalition and Joint operating environments. This program enables the Army to collaborate and participate in Joint and Army Capability Technology Demonstrations to define, improve, develop and publish Cyber Security (CS) standards for new/modernized technology insertion to support the LWN 2025 and Beyond. This effort assesses and defines risk mitigation of CS network vulnerabilities in end-to-end Army network operations and Common Operating Environment. (CIO/G6)</p> <p>FY 2016 Accomplishments: In support of Army and Combatant Commands world-wide, provided risk reduction lab tests to evaluate the maturity and security of new emerging technology which included trusted cyber sensor, Commercial Solutions for Classified (CSfC) and Cryptographic High Value Product (CHVP) Radio for unattended use to bridge operational gaps to enable secure communications between the tactical edge and DoD enterprise, and to align with the Army Network Campaign Plan and the DoD Joint Information Environment (JIE). Reviewed and assessed operational needs, standardized software testing, recommended software releases and identified fundamental building blocks for Cyber solutions. Provided policies and guidance for COMSEC programs and initiatives to ensure capabilities, interoperability, suitability remains synchronized with Army requirements. Provided security standards and technical input to the Army COMSEC Modernization Strategy. Developed Army cryptographic technology roadmaps to integrate modern technology and to assist Army organizations with phasing out legacy Crypto components. Participated in the NSA, DoD CIO, Joint Staff and Army forums to identify baseline requirements for the next generation of Cryptographic devices and future applications. Identified and submitted new Army security standards, performance and interoperability requirements for the upcoming NSA CryptoMod 2 Initial Capabilities Document (ICD) development. Identified and recommended changes to Army Technical Bulletins, Army Regulations and NSA CNSS Instructions. (CIO/G-6)</p> <p>FY 2017 Plans: Oversight and Implementation guidance that provides a framework for Army CM and KM through the evaluation of performance, operational effectiveness, and operational suitability of advanced technologies to meet mission capability needs. The core functions of this program are; to research and evaluate new emerging technology concepts for suitability and reliability and to participate in joint tests with NSA, DISA, and Services to establish functional and technical boundaries for CM, KM, and CS operations. Collaborate with the NSA, DoD and Joint Staff to define new Advanced Cryptographic Capability (ACC) standards (security and interoperability) for the tactical and operational environment. The program resources CS System of Systems Network Vulnerability Assessments (SoS NVA) to assess vulnerabilities and determine the operational risks resulting from disruption, unauthorized access, modification or exploitation of the network, information and information systems.</p> <p>FY 2018 Plans: Oversee execution of the Army's COMSEC Modernization initiative by identifying and developing new security baseline for implementation of Army CM and KM initiatives. Assess, review and validate Army operational needs. Test and evaluate CM</p>			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) 491 / <i>Information Assurance Development</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
and KM technologies to determine the maturity and viability for Army use to protect and strengthen the Network posture. Identify fundamental building blocks for IA solutions, perform risk reduction testing of commercial products prior to insertion into Army for use to increase operational availability with documented operational value and rapid integration. Collaborate with the NSA, DoD and Joint Staff to define new ACC standards (security and interoperability) for the tactical and operational environment. Provide continuous test and evaluate results to enable the Army to make sound investment strategic decisions and to reduce or eliminate duplications. Participate in operational assessment of NSA, DoD, Joint Staff and Service led Joint Capability Technology Demonstrations to align new technologies to documented Army and Service capability gaps for protecting National Security Systems and National Information. Develop strategies and policies that leverage emerging cryptographic and key management tools and services. (CIO/G6)			
Accomplishments/Planned Programs Subtotals	18.401	7.431	10.194

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• DV5: <i>Crypto Modernization</i>	8.850	21.565	27.047	-	27.047	25.847	24.843	8.599	8.666	Continuing	Continuing
• ET9: <i>Embedded Crypto Modernization</i>	-	4.585	88.949	-	88.949	51.057	14.974	-	-	0	159.565
• B96002: <i>Cryptographic Systems</i>	16.206	66.692	49.441	-	49.441	40.276	86.306	98.519	102.302	Continuing	Continuing
• B96006: <i>Embedded Cryptographic Modernization</i>	-	3.014	-	-	-	-	97.969	157.904	48.382	Continuing	Continuing
• BS9716: <i>NON PEO-SPARES</i>	0.170	2.545	2.635	-	2.635	3.170	4.917	4.961	5.000	Continuing	Continuing

Remarks
 Line Item and Title:
 DV5 - Crypto Modernization - RDTE
 ET9 - Embedded Crypto Modernization - RDTE
 B96002 - Cryptographic Systems - OPA2
 B96006 - Embedded Cryptographic Modernization - OPA2
 BS9716 - NON PEO-SPARES - OPA4

D. Acquisition Strategy
 The objective of the Cryptographic Systems program is to provide adaptive, flexible, and programmable cryptographic solutions using best practices, lessons learned and programmatic management to meet the challenge of modernizing the Army's aging cryptographic systems. Associated documents include CDD, approved by CIO/G6, 15 Jul 10; ICD, approved by JROC, 25 Mar 11; AAO; approved by G3, 15 Dec 11 and increased, 19 Jun 15.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
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E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) 491 / <i>Information Assurance Development</i>
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Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 (PL Net E)	SS/LH	CECOM RDEC : CECOM RDEC APG, MD	78.116	1.031		1.170		1.466		-		1.466	0.000	81.783	0.000
Big Data Pilot (PL ES-CYBER)	TBD	TBD : FT BELVOIR, VA	0.000	9.725		-		-		-		-	0.000	9.725	0.000
Information Assurance System Engineering Support (PL Net E)	C/FFP	DSCI Consulting : APG, MD	7.106	-		-		-		-		-	0.000	7.106	0.000
Engineering Support (PL Net E)	C/CPFF	CACI : APG, MD	5.018	-		-		-		-		-	0.000	5.018	0.000
Engineering Support (PL Net E)	C/CPFF	Booz Allen Hamilton : APG, MD	3.408	-		-		-		-		-	0.000	3.408	0.000
Engineering Support (PL Net E)	C/FP	CSC : APG, MD	16.448	-		-		-		-		-	0.000	16.448	0.000
Engineering Support (CIO/G6)	C/FP	CACI : APG, MD	3.879	1.245		1.595		2.196		-		2.196	Continuing	Continuing	Continuing
System Engineering (CIO/G6)	SS/LH	CECOM RDEC : APG, MD	1.698	2.073		1.086		1.496		-		1.496	Continuing	Continuing	Continuing
Engineering Support (CIO/G6)	C/CPFF	Booz Allen Hamilton : APG, MD	4.563	1.625		1.261		1.737		-		1.737	Continuing	Continuing	Continuing
Engineering Support (CIO/G6)	C/FFP	AASKI : Edgewood, MD	1.032	1.079		1.316		1.813		-		1.813	Continuing	Continuing	Continuing
Service (CIO/G6)	SS/LH	ARL/SLAD : White Sand Missile Range (WSMR)	3.346	1.623		1.003		1.486		-		1.486	Continuing	Continuing	Continuing
Subtotal			124.614	18.401		7.431		10.194		-		10.194	-	-	-

Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 (PL Net E)	C/CPFF	TBD : TBD	1.598	-		-		-		-		-	0	1.598	0

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) 491 / <i>Information Assurance Development</i>
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Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Subtotal			1.598	-		-		-		-		-	0.000	1.598	0.000

Remarks
Not Applicable

	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	126.212	18.401	7.431	10.194	-	10.194	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) 491 / <i>Information Assurance Development</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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 OF INE AND WIRELESS SOLUTION (PL Net E)																												
BIG DATA PILOT (PD ES-CYBER)																												
TECHNOLOGY TEST & EVALUATION (CIO/G6)																												
DEFINE SECURITY & INTEROPERABILITY STANDARDS (CIO/G6)																												
COMSEC STRATEGY & CRYPTO TECHNOLOGY ROADMAP (CIO/G6)																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) 491 / <i>Information Assurance Development</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
TEST OF INE AND WIRELESS SOLUTION (PL Net E)	1	2016	4	2018
BIG DATA PILOT (PD ES-CYBER)	1	2016	4	2016
TECHNOLOGY TEST & EVALUATION (CIO/G6)	1	2017	4	2022
DEFINE SECURITY & INTEROPERABILITY STANDARDS (CIO/G6)	1	2017	4	2022
COMSEC STRATEGY & CRYPTO TECHNOLOGY ROADMAP (CIO/G6)	1	2014	4	2022

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>				Project (Number/Name) 501 / <i>Army Key Mgt System</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
501: <i>Army Key Mgt System</i>	-	1.851	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.851
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Army Key Management System (AKMS) (501) realigned to Key Management Infrastructure (KMI)PE/Project (373140)(DV4) in FY17.

A. Mission Description and Budget Item Justification

The Army Key Management System (AKMS) is the Army's implementation of the National Security Agency's (NSA) Electronic Key Management System (EKMS) program automating the functions of Communications Security (COMSEC) electronic key management, control, planning, and distribution. AKMS supports the Army's ability to communicate and distribute data on the Army's tactical and strategic networks by limiting adversarial access to, and reducing the vulnerability of, Army Command, Control, Communications, Computers, Intelligence (C4I) systems. The AKMS System of Systems (SoS) components are the Local COMSEC Management Software (LCMS), Automated Communications Engineering Software (ACES) and Simple Key Loader (SKL).

The NSA EKMS program is being replaced by the NSA Key Management Infrastructure (KMI) Program. The transition of the legacy EKMS LCMS to the modern KMI Management Client (MGC) nodes began in FY12 and must be completed by the EKMS Tier 2 sunset date of December 2017.

AKMS supports the transition to Army Key Management Infrastructure (AKMI). Some components of the AKMS SoS will be replaced under AKMI while others will be modified or adapted to meet the new AKMI requirements. Two critical components required for the transition include the development of the Mission Planning Management Support System (MPMSS) and the ability to support Over the Network Keying (OTNK).

MP/MSS creates a secure, highly automated interface enabling secure transparent provisioning of KMI products. MP/MSS service is being developed by NSA but each Service is responsible for interface development and final integration into their infrastructure. ACES is the initial target for the interface to MPMSS. NSA will be providing additional capabilities and updates to the MP/MSS interface specification through technology insertions in the out years. The Army must then adjust to these changes delivered by NSA.

One of the major enhancement in the KMI architecture is the ability to leverage OTNK. The end state for the Army is to leverage AKMI capabilities (OTNK, Mission Plan/ Mission Support System (MP/MSS), Delivery Only Client (DOC), Client Host Only (CHO)) to increase automation, reduce soldier oversight, manage, and deliver key products to from the tactical edge up through strategic ECU's. Within AKMS this capability will be focused on ACES and SKL platform. ACES and SKL will act as an interim solution for all legacy ECUs to be recognized on the KMI network until they can be upgraded to be fully KMI aware. OTNK developments began in FY2015.

To support this transition, a new KMI compliant cryptographic engine must be developed for the SKL platform. The KOV-21 card used in current Army Tier 3 fill devices has hardware obsolescence issues and does not support the new capabilities being delivered by KMI. Redesigning and developmental efforts using modern and readily

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

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available components for use in the Army's SKL devices have been initiated. The redesign of the current KOV-21 card is referred to as the KOV-21 Replacement and is an extension of the KOV-21 card as a technology insertion. AKMS RDT&E funding line 501 realigned to DV4 / KMI FY17 and out.

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

	FY 2016	FY 2017	FY 2018
<p>Title: Mission Planning Management Support System (MPMSS) Interface</p> <p>Description: The MPMSS creates a secure, highly automated interface to enable transparent provisioning of Key Management Infrastructure (KMI) products. The MPMSS system is to be used by both the KMI system developer and MPMSS developers to have a standard interface to electronically exchange information, enabling Warfighter Operations, achieving integration between provisioning. National Security Agency (NSA) plans to deliver the MPMSS capabilities in 4 releases; Spirals 1-4, through FY16.</p> <p>FY 2016 Accomplishments: The second functional capability release of MPMSS will be completed in KMI Spiral 2 Spin 3 scheduled for delivery in July 2016. This release will include the interface to support the initial certificate management services. The Army Mission Planner software will be integrated and tested with the KMI MPMSS API Spin 3 capabilities. These installments of the MPMSS effort are a continuing effort to the base capabilities developed in the Army Key Management System (AKMS) program and will ensure maximum use of KMI architecture by Army's legacy End Crypto Units (ECU)s. This effort will commence after KMI MP/MSS software code is completed and delivered to the Army.</p>	0.945	-	-
<p>Title: Key Management Infrastructure (KMI) Awareness for Legacy Devices</p> <p>Description: KMI Awareness initiative creates a secure, highly automated interface in providing future Over the Network Keying (OTNK) capability to legacy ECUs. This initiative will allow KMI aware ECUs to receive, authenticate, and decrypt OTNK messages and increases WarFighter survivability by minimizing the need for Soldiers to travel to obtain keys. The current army inventory of ~1.5M ECUs are not currently KMI aware and cannot perform OTNK functionality.</p> <p>FY 2016 Accomplishments: KMI Awareness initiative provides OTNK like capability to legacy ECUs through the fill device. Development of a Reprogrammable Single Chip Universal Encryptor (RESCUE) is necessary for the fill device to provide KMI aware services to the ECUs. Developing this capability in the SKL will allow the ~1.5M legacy ECUs to be recognized on the KMI network until they can be upgraded to be KMI aware.</p>	0.906	-	-
Accomplishments/Planned Programs Subtotals	1.851	-	-

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

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• BA1201: TSEC - AKMS	10.373	-	-	-	-	-	-	-	-	0	10.373

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) 501 / <i>Army Key Mgt System</i>
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• B96004: <i>Key Management Infrastructure</i>	45.678	63.578	58.363	-	58.363	59.875	65.784	55.349	73.765	Continuing	Continuing
• DV4: <i>Key Management Infrastructure</i>	1.930	4.699	4.696	-	4.696	3.261	2.930	3.319	3.415	Continuing	Continuing
• 432140: <i>ISSP (TSEC-AKMS) OMA</i>	7.380	8.006	8.316	-	8.316	8.678	3.945	4.043	4.119	Continuing	Continuing

Remarks

Line Item & Title:
 BA1201: TSEC-AKMS (OPA2)
 B96004: Key Management Infrastructure (OPA2)
 DV4: Key Management Infrastructure (RDTE)
 432140: ISSP (TSEC-AKMS) (OMA)

D. Acquisition Strategy

Army Key Management System (AKMS) is an ACAT III Program of Record (POR) under PL Network Enablers (PL Net E). It is the Army's implementation of the National Security Agency (NSA)'s Electronic Key Management System (EKMS). The AKMS allows the Army to manage, control, plan, and distribute electronic key for the ~1.5M End Cryptographic Units (ECU)s necessary to communicate and distribute data on the Army's tactical and strategic networks.

AKMS was initially approved for Milestone III in FY99. The AKMS System of Systems originally included Local COMSEC Management Software (LCMS), Automated Communications Engineering Software (ACES) and Data Transfer Device (DTD) (AN-CYZ-10). In 2QFY02, the PEO C3T Milestone Decision Authority approved the procurement of the Simple Key Loader (SKL) as the replacement for the DTD within the AKMS System of Systems (SoS) POR. AKMS is a fully fielded POR that undergoes modifications to meet emerging operational needs.

The NSA EKMS program is being replaced by the NSA Key Management Infrastructure (KMI) Program. As the DoD Key Management Lead, NSA is dictating the change from EKMS to KMI. The Army's implementation of the NSA KMI is the Army Key Management Infrastructure (AKMI) program. Some components of the AKMS SoS will be replaced under AKMI while others will be modified or adapted to meet the new AKMI requirements.

The LCMS component of the AKMS SoS (AN/GYK-49) is fully fielded. The LCMS is assigned to the COMSEC Account Manager/COMSEC Custodian. LCMS most recent hardware refresh was completed in FY12. The current software baseline is 5.1.0.5 with certain select accounts upgrading to v5.2 based on operational needs. Further LCMS software releases are not anticipated. LCMS workstations will be replaced by KMI Management Client (MGC) Nodes before the NSA mandated EKMS Tier 2 sunset of December 2017. EKMS Common Tier 1 operations and Tier 1 operational support continues to be provided by CECOM. LCMS hardware is sustained by CSLA until fully replaced by the KMI MGC.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army	Date: May 2017
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The ACES component of the AKMS SoS (AN/GYK-33) current hardware platform is a Dell E6500 non-ruggedized laptop fielded to S6, Spectrum Managers and some COMSEC Account Managers at Battalion level and above. ACES is undergoing a hardware technology refresh and will be replacing 1/5 quantity of laptops each year. The current version of ACES is 3.4. Software is released on an annual basis and coincides with the Capability Set delivery schedule. PL Net E currently holds the software development contract. As the Tier 2.5 component, ACES operates between the LCMS (Tier 2) and the SKL (Tier 3). It links the key data from the LCMS with mission planning data for a single load by the SKL into the ECUs. ACES will continue with modifications to support the AKMI System of Systems. In order to support AKMI, ACES must be modified to seamlessly operate within the KMI architecture.

The SKL is the primary Army fill device and is the Tier 3 component of the AKMS SoS (AN/PYQ-10). The SKL is fully fielded to the Army. Army holds the sole full rate production procurement contract for the SKL, which is heavily utilized by other DoD and civil services as well as FMS customers. The SKL repair capability is with the Original Equipment Manufacturer but TYAD is developing an organic depot repair support. The SKL and its cryptographic engine are facing hardware obsolescence issues. SKL v3.1 in combination with a new KMI compliant cryptographic engine resolves these issues and lays the foundation for the Army's Next Generation Load Device - Medium capability. The SKL v3.1 modifications will be made to the Army's existing fleet of the fill devices via a modification kit starting in FY15. The KMI cryptographic engine is reliant on the CERDEC led RESCUE RDT&E effort that began in FY14.

AKMS RDT&E funding line 501 realigned to DV4 / KMI FY17 and out.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>				Project (Number/Name) DV4 / <i>Key Management Infrastructure (KMI)</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
DV4: <i>Key Management Infrastructure (KMI)</i>	-	1.930	4.699	4.696	-	4.696	3.261	2.930	3.319	3.415	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Key Management Infrastructure (KMI) funding line DV4 was established in FY2014. Army Key Management System (AKMS) funding line 501 realigned to KMI funding line DV4 in FY2017. AKMI supports infrastructure requirements in support of Key Management.

A. Mission Description and Budget Item Justification

The Army Key Management Infrastructure (AKMI) is the Army's implementation of the National Security Agency's (NSA) Key Management Infrastructure (KMI) ACAT IAM program. AKMI supports Department of Defense (DoD) Global Information Grid (GIG) Net Centric and Cryptographic Modernization Initiatives (CMI) and supports emerging requirements transitioned from the Army Key Management System (AKMS). AKMI automates the functions of Communications Security (COMSEC) electronic key management, control, planning, and distribution. AKMI supports the Army's ability to communicate and distribute data on the Army's tactical and strategic networks by limiting adversarial access to, and reducing the vulnerability of, Army Command, Control, Communications, Computers, Intelligence (C4I) systems.

The AKMI Program includes the Management Clients (MGC) nodes, Automated Communications Engineering Software (ACES) and Next Generation Load Device (NGLD) Family of devices to include the NGLD Small, Medium and Large. AKMI provides an integrated, operational environment that brings essential key management functions in-band. Objective AKMI will leverage NSA KMI program to provide secure software provisioning, will support legacy and modern End Crypto Units (ECU)s, simplifies all aspects of key provisioning and ECU management with traceability to individuals, expands operations to DoD unclassified networks, North Atlantic Treaty Organization (NATO) and Coalition users, automates manual business processes to increase Soldier efficiency, transforms key delivery from manual to an automate enterprise service and will provide an Over the Network Keying (OTNK) capability to support CMI.

One of the major enhancement in the AKMI architecture is the ability for to leverage the various capabilities and services from NSA KMI. The end state for the Army is to leverage AKMI capabilities (OTNK, Mission Plan/Mission Support System (MP/MSS), Delivery Only Client (DOC), Client Host Only (CHO)) to increase automation, reduce soldier oversight, manage, and deliver key products to from the tactical edge up through strategic ECU's. The objective AKMI capabilities will be found in all of the products across the AKMI product line to include MGC, ACES and NGLD family of fill devices. NGLD family will be an enduring solution to bridge the gap until legacy ECUs are fully modernized.

The NGLD Medium and Large are reliant on the Reprogrammable Single Chip Universal Encryptor (RESCUE), a new KMI compliant cryptographic engine that is currently being developed. The KOV-21 card currently used in Army Simple Key Loader (SKL) fill devices has hardware obsolescence issues and does not support OTNK. Redesign and developmental efforts using modern and readily available components for use in the Army's SKL devices have been initiated under the RESCUE program. The current KOV-21 card is referred to as the KOV-21 Replacement and is an extension of the RESCUE program as a technology insertion. The NGLD-Large

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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) DV4 / <i>Key Management Infrastructure (KMI)</i>
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technology development will start in FY2019. The NGLD-Large development will provide the same capabilities as the NGLD-Medium, along with wireless (802.11) and additional memory (64 GB) requirements.

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

	FY 2016	FY 2017	FY 2018
Title: Key Management Infrastructure (KMI) Awareness (RESCUE / KOV-21 Replacement Effort)	1.930	4.699	4.696
<p>Description: KMI Awareness initiative creates a secure, highly automated interface in providing future Over the Network Keying (OTNK) capability to legacy End Crypto Units (ECUs). This initiative will allow ECUs to receive, authenticate, and decrypt OTNK messages and increases WarFighter survivability by minimizing the need for Soldiers to travel to obtain keys. The KOV 21 card, previously in production through NSA for use in the Simple Key Loader (SKL) and the Secure DTD 2000 System (SDS), is nearing the end of life due to unavailability of parts. Redesigning and developmental efforts using modern and readily available components for use in the Army's SKL and Next Generation Load Devices (NGLDs) are currently underway. The redesign of the current KOV 21 card is referred to as the KOV 21 Replacement and is an extension of the KOV 21 card as a technology insertion. The KOV 21 Replacement will also address requirements codified in the NGLD CPD and the AKMI CPD that were technologically unachievable with the KOV 21 card.</p> <p>FY 2016 Accomplishments: The RESCUE technology development will continue in FY2017. RESCUE development will provide the ability to upgrade legacy fill devices, enabling a KMI aware fully developed PDE-enabled NGLD family of devices. The RESCUE effort lays the foundation for AKMI capabilities that can be integrated into the SKL v3.1 to make it an NGLD Medium.</p> <p>FY 2017 Plans: The RESCUE technology development will continue in FY2017. RESCUE development will provide the ability to upgrade legacy ECUs, enabling a KMI aware fully developed PDE-enabled ECU fleet. The KOV-21 Replacement effort lays the foundation for AKMI capabilities that can be inserted into the SKL to make it an NGLD Medium.</p> <p>FY 2018 Plans: The RESCUE technology development will complete in FY2018. RESCUE development will provide the ability to upgrade legacy ECUs, enabling a KMI aware fully developed PDE-enabled ECU fleet. The KOV-21 Replacement effort lays the foundation for AKMI capabilities that can be inserted into the SKL to make it an NGLD Medium.</p>			
Accomplishments/Planned Programs Subtotals	1.930	4.699	4.696

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u>	<u>Total Cost</u>
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• B96004: <i>Key Management Infrastructure</i>	45.678	63.578	58.363	-	58.363	59.875	65.784	55.349	73.765	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) DV4 / <i>Key Management Infrastructure (KMI)</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• BA1201: TSEC - Army Key Mgt Sys (AKMS)	10.373	-	-	-	-	-	-	-	-	0	10.373
• 501: Army Key Management System (AKMS)	1.851	-	-	-	-	-	-	-	-	0	1.851
• 432140: ISSP (TSEC-AKMS)	7.385	8.006	8.316	-	8.316	8.678	3.945	4.043	4.119	Continuing	Continuing

Remarks

Line Item & Title:
 B96004: Key Management Infrastructure (OPA2)
 BA1201: TSEC-Army Key Mgt Sys (AKMS) (OPA2)
 501: Army Key Management System (AKMS) (RDTE)
 432140: ISSP (TSEC-AKMS) (OMA)

D. Acquisition Strategy

Army Key Management Infrastructure (AKMI) is a Non Program of Record (POR) under Project Lead Network Enablers (PL Net E). AKMI is the Army's implementation of the National Security Agency (NSA) Key Management Infrastructure (KMI) ACAT IAM Program of Record. The AKMI will allow the Army to manage, control, plan, and distribute electronic key for the ~1.5M End Cryptographic Units (ECU)s necessary to communicate and distribute data on the Army's tactical and strategic networks.

AKMI initial Army Acquisition Program Baseline (APB) was approved 2QFY12. The AKMI Program will include the Management Clients (MGC) nodes, Automated Communications Engineering Software (ACES) and Next Generation Load Device (NGLD) Family. Each component of the AKMI Program is in a different phase of the acquisition cycle.

The NSA KMI Program is replacing the NSA Electronic Key Management System (EKMS) program. As the DoD Key Management Lead, NSA is dictating the change from EKMS to KMI by a sunset date of December 2017. Components of the AKMI Program will be retained and adapted from the legacy AKMS program while others will be developed and fielded to meet AKMI requirements.

The NGLD family of devices will become the primary Army fill devices and Tier 3 component of the AKMI Program. The NGLD Capability Production Document (CPD) was signed 4QFY13. The NGLD CPD calls for a family of 3 devices (small, medium, and large) to meet the AKMI requirements. The AKMI program has partnered with RDECOM CERDEC to develop a KMI compliant cryptographic engine, the Reprogrammable Single Chip Universal Encryptor (RESCUE). The Army will gain the NGLD Medium capability through the SKL v3.1 in combination with a new KMI compliant cryptographic engine, the RESCUE, the first iteration of the RESCUE being the KOV-21 Replacement. The redesign of the current SKL cryptographic engine, the KOV-21 card, is required due to parts obsolescence and inability to be KMI Aware. The KOV-21 Replacement is an extension of the RESCUE program as a technology insertion into the SKL v3.1 which in turn meets the NGLD Medium CPD

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requirements. The NGLD Medium will be available in FY19. Additionally, the Army NGLD large strategy is highly reliant on the development of the RESCUE and will drive a materiel solution decision in FY19.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>				Project (Number/Name) DV5 / <i>Crypto Modernization (Crypto Mod)</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
DV5: <i>Crypto Modernization (Crypto Mod)</i>	-	8.850	21.565	27.047	-	27.047	25.847	24.843	8.599	8.666	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

DV5 - The Crypto Modernization line was established in Sept 2012.

A. Mission Description and Budget Item Justification

This program supports using National Security Agency (NSA) developed Communications Security (COMSEC) technologies within the Army providing encryption, trusted software, or standard operating procedures, and integrating these mechanisms into specified systems in support of securing the Army Tactical and Enterprise Networks.

This entails architecture studies, system integration and testing, developing installation kits, and certification and accreditation of Automation Information Systems. The program assesses, develops and integrates emerging Information Assurance (IA)/COMSEC tools (hardware and software) which provide protection for fixed infrastructure post, camp, and station networks as well as tactical networks. The cited work is consistent with Strategic Planning Guidance and the Army Modernization and Strategy Plan.

The Embedded Cryptographic Modernization Initiative (ECMI) is designed to investigate Courses Of Action, conduct a Material Solution Analysis, and execute upgrade activities to ensure all enduring Army communications and data equipment that employ embedded cryptographic hardware will utilize modern cryptographic algorithms and keys.

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

	FY 2016	FY 2017	FY 2018
Title: VINSON/ANDVT (Advanced Narrowband Digital Voice Terminal) Cryptograph Modernization (VACM) program	0.500	0.500	0.500
Description: This program researches, assesses, tests, plans and works to integrate VACM products for the Army. The VACM program is a NSA mandated program established to replace legacy external cryptographic devices such as the KY-57, KY-99A, KY-58, KY-100 and CV- 3591 / KYV-5. In order to ensure the confidentiality, integrity and availability of classified communications, the cryptographic modules must be tested for interoperability and form fit to ensure a successful fielding. Each software release will require testing to insure comparability and interoperability.			
FY 2016 Accomplishments:			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
<p>The program tested and evaluated engineering changes to Low Rate Initial Production (LRIP) of VACM devices to confirm continued capability and interoperability on Army networks and tactical systems and identified new risk areas for compliance with COMSEC regulations and procedures.</p> <p>FY 2017 Plans: The program will continue to test and evaluate engineering changes to Full Rate Production (FRP) of VACM devices to confirm continued capability and interoperability on Army networks and tactical systems as well as identifying new risk areas for compliance with COMSEC regulations and procedures.</p> <p>FY 2018 Plans: The program will continue to test and evaluate engineering changes to Full Rate Production (FRP) of VACM devices to confirm continued capability and interoperability on Army networks and tactical systems as well as identifying new risk areas for compliance with COMSEC regulations and procedures. Will begin fielding to Secret level users performing site surveys and installing at both CONUS and OCONUS locations.</p>			
<p>Title: Cryptographic Systems Test and Evaluation</p> <p>Description: This program supports the Army Cryptographic Modernization Transformational Initiative. This is accomplished by providing test and evaluation capabilities to the COMSEC community in order to assess emerging technologies before being released and approved for Army use; testing will be performed on hardware, software and network systems.</p> <p>FY 2016 Accomplishments: The program tested and evaluated of COMSEC devices to confirm capability and interoperability on Army networks and tactical systems and identified risk areas for compliance with COMSEC regulations and procedures. The program tested and evaluated Crypto Systems compliant devices, Suite B IPSec devices built on commercial standards, Cryptographic High Value Product (CHVP), Commercial Solutions for Classified (CSfC) Standards, and new software releases to High Assurance Internet Protocol Encryptor (HAIPE) 4.X devices in accordance with AR 700-142 Rapid Action Revision dated October 16, 2008. The program tested interfaces and provided ways to insert Data At Rest (DAR) and Data In Transit (DIT) technology within the existing and future network infrastructure. Evaluated performance of technologies and provided direction to ensure the lowest impact on performance while providing the greatest protection from loss of sensitive data.</p> <p>FY 2017 Plans: The program continues testing and evaluation of COMSEC devices to confirm capability and interoperability on Army networks and tactical systems as well as identifying risk areas for compliance with COMSEC regulations and procedures. The program will test and evaluate Crypto Systems compliant devices, Suite B IPSec devices built on commercial standards, Cryptographic High Value Product (CHVP), Commercial Solutions for Classified (CSfC) Standards, and new software releases to HAIPE 4.X devices in accordance with AR 700-142 Rapid Action Revision dated October 16, 2008. Tests interfaces and provides</p>	3.120	4.314	5.450

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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) DV5 / <i>Crypto Modernization (Crypto Mod)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>ways to insert Data At Rest (DAR) and Data In Transit (DIT) technology within the existing and future network infrastructure. Evaluates performance of technologies and provide direction to ensure the lowest impact on performance while providing the greatest protection from loss of sensitive data. Examples of common analysis to be performed are comparisons in encryption implementations, network initialization overhead, and comparison of emerging Commercial Solutions for Classified architectures with COMSEC architectures.</p> <p>FY 2018 Plans: The program continues testing and evaluation of COMSEC devices to confirm capability and interoperability on Army networks and tactical systems as well as identifying risk areas for compliance with COMSEC regulations and procedures. The program will test and evaluate Crypto Systems compliant devices, Suite B IPsec devices built on commercial standards, CHVP, CSfC Standards, and new software releases to HAIPE 4.X devices in accordance with AR 700-142 Rapid Action Revision dated October 16, 2008. The program tests interfaces and provides ways to insert DAR and DIT technology within the existing and future network infrastructure. Evaluates performance of technologies and provides direction to ensure the lowest impact on performance while providing the greatest protection from loss of sensitive data.</p>				
<p>Title: High Assurance Internet Protocol Encryption (HAIPE) extension manager</p> <p>Description: A management tool to configure the new extensions to the HAIPE standard and process the resulting data to provide early indications of cyber attacks.</p> <p>FY 2017 Plans: Conduct a software development effort that will provide configuration and management of the HAIPE extensions and the user interface for collecting and analyzing the data that results from implementation of these HAIPE extensions. This will upgrade Army HAIPEs to include new cyber-sensor functionality for the tactical cyber cell.</p> <p>FY 2018 Plans: Continue a software development efforts that will provide configuration and management of the HAIPE extensions and the user interface for collecting and analyzing the data that results from implementation of these HAIPE extensions. This will facilitate the upgrade of the Army HAIPEs to include new cyber-sensor functionality for the tactical cyber cell.</p>		-	1.503	1.748
<p>Title: Embedded Cryptographic Modernization Initiative (ECMI)</p> <p>Description: The ECMI is an upgrade activity that will ensure enduring Army radios remain secure by operating with modern cryptographic algorithms and keys. Funding secured in DV5 line to support ECMI Non Recurring Engineering (NRE) efforts to comply with cease key dates mandated by CJCSI 6510.</p> <p>FY 2016 Accomplishments:</p>		5.230	15.248	19.349

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Determined optimal algorithms and engineering approaches to modernize various embedded cryptographic modules within Army communications systems and data links. The analysis and resulting program plans used a complete life cycle approach and included fielding, training, and sustainment as well as the technical approach to ensure compliance with NSA mandated cease key dates, while minimizing cost. Initiated contract for, the necessary non-recurring testing, engineering and development of hardware and software. Preliminary fielding and training plans developed.			
<i>FY 2017 Plans:</i> Software engineering and coding to upgrade the government purpose rights software code used in software defined radios to ensure these radios remain secure by employing algorithms and keys that comply with CJCSI 6510. System engineering activities including detailed requirements decomposition, and functional allocation. Design of modern reprogrammable cryptographic modules. Detailed hardware design and software coding.			
<i>FY 2018 Plans:</i> Continue execution of NRE efforts to develop, design, test/evaluate, and certify cryptographic hardware and software embedded in tactical radios to ensure these radios remain secure. System engineering activities including detailed requirements decomposition, and functional allocation. Design of modern reprogrammable cryptographic modules. Detailed hardware design and software coding.			
Accomplishments/Planned Programs Subtotals	8.850	21.565	27.047

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 491: <i>Information Assurance Development</i>	18.401	7.431	10.194	-	10.194	8.872	9.303	9.884	7.600	Continuing	Continuing
• ET9: <i>Embedded Crypto Modernization</i>	-	4.585	88.949	-	88.949	51.057	14.974	-	-	0.000	159.565
• B96002: <i>Cryptographic Systems</i>	16.206	66.692	49.441	-	49.441	40.276	86.306	98.519	102.302	Continuing	Continuing
• B96006: <i>Embedded Cryptographic Modernization</i>	-	3.014	-	-	-	-	97.969	157.904	48.382	Continuing	Continuing
• BS9716: <i>NON PEO-SPARES</i>	0.170	2.545	2.635	-	2.635	3.170	4.917	4.961	5.000	Continuing	Continuing

Remarks
 Line Item & Title:
 491 - Information Assurance Development - RDTE - funding executed by PL Net E, CIO/G6 and PL ES-CYBER
 ET9 - Embedded Crypto Modernization - RDTE

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) DV5 / <i>Crypto Modernization (Crypto Mod)</i>

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
B96002 - Cryptographic Systems - OPA2											
B96006 - Embedded Cryptographic Modernization - OPA2											
BS9716 - NON PEO-SPARES - OPA4											

D. Acquisition Strategy

The objective of this program is to integrate and validate hardware and software solutions to provide COMSEC superiority in order to protect against threats, increase battlefield survivability/lethality, and enable critical Mission Command activities. The objective of the Cryptographic Systems program is to provide adaptive, flexible, and programmable cryptographic systems using best practices, lessons learned and programmatic management to meet the challenge of modernizing the Army's aging cryptographic systems. The effort will support the network operations from end-to-end throughout the force and the Common Operating Environment (COE) thus mitigating networked vulnerabilities to Army information security systems. CDD, approved by CIO/G6, 15 Jul 10; ICD, approved by JROC, 25 Mar 11; AAO; approved by G3, 15 Dec 11 and increased, 19 Jun 15.

E. Performance Metrics

N/A

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) DV5 / <i>Crypto Modernization (Crypto Mod)</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
VACM INTEROPERABILITY																												
TEST AND EVALUATION OF LINK/TRUNK ENCRYPTORS SW																												
TEST AND EVALUATION OF SECURE VOICE SW & HW																												
TEST AND EVALUATION OF INE SW & HW																												
HAIPE EXTENSION MANAGER																												
ECMI DEVELOPMENT																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) DV5 / <i>Crypto Modernization (Crypto Mod)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
VACM INTEROPERABILITY	1	2016	4	2018
TEST AND EVALUATION OF LINK/TRUNK ENCRYPTORS SW	1	2016	4	2019
TEST AND EVALUATION OF SECURE VOICE SW & HW	4	2013	4	2022
TEST AND EVALUATION OF INE SW & HW	1	2017	4	2022
HAIPE EXTENSION MANAGER	1	2017	4	2022
ECMI DEVELOPMENT	1	2017	4	2018

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>				Project (Number/Name) ET9 / <i>Embedded Crypto Modernization (CRYPTO MOD)</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
ET9: <i>Embedded Crypto Modernization (CRYPTO MOD)</i>	-	0.000	4.585	88.949	-	88.949	51.057	14.974	0.000	0.000	0.000	159.565
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
ET9 – The Embedded Crypto Modernization Initiative (ECMI) line was established in July 2015

A. Mission Description and Budget Item Justification

Embedded Cryptographic Modernization Initiative (ECMI) is an upgrade activity that will ensure enduring Army radios remain secure by operating with modern cryptographic algorithms and keys. Tactical radios using embedded cryptographic systems will no longer be able to communicate securely after cease key dates documented in the Chairman of the Joint Chiefs Staff instruction (CJCSI) 6510. In order to ensure Warfighters continue to have secured communications (i.e., encrypted data and voice), Army tactical radios are required to modernize their cryptographic capabilities by implementing the modern algorithms. If cease key dates are not met, the Army will be forced to communicate at risk.

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

	FY 2016	FY 2017	FY 2018
Title: Embedded Cryptographic Modernization Initiative (ECMI) Development Contracts	-	4.585	88.949
Description: ECMI Non Recurring Engineering (NRE) Contract Prep Work and Execution			
FY 2017 Plans: Complete acquisition documentation and award contracts to develop, design, test/evaluate, and certify cryptographic hardware and software embedded in tactical radios to ensure these radios remain secure. System engineering activities including detailed requirements decomposition, and functional allocation. Design of modern reprogrammable cryptographic modules. Detailed hardware design and software coding.			
FY 2018 Plans: Support NRE development of ECMI efforts for vendor developmental and production contracts which supports NSA mandated Cease Key Date IAW CJCSI 6510.02E. This capability will ensure Army tactical radios possess the latest cryptographic solutions.			
Accomplishments/Planned Programs Subtotals	-	4.585	88.949

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) ET9 / <i>Embedded Crypto Modernization (CRYPTO MOD)</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• 491: <i>Information Assurance Development</i>	18.401	7.431	10.194	-	10.194	8.872	9.303	9.884	7.600	Continuing	Continuing
• DV5: <i>Crypto Modernization</i>	8.850	21.565	27.047	-	27.047	25.847	24.843	8.599	8.666	Continuing	Continuing
• B96002: <i>Cryptographic Systems</i>	16.206	66.692	49.441	-	49.441	40.276	86.306	98.519	102.302	Continuing	Continuing
• B96006: <i>Embedded Cryptographic Modernization</i>	-	3.014	-	-	-	-	97.969	157.904	48.382	Continuing	Continuing
• BS9716: <i>NON PEO-SPARES</i>	0.170	2.545	2.635	-	2.635	3.170	4.917	4.961	5.000	Continuing	Continuing

Remarks

Line Item & Title:

491 - Information Assurance Development - RDTE - funding executed by PL Net E, CIO/G6 and PL ES-CYBER

DV5 - Crypto Modernization - RDTE

B96002 - Cryptographic Systems - OPA2

B96006 - Embedded Cryptographic Modernization - OPA2

BS9716 - NON PEO-SPARES - OPA4

D. Acquisition Strategy

The objective of the Cryptographic Systems program is to provide adaptive, flexible, and programmable embedded cryptographic solutions using best practices, lessons learned and programmatic management to meet the challenge of modernizing the Army's aging cryptographic systems. ECMI will design, develop, and execute upgrade activities to ensure all enduring Army tactical radios that employs embedded cryptographic hardware will be able to accept and utilize modern cryptographic keys.

Applicable documents affecting Tactical Radio ONS, ORD, & CPDs requiring crypto:

CDD for Cryptographic Equipment and Services Modernization, Increment 1, dated March 2010.

CJCSI 6510.02E – “Cryptographic Modernization Planning”, 01 April 2014.

CNSSP-15 – “National Information Assurance Policy on the Use of Public Standards for the Secure Sharing of Information Among National Security Systems”, 01 October 2012.

NSA CSS 3-9 – “Cryptographic Modernization Initiative Requirements for Type 1 Cryptographic Products”, dated 28 March 2013.

Memorandum from Army Acquisition Executive with subject “Management and Procurement of Communications Security (COMSEC) Capability, dated 28 Feb 2012.

E. Performance Metrics

N/A

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) ET9 / <i>Embedded Crypto Modernization (CRYPTO MOD)</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
ECMI DEVELOPMENT																												
ECMI DEVELOPMENT CONTRACT AWARDS																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) ET9 / <i>Embedded Crypto Modernization (CRYPTO MOD)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
ECMI DEVELOPMENT	1	2017	2	2020
ECMI DEVELOPMENT CONTRACT AWARDS	4	2017	1	2018

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>				Project (Number/Name) FF8 / <i>Unit Activity Monitoring (UAM)</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
FF8: <i>Unit Activity Monitoring (UAM)</i>	-	0.000	0.000	1.552	-	1.552	0.971	0.983	1.046	1.071	0.000	5.623
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

User activity monitoring (UAM) automation/analytics will provide technical capability to enhance Army UAM analysis effectiveness and efficiency. The UAM mission is to observe and record the actions and activities of an individual, at any time, on any device accessing Army information on classified networks in order to detect insider threats and to support authorized investigations. Army UAM is a component of the Army Insider Threat (InT) Program. Army's InT Program and UAM are conducted in accordance with the National Defense Authorization Act for Fiscal Year 2012, section 922., Insider Threat Detection; Presidential Memorandum, National Insider Threat Policy and Minimum Standards for Executive Branch Insider Threat Programs, dated 21 November 2012; Executive Order 13587, Structural Reforms to Improve the Security of Classified Networks and the Responsible Sharing and Safeguarding of Classified Information, (Reference b) dated 7 October 2011, and Army Directive 2013-18 (Army Insider Threat Program), 31 July 2013. Innovative enhancements are required to improve UAM analysis productivity, data visualization, and workflow management. The analysis productivity objective is to develop and implement user behavior models that use UAM and other network data to identify anomalous user behavior over time, and to integrated new data sources into the UAM analytical data store and processing system. Data visualization advances will present UAM analysts behavior model processing results in an intuitive format that reduce the time required to review the results. Workflow management improvements will add new capabilities to the UAM workflow management system with the objective of enhancing analysis reporting productivity and metrics collection.

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

	FY 2016	FY 2017	FY 2018
Title: Unit Activity Monitoring	-	-	1.552
Description: FY 2018 marks the first UAM automation/analytics program year. FY 2018 Base funds in the total amount of \$1.552 million are provided for software engineering development and testing resources to enhance the Army' UAM data processing, analysis, and data visualization capabilities, and its workflow management system, plus the integration of new data sources into the data processing component. All work is focused on the development of new capabilities.			
The details of this program are reported in accordance with Title 10, United States Code, Section 119(a)(1).			
FY 2018 Plans: Unit Activity Monitoring			
Accomplishments/Planned Programs Subtotals	-	-	1.552

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

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303140A / <i>Information Systems Security Program</i>	Project (Number/Name) FF8 / <i>Unit Activity Monitoring (UAM)</i>

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

Remarks

D. Acquisition Strategy

FY18: The planned acquisition strategy to acquire UAM Automation/Analytics software engineering services is to award through the use of competitive acquisition, a Base plus three-option year firm-fixed price contract.

FY19: The planned acquisition is to exercise option year one of the software engineering services contract.

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army											Date: May 2017	
Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0303141A / Global Combat Support System							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	25.304	28.667	64.370	-	64.370	74.484	33.890	7.376	6.259	Continuing	Continuing
083: Global Combat Support Sys - Army	-	1.589	1.128	0.307	-	0.307	0.313	0.324	0.333	0.346	Continuing	Continuing
08A: Army Enterprise System Integration Program	-	1.618	2.340	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.958
EK2: GCSS-A Increment 2	-	22.097	25.199	64.063	-	64.063	74.171	33.566	7.043	0.913	0.000	227.052
EK3: AESIP Increment 2	-	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	5.000	0.000	5.000

A. Mission Description and Budget Item Justification

The Global Combat Support System-Army (GCSS-Army) program has two components: a functional component titled GCSS-Army and a technology enabler component titled Army Enterprise Systems Integration Program (AESIP). GCSS-Army coupled with AESIP are information and communications technology investments that will provide key enabling support to the transformation of the Army into a network-centric, knowledge-based future force. The GCSS-Army approved Capability Description Document (CDD) and Capability Production Document (CPD) require an enterprise approach to replace current logistics and maintenance Standard Army Management Information Systems (STAMIS). GCSS-Army will provide the Army's Sustainment Support for the soldier with a seamless flow of timely, accurate, accessible and secure information management that gives combat forces a decisive edge. AESIP will provide the system's enterprise hub services, centralized master data management and cross-functional business intelligence/analytics. GCSS-Army will implement best business practices to streamline supply, accountability, maintenance, distribution, and reporting procedures in support of the future force transition path of the Army Campaign Plan.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	21.574	27.223	60.063	-	60.063
Current President's Budget	25.304	28.667	64.370	-	64.370
Total Adjustments	3.730	1.444	4.307	-	4.307
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.487	-			
• Adjustments to Budget Years	4.217	1.444	0.000	-	0.000
• Other Adjustments 1	0.000	0.000	4.307	-	4.307

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303141A / <i>Global Combat Support System</i>	
<u>Change Summary Explanation</u> FY16 Army reprogramming- Increase Proj EK2: +4.217 million FY17 Additional Appropriation Request 373141.08A: \$1.444 million FY18 Army program adjustment increase to EK2: \$4.311 million; program adjustment decrease to 083: \$0.004 million		

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303141A / <i>Global Combat Support System</i>				Project (Number/Name) 083 / <i>Global Combat Support Sys - Army</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
083: <i>Global Combat Support Sys - Army</i>	-	1.589	1.128	0.307	-	0.307	0.313	0.324	0.333	0.346	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

GCSS-Army is the tactical unit / installation logistics and financial system for the U.S. Army. GCSS-Army is an Enterprise Resource Planning (ERP) solution that will track supplies, spare parts and organizational equipment. It will track unit maintenance, total cost of ownership and other financial transactions related to logistics for all Army units. This modernized application will subsume outdated Standard Army Management Information Systems (STAMIS) that are not financially compliant and integrate numerous local supply and logistics databases into a single, enterprise-wide authoritative system. GCSS-Army will be financially compliant and is a key component for the Army Enterprise strategy to be financially auditable. When fully deployed, GCSS-Army will affect every supply room, motor pool, direct support repair shop, warehouse, Logistics Readiness Centers (LRCs) and property book office in the Army.

GCSS-Army will modernize automated logistics by implementing best business practices to streamline supply operations, maintenance operations, property accountability, and tactical logistics and financial management and integration procedures in support of the Future Force transition path of the Army Campaign Plan. GCSS-Army is a key component of the Federated ERP Integration solution that will optimize tactical logistics and finance domain business processes into a single federated approach. Delivering GCSS-Army will eliminate the need for extensive maintenance and modification of aging, diverse software systems that are not cyber compliant, resulting in improved and efficient change control and configuration management through implementation of an enterprise system.

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

	FY 2016	FY 2017	FY 2018
Title: Government System Test and Evaluation	1.589	1.128	0.307
Description: Plans, conducts and reports on developmental tests and assists in planning, conducting, and reporting of operational and interoperability tests, assessments, and experiments in order to provide essential information for the acquisition and fielding of warfighting systems.			
FY 2016 Accomplishments: As a result of completing nearly 50% of Increment 1 Wave 2 fielding, funding was utilized to fix any major issues in the ERP solution that were identified as the fielding continued and made necessary updates to the software baseline to meet auditability and cyber security requirements.			
FY 2017 Plans: The program will be at the end of Increment 1 Wave 2 Fielding, fixing any major issues in the ERP solution that are identified as the fielding continues and making necessary updates to the software baseline to meet auditability requirements. As of 31 Mar 17 fielding of Wave 2 is 70% complete.			
FY 2018 Plans:			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303141A / <i>Global Combat Support System</i>	Project (Number/Name) 083 / <i>Global Combat Support Sys - Army</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
FY18 Base Plans (continued) The program finishes Increment 1, Wave 2 fielding. Funding will be utilized to perform regression testing to ensure proper interfaces remain interoperable with system and technology upgrades and modifications.			
Accomplishments/Planned Programs Subtotals	1.589	1.128	0.307

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

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• W00800: <i>GCSS-Army Other Procurement, Army (OPA)</i>	143.262	152.965	30.637	-	30.637	2.394	2.316	0.069	0.025	Continuing	Continuing

Remarks

D. Acquisition Strategy

GCSS-Army has an evolutionary acquisition strategy as defined in DoD Directive 5000.01 and DoD Instruction 5000.02 and will define, develop, and deploy an initial operational capability based upon proven technology, time-phased requirements, projected threat assessments, and demonstrated manufacturing capabilities. Increment 1 will be a viable stand alone capability.

GCSS-Army Increment I is being implemented in three releases.

Release 1.0 replaces: Standard Army Retail Supply System (SARSS) at one Direct Support Unit (DSU) in the 11th Armored Cavalry Regiment (ACR), Fort Irwin, California. An Operational Assessment (OA) was conducted on Release 1.0 and information is gathered through Continuous Evaluation.

Release 1.1 subsumes Release 1.0 and provides over 80% of the required GCSS-Army capability.

Release 1.2 represents the complete baseline with all required capabilities provided.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303141A / <i>Global Combat Support System</i>				Project (Number/Name) 08A / <i>Army Enterprise System Integration Program</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
08A: <i>Army Enterprise System Integration Program</i>	-	1.618	2.340	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.958
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Not applicable for this item.

A. Mission Description and Budget Item Justification

Army Enterprise Systems Integration Program (AESIP), mission is to integrate Army business processes by providing a single source for enterprise hub services, centralized master data management, and business intelligence and analytics. AESIP is the principle GCSS-Army Business Intelligence system and will aggregate data for enterprise reporting. AESIP will support the Army's federated approach and enable the integration of end-to-end logistical and financial processes. The Army has successfully addressed concerns about the lack of integration of ERPs by leveraging AESIP core capabilities and expanding those benefits across the Army enterprise. AESIP will be an Army specific commercial off-the-shelf (COTS) web portal implementation via the NetWeaver Platform from developer Systems Applications and Products (SAP) American Group to support Army process scenarios and requirements that will provide core competencies:

- Enterprise Service Bus (Hub Services) - For a Service oriented, Single Point of Entry to connect, mediate, and control the exchange of data.
- Enterprise Business Intelligence/Business Warehouse - Aggregates data from ERP and non-ERP systems to provide flexible Enterprise level reporting.
- Enterprise Master Data Management - For a single source of authoritative data and improved workflow and business processes.

The AESIP solution establishes a framework for a fully integrated ERP centric environment that will ultimately provide Commanders Total Visibility from Factory to Battlefield thereby ensuring delivery of the right equipment to the right unit at the right time, while reducing backlogs of material on the battlefield.

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

	FY 2016	FY 2017	FY 2018
Title: Production & Full Deployment Phases Contract Activity	1.362	2.340	-
Description: Manage Government contracts associated with work relating to acquisition, engineering, planning and integration activities supporting Army Enterprise Systems Integration Program (AESIP).			
FY 2016 Accomplishments: Implemented system enhancements as requested from users and critical requirements from CASCOM or LOGSA during the GCSS-Army full fielding. Enhanced the Customer Vender Solution (CVS); required for migrating remaining customer functionality			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303141A / <i>Global Combat Support System</i>	Project (Number/Name) 08A / <i>Army Enterprise System Integration Program</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
<p>into ERP Central Component (ECC) and expanding customer records. Expanded Business Analytics capability across the Army providing access to data from ERP and non-ERP systems; retiring duplicative capabilities.</p> <p>FY 2017 Plans: Will address system enhancement requests from users and critical requirements from CASCOM or LOGSA during the GCSS-Army full fielding. Enhance the Customer Vender Solution (CVS); required for migrating remaining customer functionality into ERP Central Component (ECC) and expanding customer records. Expand Business Analytics capability across the Army providing access to data from ERP and non-ERP systems; retiring duplicative capabilities.</p> <p>Additional FY17 Appropriations: Funds will be used to develop Business Intelligence/Business Warehouse (BI/BW) technology application to AESIP, to include data warehousing functionality, a business intelligence platform, and a suite of business intelligence tools integrated to the enterprise. Relevant business information from productive SAP applications and all external data sources will be integrated, transformed, and consolidated in BI with the toolset provided. PM will develop an integration architecture for data warehousing workbench, a BI platform, Business Explorer suite, open analysis interfaces, and apply other technologies to AESIP and the ERP suite.</p>			
<p>Title: Government System Test and Evaluation</p> <p>Description: Plans, conducts and reports on developmental tests and assists in planning, conducting, and reporting of operational and interoperability tests, assessments, and experiments.</p> <p>FY 2016 Accomplishments: Will continue evaluation in support of GCSS-Army Increment 1, Wave 1 & 2 Fielding, identifying issues during fielding and documenting necessary updates to the software baseline for auditability requirements.</p>	0.256	-	-
Accomplishments/Planned Programs Subtotals	1.618	2.340	-

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• AESIP Procurement: <i>AESIP Other Procurement, Army (OPA) (SSN W11001)</i>	3.392	2.695	2.697	-	2.697	1.253	5.096	3.374	2.620	Continuing	Continuing
Remarks											

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303141A / <i>Global Combat Support System</i>	Project (Number/Name) 08A / <i>Army Enterprise System Integration Program</i>

D. Acquisition Strategy

As the technical component of GCSS-Army, AESIP employs an evolutionary acquisition strategy as defined in DoD Directive 5000.01 and DoD Instruction 5000.02, and will define, develop, and deploy an initial operational capability based upon proven technology, time-phased requirements, projected threat assessments, and demonstrated manufacturing capabilities. The system will be developed in multiple releases then integrated and synchronized with related systems.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303141A / <i>Global Combat Support System</i>				Project (Number/Name) EK2 / <i>GCSS-A Increment 2</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EK2: <i>GCSS-A Increment 2</i>	-	22.097	25.199	64.063	-	64.063	74.171	33.566	7.043	0.913	0.000	227.052
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Global Combat Support System-Army (GCSS-Army) program has two components: a functional component titled GCSS-Army and a technology enabler component titled Army Enterprise Systems Integration Program (AESIP). GCSS-Army coupled with AESIP are information and communications technology investments that currently provides provide key enabling support to the transformation of the Army into a network-centric, knowledge-based future force. Building on the foundation of GCSS-Army Increment 1, Increment 2 will provide the Army Enterprise Aviation maintenance, enhanced Business Intelligence / Business Warehouse (BI/BW) and Army Pre-Positioned Stock (APS) functional capabilities to deliver greater efficiencies and to improve information flow and accuracy in real time to decision makers. Upon the completion of Increment 2, the Unit Level Logistics System-Aviation (Enhanced) (ULLS-A(E)), Unmanned Aircraft System-Initiative (UAS-I), and Army War Reserve Deployment System (AWRDS) will be eligible for retirement since the necessary functionality will have been replaced by GCSS-Army increments. GCSS-Army will provide the Army sustainment support for the warfighter with a seamless flow of timely, accurate, accessible and secure management information that gives combat forces a decisive edge.

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

	FY 2016	FY 2017	FY 2018
Title: Technology Maturation and Risk Reduction Phase	22.097	24.279	20.573
Description: During the Technology Maturation and Risk Reduction (TMRR) phase, the program develops and demonstrates prototype designs to reduce technical risk, validate design approaches, validate cost estimates, and refine requirements. TMRR is an iterative process of maturing technologies and refining user performance parameters to ensure an affordable and executable production program.			
FY 2016 Accomplishments: Performed analysis to assess risk, affordability, and feasibility of the capability required. Continue the fit/gap analysis and blueprinting of stakeholder requirements. Efforts are intended to reduce the specific risks (e.g. technology, engineering, integration and life-cycle risk) associated with the incremental development of the GCSS-Army system.			
FY 2017 Plans: Perform analysis to assess risk, affordability, and feasibility. Continue fit/gap analysis and blueprinting of stakeholder requirements. Efforts are intended to reduce the specific risks (e.g. technology, engineering, integration and life-cycle risk) associated with the incremental development of the GCSS-Army system.			
FY 2018 Plans:			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303141A / <i>Global Combat Support System</i>	Project (Number/Name) EK2 / <i>GCSS-A Increment 2</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Complete analysis to assess risk, affordability, and feasibility. Continue fit/gap analysis and blueprinting of stakeholder requirements. Efforts are intended to reduce the specific risks (e.g. technology, engineering, integration and life-cycle risk) associated with the incremental development of the GCSS-Army system.			
Title: System Design, Build and Test Description: The purpose of this phase is to begin the system development for an incremental capability that is affordable and executable to satisfy the Key Performance Parameters and Key System Attributes . FY 2018 Plans: Finish design phase and begin the development and build of Increment 2. Develop test plans preparatory to begin testing. Verify achievement of critical technical parameters and the ability to achieve key performance parameters, and assess progress toward achievement of critical operational issues. Validate system functionality. Identify system capabilities, limitations, and deficiencies. Assess system specification compliance, system safety, and compatibility with relational database management systems.	-	-	42.550
Title: PMO Operations Description: Program Management operations to support engineering and manufacturing development. FY 2017 Plans: Program Management operations to support engineering and manufacturing development. FY 2018 Plans: Program Management operations to support engineering and manufacturing development.	-	0.920	0.940
Accomplishments/Planned Programs Subtotals	22.097	25.199	64.063

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• GCSS-Army Increment 2 OPA: GCSS-Army Increment 2 Other Procurement (SSN W11011)	-	-	3.867	-	3.867	6.925	27.526	35.469	12.356	56.924	143.067

Remarks

D. Acquisition Strategy
GCSS-Army Increment 2 continues the evolutionary acquisition strategy of Increment 1 and will define, develop, and deploy additional and enhanced capabilities to GCSS-Army based upon proven technology, time-phased requirements, projected threat assessments, and demonstrated manufacturing capabilities.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303141A / <i>Global Combat Support System</i>	Project (Number/Name) EK2 / <i>GCSS-A Increment 2</i>

GCSS-Army Increment 2 is being implemented in three waves:

Wave 1 provides the Army Enterprise Aviation maintenance capability.

Wave 2 provides the enhanced Business Intelligence/Business Warehouse (BI/BW) capability.

Wave 3 provides the Army Pre-Positioned Stock (APS) capability

E. Performance Metrics
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303141A / <i>Global Combat Support System</i>	Project (Number/Name) EK2 / <i>GCSS-A Increment 2</i>
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Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Operations	TBD	PMO : Huntsville AL	0.000	-		0.920		0.940		-		0.940	2.920	4.780	0.000
Subtotal			0.000	-		0.920		0.940		-		0.940	2.920	4.780	0.000

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Maturization and Risk Reduction	Various	Various : Various	0.000	22.097	Mar 2016	24.279	Feb 2017	20.573		-		20.573	0.000	66.949	0.000
System Design, build and test	C/CPFF	TBD : TBD	0.000	-		-		42.550	Apr 2018	-		42.550	72.847	115.397	115.397
Subtotal			0.000	22.097		24.279		63.123		-		63.123	72.847	182.346	115.397

Remarks
 Finish Design and begin development (FY17-FY18) and build of Increment 2. Verify achievement of critical technical parameters and the ability to achieve key performance parameters, and assess progress toward achievement of critical operational issues. Validate system functionality. Identify system capabilities, limitations, and deficiencies. Assess system specification compliance, system safety, and compatibility.

Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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	C/Various	TBD : TBD	0.000	-		-		-		-		-	39.916	39.916	39.916
Subtotal			0.000	-		-		-		-		-	39.916	39.916	39.916

Remarks
 Test and evaluation efforts anticipated to begin FY19.

Project Cost Totals	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
	0.000	22.097	25.199	64.063	-	64.063	115.683	227.042	155.313

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army							Date: May 2017			
Appropriation/Budget Activity 2040 / 7			R-1 Program Element (Number/Name) PE 0303141A / Global Combat Support System			Project (Number/Name) EK2 / GCSS-A Increment 2				
	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract	

Remarks									
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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303141A / <i>Global Combat Support System</i>	Project (Number/Name) EK2 / <i>GCSS-A Increment 2</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022							
	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				
Preliminary Design, RFP, Source Selection, Prototyping, Requirements	[Redacted]																															
(1) MDA Meeting	▲ ₁										▲ ₂																					
(2) Milestone B																																
(3) Milestone FDD																							▲ ₃									

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303141A / <i>Global Combat Support System</i>	Project (Number/Name) EK2 / <i>GCSS-A Increment 2</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Preliminary Design, RFP, Source Selection, Prototyping, Requirements Analysis	1	2016	2	2018
MDA Meeting	2	2016	2	2016
Milestone B	3	2018	3	2018
Milestone FDD	2	2021	2	2021

Note

The schedule for GCSS-Army Increment 2 is based upon the Army Acquisition Executive (AAE) decision to utilize the Government Lead System Integrator (LSI) strategy. .

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303141A / <i>Global Combat Support System</i>	Project (Number/Name) EK3 / <i>AESIP Increment 2</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EK3: <i>AESIP Increment 2</i>	-	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	5.000	0.000	5.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Global Combat Support System-Army (GCSS-Army) program has two components: a functional component titled GCSS-Army and a technology enabler component titled Army Enterprise Systems Integration Program (AESIP). GCSS-Army coupled with AESIP are information and communications technology investments that currently provides provide key enabling support to the transformation of the Army into a network-centric, knowledge-based future force. Building on the foundation of GCSS-Army Increment 1, Increment 2 will provide the Army Enterprise Aviation maintenance, enhanced Business Intelligence / Business Warehouse (BI/BW) and Army Pre-Positioned Stock (APS) functional capabilities to deliver greater efficiencies and to improve information flow and accuracy in real time to decision makers. Upon the completion of Increment 2, the Unit Level Logistics System-Aviation (Enhanced) (ULLS-A(E)), Unmanned Aircraft System-Initiative (UAS-I), and Army War Reserve Deployment System (AWRDS) will be eligible for retirement since the necessary functionality will have been replaced by GCSS-Army increments. GCSS-Army will provide the Army sustainment support for the warfighter with a seamless flow of timely, accurate, accessible and secure management information that gives combat forces a decisive edge.

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

N/A

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

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0303142A / SATCOM Ground Environment (SPACE)
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	9.045	18.815	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	27.860
253: Dscs-Dcs (Phase II)	-	1.573	5.164	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.737
456: MILSATCOM System Engineering	-	0.908	4.287	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.195
EA3: Transportable Tactical Cmd Comms (T2C2)	-	5.203	3.652	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.855
EK8: Enroute Mission Command	-	1.361	5.712	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.073

Note

FY18 and out funding realigned to APE 0103142 reflect new Major Force Program 12 (MFP12) Space configuration.

A. Mission Description and Budget Item Justification

Military Satellite Communication (MILSATCOM) systems are joint program/project efforts to satisfy ground mobile requirements for each Service, the Joint Chiefs of Staff (JCS), the National Command Authority, the combatant commanders, the Office of the Secretary of Defense, and other governmental, non-DoD users. The worldwide MILSATCOM systems are: the Super High Frequency (SHF) Defense Satellite Communications System (DSCS); the Wideband Global SATCOM (WGS); the MILSTAR Extremely High Frequency (EHF) Low Data Rate (LDR) and Medium Data Rate (MDR); the Advanced Extremely High Frequency (AEHF); and future MILSATCOM capabilities. All of these systems are required to support legacy, interim and emerging communication space architectures and Future Force requirements. The Army is responsible for materiel development, acquisition, product improvement, testing, fielding and integrated logistics support of ground satellite terminals and SATCOM control subsystems and all associated equipment used to provide range extension of Mission Command Networks and Systems. The Army also participates in the development of MILSATCOM programs, including architectures, payloads, waveforms, antennas and terminal developments to ensure US Army equities are appropriately addressed with our sister services. This includes technology assessment efforts associated with the integration of MILSATCOM components to US Army LandWarNet. This responsibility also includes maintaining the life cycle logistics support required to achieve end-to-end connectivity and interoperability, satisfying JCS network operations in support of the President, JCS, combatant commanders, Military Departments, Department of State, and other government Departments and Agencies. EMC supports Global Response Force (GRF) and other Army units with the requirement to conduct Airborne forcible entry operations with the ability to conduct mission command.

This program is designated as a DoD Space Program.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303142A / SATCOM Ground Environment (SPACE)
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	9.355	18.815	10.677	-	10.677
Current President's Budget	9.045	18.815	0.000	-	0.000
Total Adjustments	-0.310	0.000	-10.677	-	-10.677
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.310	-			
• Adjustments to Budget Years	0.000	0.000	-10.677	-	-10.677

Change Summary Explanation

FY18 funding realigned to APE 0103142 reflect new Major Force Program 12 (MFP12) Space configuration

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) 253 / Dscs-Dcs (Phase II)
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
253: Dscs-Dcs (Phase II)	-	1.573	5.164	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.737
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Note

As result of the new Major Force Program 12 (MFP12) Space Configuration, OSD directed this funding line transition to 173142/FE1 in FY18 and beyond.

A. Mission Description and Budget Item Justification

This project provides funds to develop Satellite Communication (SATCOM) ground subsystem equipment and software in support of Joint Chiefs of Staff (JCS) validated Mission Command Network and Systems requirements for the worldwide Defense Enterprise Wideband SATCOM System (DEWSS). DEWSS is composed of the Super High Frequency (SHF) Defense Satellite Communications System (DSCS) and Wideband Global SATCOM (WGS) programs, which are required to support legacy, interim and emerging communication space architectures and future Force requirements. Expansion of the WGS constellation and upgrades to both DSCS and WGS are vital to support the Army's emerging power projection and rapid deployment role. DSCS and WGS provide multiple channels of tactical end-to-end connectivity and interoperability with strategic networks and national decision-makers, satisfying JCS network operations in support of the President, JCS, combatant commanders, military departments, Department of State and other government departments and agencies.

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

	FY 2016	FY 2017	FY 2018
<p>Title: SATCOM Terminal Digital IF Implementation Analysis</p> <p>Description: SATCOM Terminal Digital IF Implementation Analysis</p> <p>FY 2016 Accomplishments: Conducted a preliminary survey of available Commercial off the shelf Digital IF network devices. Assess interoperability certification, IA accreditation and readiness for integration into DoD Gateways.</p>	0.290	-	-
<p>Title: Electromagnetic Interference Mitigation Analysis</p> <p>Description: Electromagnetic Interference Mitigation Analysis</p> <p>FY 2016 Accomplishments: Completed Protected Transponded SATCOM efforts and conducted a complete system evaluation at Joint SATCOM Engineering Center (JSEC).</p> <p>FY 2017 Plans:</p>	0.975	4.814	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) 253 / Dscs-Dcs (Phase II)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Build a prototype network of 6 modems and integrate with Gateway equipment at Joint SATCOM Engineering Center (JSEC). Study Anti-Jam System behavior when subjected to real threat in a classified environment.			
Title: Improve WSOC Situational Awareness Description: Improve WSOC Situational Awareness FY 2016 Accomplishments: Funded WSOMS database consolidation effort to evaluate existing database schemas (structure) for each independent Wideband Control subsystem. The result of the analysis will be to define a structure of a consolidated database along with a transition plan. The desired impact will be to reduce total cost of ownership for multiple subsystems in terms of recurring annual licensing costs and shorten logistics trail with associated database storage equipment. FY 2017 Plans: Continue analysis for Netcentric System Engineering	0.308	0.350	-
Accomplishments/Planned Programs Subtotals	1.573	5.164	-

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• 20: Defense Enterprise Wideband SATCOM Systems (DEWSS) (BB8500)	172.306	143.805	161.383	-	161.383	125.787	135.036	117.599	141.392	Continuing	Continuing

Remarks

D. Acquisition Strategy

As result of the new Major Force Program 12 (MFP12) Space Configuration, OSD directed this funding line transition to 173142/FE1 in FY18 and beyond.

This effort finances Project Manager, Defense Communications and Army Transmission Systems (PM DCATS) Netcentric systems engineering, modem risk mitigation, and DoD Information Assurance Certification Accreditation Process (DIACAP) support. Funding provides for SATCOM terminal upgrades, enhancement of baseband throughput capabilities, technology insertion and upgrades which enhance decision support capabilities, allowing for full utilization of Wideband Global SATCOM (WGS) capabilities. Both the Wideband SATCOM Operational Management System (WSOMS) and the Enterprise Wideband SATCOM Terminal System (EWSTS) Capability Production Documents (CPDs) contain Netcentric-Ready Key Performance Parameters (NR-KPPs) as required by CJCSI 6212.01C. Netcentric efforts are required to facilitate the migration from the current trunk-based communications systems to Internet Protocol (IP) based systems and to engineer, test and integrate IP based capabilities into EWSTS and WSOMS systems. Studies, risk mitigation, system integration and advanced demonstrations for Netcentric baseband and policy based

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army Date: May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) 253 / Dscs-Dcs (Phase II)
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control will accommodate technology insertion, data sharing, remote operations, architecture efforts and use of commercial technology, thus ensuring the life of the Defense Enterprise Wideband System (DEWSS) terminal family beyond 2025 and reducing lifecycle costs and enterprise requirements on the WGS and Defense Satellite Communication System (DSCS) satellites in the future.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303142A / SATCOM Ground Environment (SPACE)				Project (Number/Name) 456 / MILSATCOM System Engineering			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
456: MILSATCOM System Engineering	-	0.908	4.287	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.195
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FY18 and out funding will be realigned to 0103142A.FE2 to reflect the new Major Force Program 12 (MFP12) Space configuration.

A. Mission Description and Budget Item Justification

Military Satellite Communications (MILSATCOM) System Engineering (SE) assures that tactical Army Satellite Communications (SATCOM) and SATCOM On-The-Move (SOTM) systems are engineered to legally and efficiently operate worldwide. MILSATCOM SE shapes Joint SATCOM systems' design efforts, standards development and planning processes. MILSATCOM SE represents the Army's tactical interests within DoD, Commercial & International forums to ensure affordable and scalable future SATCOM capabilities for maneuver forces. These efforts, performed by MILSATCOM SE, lead to savings for the overall Army in the out years.

FY 17 funds support the continued systems engineering required to support technology maturation, systems analysis, and planning associated with joint SATCOM development efforts including complying with the outcome of the Protected SATCOM communications Systems (PSCS) Analysis of Alternatives (AoA), the follow-on Wideband AoA, and other efforts that have impact on tactical Army use of military and commercial satellite constellations. These efforts have a direct impact in reducing technical and programmatic risk for the acquisition efforts for tactical Army SATCOM systems using these constellations.

FY18 and out funding will be realigned to 0103142A.FE2 to reflect the new Major Force Program 12 (MFP12) Space configuration.

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

	FY 2016	FY 2017	FY 2018
Title: Protected Communications System Engineering	0.454	2.354	-
Description: Protected Communications System Engineering			
FY 2016 Accomplishments: Protected Communications System Engineering			
FY 2017 Plans: Protected Communications System Engineering			
Title: Wideband Global SATCOM (WGS) Communications System Engineering	0.454	1.833	-
Description: WGS Communications System Engineering			
FY 2016 Accomplishments:			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) 456 / MILSATCOM System Engineering

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
WGS Communications System Engineering to improve Ku/Ka antenna SWAP			
FY 2017 Plans: WGS Communications System Engineering to improve Ku/Ka antenna SWAP			
Title: Experimentation, development, testing and certification of critical SATCOM and Satellite-On-The-Move (SOTM) communication and network technologies. Description: Experimentation, development, testing and certification of critical SATCOM and SOTM communication and network technologies.	-	0.100	-
FY 2017 Plans: Experimentation, development, testing and certification of critical SATCOM and SOTM communication and network technologies.			
Accomplishments/Planned Programs Subtotals	0.908	4.287	-

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks
FY18 and out funding will be realigned to 0103142A.FE2 to reflect the new Major Force Program 12 (MFP12) Space configuration.

D. Acquisition Strategy
This project funds advanced systems engineering, research, development, test and evaluation of new and emerging technologies to optimize terminal performance and communications control. Once the technologies are mature and deemed feasible, funding and management responsibility for implementation of the technology will transition to WIN-T and related PoRs.

E. Performance Metrics
N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303142A / SATCOM Ground Environment (SPACE)				Project (Number/Name) EA3 / Transportable Tactical Cmd Comms (T2C2)			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EA3: Transportable Tactical Cmd Comms (T2C2)	-	5.203	3.652	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.855
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Transportable Tactical Command Communications (T2C2) extends the Warfighter Information Network Tactical (WIN-T) network to small company and team sized early entry units. The T2C2 system is based on combat proven capabilities and provides robust voice and data communication capabilities. The T2C2 systems will also integrate users into the higher capacity WIN-T network and extend that network to the tactical edge; T2C2 also enables warfighters in select small Command Posts (CP) (typically Company level) and select Army teams to send and receive time sensitive Situational Awareness (SA), Intelligence, and Mission Command (MC) information while At-the-Halt (ATH) in support of all Joint determined and defined operational phases. These phases span from the initial Shaping Phase, designed to dissuade or deter adversaries and assure mission friends, to Deterrence, Initiative Seizure and Domination phases culminating with post maneuver Stabilization and Enabling of Civil Authorities enabling legitimate civil governance in safe and secure environment. FY17 funds are in support of T2C2 systems (Light and Heavy) Initial Operational Test & Evaluation (IOT&E) to inform a Full Rate Production (FRP) decision scheduled for 4Q FY17 (on track).

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

	FY 2016	FY 2017	FY 2018
Title: T2C2 Testing	5.203	3.652	-
Description: Testing requirements to achieve FRP.			
FY 2016 Accomplishments: Supports testing requirements including Electromagnetic testing, Environmental testing, a Network interoperability test, Joint Interoperability Testing Command (JITC) Certification, and initial planning and instrumentation for the Initial Operational Test & Evaluation event.			
FY 2017 Plans: Initial Operational Test & Evaluation at the Network Integration Event (NIE) 17.2 (May 2017).			
Accomplishments/Planned Programs Subtotals	5.203	3.652	-

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

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• B85800: Transportable Tactical Command Communications (T2C2)	47.305	36.580	62.600	-	62.600	62.988	78.444	79.022	80.606	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) EA3 / Transportable Tactical Cmd Comms (T2C2)

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
Remarks											

D. Acquisition Strategy

The Transportable Tactical Command Communications (T2C2) program Acquisition Strategy (AS) is based on integration of existing Commercial-Off-the-Shelf (COTS)/Non-Developmental Items (NDI) into new integrated systems fielded in the needed configuration for small teams or small unit Command Posts (CP) to allow these units to receive and transmit data. T2C2 will provide a high bandwidth tactical network extension for small unit CPs operating beyond line-of-sight from their higher headquarters and for teams operating outside the full tactical network architecture. The acquisition strategy leverages an existing Small Business Innovation Research (SBIR) Phase III Indefinite Delivery Indefinite Quantity (IDIQ) contract supporting the commercialization of the preceding SBIR efforts. T2C2 will utilize a two-level maintenance concept, will be Soldier-maintained, and initially supported by Interim Contractor Support. An analysis will be conducted to determine the ultimate supportability path. This strategy will allow a capability to be integrated and delivered quickly to support a limited deployment of Low Rate Initial Production (LRIP) units in FY17 required for Production Verification and the Initial Operational Test and Evaluation (IOT&E), with Full-Rate Production (FRP) planned for 4Q FY17.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) EK8 / Enroute Mission Command
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EK8: Enroute Mission Command	-	1.361	5.712	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.073
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Note

Funds in this program element are for testing requirements. FY16/17 RDTE funds are on Program Element 0303142A/EK8 SATCOM Ground Environment (SPACE). Funds in FY18 and out have been realigned to support the establishment of the Major Force Program 12 (MFP12) Program Element 173142/FE4; program is not a New Start.

A. Mission Description and Budget Item Justification

Enroute Mission Command (EMC) supports the Global Response Force (GRF) and other Army units with the requirement to conduct Airborne forced entry operations with the ability to conduct mission command, to include mission planning and rehearsal, while enroute on board US Air Force Air Mobility Command (AMC) aircraft. EMC provides a modernization to enroute communications to enable broadband reach-back data capability utilizing military or commercial networks with adequate bandwidth support required by Mission Command and Intelligence applications. EMC will provide commanders with the ability to obtain and share near real-time information regarding intelligence, situational awareness and command and control information while enroute to their objective. The ability to adjust plans and strategize utilizing the latest Intel data will give the GRF the information dominance needed to execute their mission once they arrive at their objective.

FY17 funding will support test by the Army Test and Evaluation Command (ATEC) during Operational Assessment (OA). The OA supports the Milestone Decision Authority (MDA) Disposition Decision (FY18) to continue procurement and fielding.

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

	FY 2016	FY 2017	FY 2018
Title: EMC Testing	1.361	5.712	-
Description: EMI/EMC, Flight Test and Operational Assessment			
FY 2016 Accomplishments: Flight Test and EMI/EMC Testing			
FY 2017 Plans: Operational Assessment			
Accomplishments/Planned Programs Subtotals	1.361	5.712	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) EK8 / Enroute Mission Command
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• B08400: <i>Enroute Mission Command</i>	7.116	-	21.667	-	21.667	23.072	5.957	-	-	0	57.812

Remarks

D. Acquisition Strategy

The continued procurement of the EMC full operational capability follows DoDI 5000.02, 7 Jan 2015, Enclosure 13, Rapid Fielding of Capabilities. The Milestone Decision Authority (MDA) and project manager will tailor and streamline program strategy based on the required timelines to meet urgent need capability requirements. The Army Executive Agent signed an Acquisition Decision Memorandum (ADM) on 27 April 2015 delegating MDA to PEO C3T. The MDA signed an ADM on 11 May 2015 selecting the KuKa Antenna and Radome for the Full Operational Capability (FOC). An ADM was signed on 20 May 2015 granting approval to enter into production and deployment phase.

Due to rephasing of FY17 OPA funding into FY18/19, program has been restructured. Initial Operational Capability met in May 2015 with modification of five C-17s with satellite antennae and installation kits, and roll-on/roll-off, battalion level, Key Leader Node (KEN). Full Operational Capability (FOC) is 35 C-17s, seven KENs and 21 company level Dependent Airborne Nodes (DAN) and an airborne command post suite (CASSPAN). FOC is currently projected for FY20. Planning to field an interim capability and conduct an Operational Assessment in FY17.

FY17 RDT&E funding supports test by the Army Test and Evaluation Command (ATEC) during Operational Assessment (OA). The OA supports the Milestone Decision Authority (MA) Disposition Decision (FY18) to continue procurement and fielding.

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>					R-1 Program Element (Number/Name) PE 0303150A / <i>WWMCCS/Global Command and Control System</i>							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	6.810	4.718	10.475	-	10.475	4.554	5.465	14.261	15.509	Continuing	Continuing
C86: <i>Army Global C2 System</i>	-	6.810	0.467	6.028	-	6.028	0.000	0.000	0.000	0.000	0.000	13.305
EA5: <i>Strategic and Joint Mission Command</i>	-	0.000	4.251	4.447	-	4.447	4.554	5.465	14.261	15.509	Continuing	Continuing

A. Mission Description and Budget Item Justification

Global Command and Control System-Army (GCCS-A): This project is the Army component system that directly supports the implementation of the Global Command and Control System Family of Systems. GCCS-A provides automated command and control tools for Army Strategic and Operational Theater Commanders to enhance warfighter capabilities throughout the spectrum of conflict during joint and combined operations in support of National Security. The GCCS-A developed software systems dramatically improves the Army's ability to analyze courses of action; develop and manage Army Forces; and ensure feasibility of war plans. In accordance with Army Command Post Computing Environment and Joint Command and Control objectives, GCCS-A was re-architected away from a scalable process architecture based server - thick client architecture to a virtualized server - web client architecture hosted on Battle Command Common Services (BCCS)/Tactical Server Infrastructure (TSI) and Mission Command Workstation. GCCS-A strategic tools for readiness reporting have been modernized and replaced with the Defense Readiness Reporting System - Army (DRRS-A), a suite of web based applications for Army Readiness, Force Registration and Force Projection.

Army Joint and Strategic Command and Control (AJaSC2) is a modernization development effort for the Army's joint and strategic C2 capabilities. AJaSC2 provides the materiel solution in response to the Army Mission Command for Unified Action Capability Definition Package (AMCUA CDP). AJaSC2 enables Army operational headquarters to integrate with the Joint Force Commands and Unified Action Partners (UAP). AJaSC2 provides Army leaders: Joint Common Operating Picture (COP); Adaptive planning and execution capabilities for distributed, synchronous and asynchronous collaboration services to develop, revise, and execute their warfighting plans supported by theaterwide analytics; strategic Situational Awareness (SA) to coalition operations and other mission partners and Coordination and synchronization of Joint Execution Mission Management.

Fiscal Year 2018 Base funding in the amount of \$0.316 million supports GCCS-A 4.3 software updates and Army Interoperability Certification (AIC) testing of the GCCS-A Bridge Effort in conjunction with Common Operating Environment. Certification testing ensures that GCCS-A Bridge Effort software is successfully configured as a virtual machine on BCCS/TSI and is interoperable with Army and Joint Mission Command Systems.

Fiscal Year 2018 base funding in the amount of \$5.712 million will support the Army's capability for unit readiness reporting, unit registration and force planning and projection activities to enable Title 10 reporting to Congress. Specifically the funding will provide program and acquisition oversight, technical development and training support to enable the readiness and force projection capabilities.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303150A / <i>WWMCCS/Global Command and Control System</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	7.034	4.718	4.710	-	4.710
Current President's Budget	6.810	4.718	10.475	-	10.475
Total Adjustments	-0.224	0.000	5.765	-	5.765
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.224	-			
• Adjustments to Budget Years	0.000	0.000	5.712	-	5.712
• Other Adjustments 12	0.000	0.000	0.053	-	0.053

Change Summary Explanation

Fiscal Year 2018 funding increase in the amount of \$5.712 million will support the Army's capability for unit readiness reporting, unit registration and force planning and projection activities to enable Title 10 reporting to Congress. Specifically the funding will provide program and acquisition oversight, technical development and training support to enable the readiness and force projection capabilities. Increase in the amount of \$.053 million reflects project EA5 pricing adjustments.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303150A / WWMCCS/Global Command and Control System	Project (Number/Name) C86 / Army Global C2 System
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
C86: Army Global C2 System	-	6.810	0.467	6.028	-	6.028	0.000	0.000	0.000	0.000	0.000	13.305
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Global Command and Control System-Army (GCCS-A): This project is the Army component of the Global Command and Control System (GCCS) Family of Systems (FoS). GCCS-A provides automated command and control tools, including Force readiness, planning and movement, and situational awareness, for Army Strategic and Operational Theater commanders to enhance warfighter capabilities throughout the spectrum of conflict during Joint and combined operations in support of National Security. GCCS-A dramatically improves the Army's ability to analyze courses of action, develop and manage Army forces and execute war plans. GCCS-A links the GCCS-Joint Common Operating Picture with the Army Mission Command systems. In accordance with Army Command Post Computing Environment and Joint Command and Control objectives, GCCS-A will be re-architected away from a scalable process architecture based server - thick client architecture to a virtualized server - Battle Command Common Services (BCCS)/Tactical Server Infrastructure (TSI) and Mission Command Workstation.

Fiscal Year 2018 Base funding in the amount of \$0.316 million supports GCCS-A 4.3 software updates and Army Interoperability Certification (AIC) testing of the GCCS-A Bridge Effort in conjunction with Common Operating Environment. Certification testing ensures that GCCS-A Bridge Effort software is successfully configured as a virtual machine on BCCS/TSI and is interoperable with Army and Joint Mission Command Systems.

Fiscal Year 2018 base funding in the amount of \$5.712 million will support the Army's capability for unit readiness reporting, unit registration and force planning and projection activities to enable Title 10 reporting to Congress. Specifically the funding will provide program and acquisition oversight, technical development and training support to enable the readiness and force projection capabilities.

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

	FY 2016	FY 2017	FY 2018
<p>Title: Software and System Engineering</p> <p>Description: Software and System Engineering for GCCS-A and DRRS-A Modernization</p> <p>FY 2016 Accomplishments: Software and System Engineering for GCCS-A. Successful completion of the follow-on operational test.</p> <p>FY 2017 Plans: Software and System Engineering modifications to existing GCCS-A version 4.3 baseline</p>	2.932	0.180	-
<p>Title: Synchronize with Joint C2 objective Architecture</p> <p>Description: Software enhancement efforts required to synchronize with Joint C2 objective Architecture</p>	2.798	0.047	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303150A / WWMCCS/Global Command and Control System	Project (Number/Name) C86 / Army Global C2 System		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>FY 2016 Accomplishments: Software enhancement efforts required to synchronize with COE/CPCE and Joint C2 objective Architecture</p> <p>FY 2017 Plans: Synchronize existing baseline with any COE standard modifications</p>				
<p>Title: Test and Evaluation</p> <p>Description: Test and Evaluation for GCCS-A</p> <p>FY 2016 Accomplishments: Test and Evaluation for GCCS-A. JITC/CTSF/SEC testing.</p> <p>FY 2017 Plans: Test and Evaluation for GCCS-A. CTSF and SEC testing/support.</p> <p>FY 2018 Plans: Test and Evaluation for GCCS-A. CTSF and SEC testing/support.</p>		0.450	0.110	0.166
<p>Title: Program Support and Management</p> <p>Description: Program management includes overall management of program execution, major events, reporting, funds execution, contract management, and logistical support. Includes participation in program planning meetings and IPTs</p> <p>FY 2016 Accomplishments: Program Support and Management for GCCS-A</p> <p>FY 2017 Plans: Program Support and Management for GCCS-A</p> <p>FY 2018 Plans: Program Support and Management for GCCS-A</p>		0.630	0.130	0.150
<p>Title: Program Support and Management for Readiness Capabilities</p> <p>Description: Provides program management and acquisition oversight functions to enable the Army's readiness capabilities.</p> <p>FY 2018 Plans: Provide program management and acquisition oversight functions to enable the Army's readiness capabilities.</p>		-	-	0.559
<p>Title: Development, Training and System Support for Readiness Capabilities</p>		-	-	5.153

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303150A / WWMCCS/Global Command and Control System	Project (Number/Name) C86 / Army Global C2 System
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Description: Provides technical development, training and overall system support for the Army's readiness capabilities.			
FY 2018 Plans: Provide technical development, training and overall system support for the Army's readiness capabilities.			
Accomplishments/Planned Programs Subtotals	6.810	0.467	6.028

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• BA8250: BA8250 Army Global Cmd & Control Sys (AGCCS) - OPA	8.291	2.530	2.658	-	2.658	2.643	3.688	2.848	-	0	22.658

Remarks

D. Acquisition Strategy
GCCS-A is modernizing to meet the requirements defined in the Joint C2 Capability Development Document (CDD) and to align with the Joint and Army Enterprise architectures.

In accordance with the Joint Requirements Oversight Committee (JROC) Memorandum (JROCM) 145-09 which states, "The JROC endorses efforts to develop and implement programmatic recommendations to support the "Do No Harm" Strategy", GCCS-A continues to synchronize and modernize along with the GCCS Family of Systems (FoS).

The GCCS-A Modernization Strategy consists of two separate program efforts. (1) A Bridge effort, Acquisition Category (ACAT) III level and (2) a Modernization development effort for the Army's Joint and Strategic command and Control capabilities infrastructure software products. The GCCS-A modernization development effort will be in compliance with Joint Command and Control Capability Development Document (JC2 CDD) and Army Mission Command for Unified Action Capability Definition Package (AMCUA CDP). DRRS-A will continue to satisfy readiness reporting requirements from Army Readiness Division (DAMO-ODR). The Bridge Effort's acquisition approach consists of a support agreement with CECOM LCMC SEC as the prime software developer utilizing a mix of government and contractor support.

The product development funded under this R-Form is an integral part of the Mission Command System of Systems, under a strategy designed to optimize opportunity to improve readiness among the systems, to capture the benefits of competition where possible and to ensure the rapid integration of new capability into warfighter systems.

E. Performance Metrics
N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0303150A / WWMCCS/Global Command and Control System				Project (Number/Name) EA5 / Strategic and Joint Mission Command			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EA5: Strategic and Joint Mission Command	-	0.000	4.251	4.447	-	4.447	4.554	5.465	14.261	15.509	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Army Joint and Strategic Command and Control (AJaSC2) is a modernization development effort for the Army's joint and strategic C2 capabilities. AJaSC2 provides the materiel solution in response to the Army Mission Command for Unified Action Capability Definition Package (AMCUA CDP). AJaSC2 enables Army operational headquarters to integrate with the Joint Force Commands and Unified Action Partners (UAP). AJaSC2 is a software only implementation of strategic applications and interoperability services that leverage the unified software architecture design (core infrastructure and selected common applications being implemented in the CPCE) that provides Army leaders: Joint Common Operating Picture (COP); Adaptive planning and execution capabilities for distributed, synchronous and asynchronous collaboration services to develop, revise, and execute their warfighting plans supported by theaterwide analytics; strategic Situational Awareness (SA) to coalition operations and other mission partners and coordination and synchronization of Joint Execution Mission Management. Capability Packages enabled by AJaSC2 are providing Force Employment, Joint Force Synchronization, and Total Force Analysis. The operational payoff providing the Joint Force Commander a linkage between Army Mission Command and Unified Action Partners, enabling Unified Action through integration with existing and future applications (including CPCE and MCE) and contributes to achieving Shared Understanding during Unified Land Operations (ULO) facilitating effective Mission Command.

Current plan for Fiscal Year 2017 funding is to utilize 853K to support initial development design of Capability Packages. Fiscal Year 2018 base funding supports program level pre-Material Development Decision (MDD) activities including final design efforts, documentation required by policy and regulation, research and analysis, and Joint requirements validation process.

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

	FY 2016	FY 2017	FY 2018
Title: Software Design and Systems Engineering (Pre Milestone B)	-	3.341	1.853
Description: Software Development and Systems Engineering of Capability Packages (Common Operating Environment (COE) System Engineering)			
FY 2017 Plans: Supports initial software development and engineering support of Capability Packages.			
FY 2018 Plans: Finalize Capability Package designs and required specifications/standards. Conduct research and analysis and systems engineering in coordination with other Joint Programs with an interdependency and with the Army Command Post and Mounted Computing Environments.			
Title: Synchronization with COE and Command Post Computing Environment (CP CE) and Joint C2 objective Architecture	-	0.510	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303150A / WWMCCS/Global Command and Control System	Project (Number/Name) EA5 / Strategic and Joint Mission Command

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Description: Software enhancement efforts required to sync with COE/CPCE and Joint C2 objective architecture FY 2017 Plans: Software enhancement efforts required to synchronize with COE/CPCE and Joint C2 objective Architecture			
Title: Program Support and Management Description: Program management includes overall management of program execution, major events, reporting, funds execution, contract management, and logistical support. Includes participation in program planning meetings and IPTs FY 2017 Plans: Program Support and Management for AJaSC2 FY 2018 Plans: Develop technical requirements for the three Capability Packages and synchronize those requirements with CPCE and the Joint community to ensure requirements supporting the Joint C2 objective Architecture are fully accounted for.	-	0.400	1.315
Title: Joint Requirements Validation Process Description: Synchronization and Systems Engineering efforts with COE and Command Post Computing Environment (CPCE) and Joint C2 objective Architecture for CP 3, 4 and 5. FY 2018 Plans: Develop technical requirements for the three Capability Packages and synchronize those requirements with CPCE and the Joint community to ensure requirements supporting the Joint C2 objective Architecture are fully accounted for.	-	-	1.279
Accomplishments/Planned Programs Subtotals	-	4.251	4.447

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• BA8250A: BA8250 Army Global Cmd & Control Sys (AGCCS) - OPA	8.291	2.530	2.658	-	2.658	2.643	3.688	2.848	-	0.000	22.658
Remarks											

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0303150A / WWMCCS/Global Command and Control System	Project (Number/Name) EA5 / Strategic and Joint Mission Command

D. Acquisition Strategy

In accordance with the Army Mission Command for Unified Action (AMCUA) CDP approved December of 2014. The AMCUA CDP provides an overarching structure for future Army Mission Command systems. The AMCUA initiative will meet the requirements to enable planning and share situational awareness within an interdependent enterprise services network comprised of Unified Action Partners (UAP) and sister service components to achieve integrated mission operations. The AMCUA CDP defines the Land Component-unique Mission Command (MC) capabilities that the Army will develop to enable unified action through integration with existing and future Joint and Service command and control applications. MC capability contributions will enable Joint Forces Land Component Command (JFLCC) Commanders to gain and maintain Situational Awareness (SA), make decisions, and exercise authority and direction via a flexible, distributive and seamless system.

The acquisition strategy for AJaSC2 consists of the development, testing and fielding of Capability Packages implemented over time and synchronized with Command Post Computing Environment infrastructure. AJaSC2 will utilize the "Information Technology (IT) Box" construct. As such, evolutionary development of the software will continue as defined Capability Packages to meet emerging requirements that fall within the bounds of the approved IT Box. AJaSC2 strategy will consist of agile application development which will utilize and leverage existing and emerging technologies from Programs of Record and Common Operating Environment (COE) infrastructure. The product development under this R-Form will be accomplished in part under a Project Manager, Mission Command engineering services contract approach which will consist of multiple prime contractors competitively bidding on development efforts.

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0305172A / Combined Advanced Applications
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	1.100	-	1.100	1.500	1.500	1.500	1.500	0.000	7.100
XT9: COMBINED ADVANCED APPLICATIONS	-	0.000	0.000	1.100	-	1.100	1.500	1.500	1.500	1.500	0.000	7.100

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).

<u>B. Program Change Summary (\$ in Millions)</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	1.100	-	1.100
Total Adjustments	0.000	0.000	1.100	-	1.100
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	1.100	-	1.100

Change Summary Explanation

This is a New Start. 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: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305179A / <i>Integrated Broadcast Service (IBS)</i>
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.750	0.000	0.000	-	0.000	0.450	0.459	0.467	1.316	Continuing	Continuing
EF4: <i>Integrated Broadcast System</i>	-	0.750	0.000	0.000	-	0.000	0.450	0.459	0.467	1.316	Continuing	Continuing

Note

Funding realigned from PE 0603850A Project 472.

A. Mission Description and Budget Item Justification

The Joint Program Office (JPO) for Integrated Broadcast Service (IBS) Terminals supports all of the Joint Services and SOCOM. The IBS is the worldwide DoD standard network enterprise for transmitting time-sensitive tactical and strategic intelligence and targeting data to all echelons of Joint Service operational Users. The JPO's role is to coordinate modernization and sustainment of IBS terminals compatible with the UHF SATCOM IBS broadcasts. The transmit/receive-capable Joint Tactical Terminal (JTT) systems currently consist of the JTT-Senior and JTT-IBS configurations, and they satisfy the radio communication KPPs for the IBS Program. The JTT is the official IBS producer system, and ensures continued IBS interoperability to a variety of tactical producers/consumers across the Joint Services.

B. Program Change Summary (\$ in Millions)

	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>
Previous President's Budget	0.750	0.000	0.000	-	0.000
Current President's Budget	0.750	0.000	0.000	-	0.000
Total Adjustments	0.000	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0305179A / <i>Integrated Broadcast Service (IBS)</i>				Project (Number/Name) EF4 / <i>Integrated Broadcast System</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EF4: <i>Integrated Broadcast System</i>	-	0.750	0.000	0.000	-	0.000	0.450	0.459	0.467	1.316	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

JPO for IBS Terminal performs JTT life cycle program management and technical fixes. The IBS network uses encryption, Common Interactive Broadcast (CIB), and Common Message Format (CMF). Funds support acquisition related technical development, requirements, testing and integration of next generation JTT systems and components.

FY2018 has no funding for Project EF4.

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

	FY 2016	FY 2017	FY 2018
Title: Integration and Test	0.550	-	-
Description: Integration and testing of enhancements for modernization of the JTT fleet.			
FY 2016 Accomplishments: Initiated integration and testing of enhancements.			
Title: Support Costs and Management Services	0.200	-	-
Description: Project Management Support			
FY 2016 Accomplishments: Continued Project Management and Matrix Support.			
Accomplishments/Planned Programs Subtotals	0.750	-	-

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

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• V29600 / JTT/CIBS-M: <i>OTHER PROCUREMENT, ARMY</i>	0.881	5.337	12.154	-	12.154	0.924	0.940	0.963	0.987	Continuing	Continuing

Remarks

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305179A / <i>Integrated Broadcast Service (IBS)</i>	Project (Number/Name) EF4 / <i>Integrated Broadcast System</i>

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>					R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	15.370	8.218	9.433	7.492	16.925	12.657	8.263	8.476	8.531	Continuing	Continuing
11A: <i>Advanced Payload Develop & Spt (MIP)</i>	-	3.589	2.830	3.241	7.492	10.733	1.279	0.172	0.175	0.000	Continuing	Continuing
11B: <i>Tsp Development (MIP)</i>	-	9.283	1.446	1.480	-	1.480	6.630	3.137	3.200	3.300	0.000	28.476
123: <i>Joint Technology Center System Integration</i>	-	2.498	3.942	4.712	-	4.712	4.748	4.954	5.101	5.231	Continuing	Continuing

Note

The Fiscal Year (FY) 2018 funding was re-aligned in accordance to Project 11B scheduled OT Event in FY19.

A. Mission Description and Budget Item Justification

Project 11A: The Advanced Payloads Development project line is a shared funding line between multiple Payload programs. These Payload programs support the Army's transformation by developing Reconnaissance, Surveillance and Target Acquisition (RSTA) and Intelligence, Surveillance and Reconnaissance (ISR) payload systems for Brigade Combat Teams, Divisions, and Corps Unmanned Aircraft Systems (UAS). This is in accordance with Headquarters Department of the Army (HQDA) and Training and Doctrine Command (TRADOC) UAS priorities. Additionally, this Program Element (PE) supports Future Advanced Payloads for Army UAS systems.

Small Tactical Radar - Lightweight (STARLite) Synthetic Aperture Radar/Moving Target Indicator (SAR/MTI) is a lightweight, high performance, all weather, multi-functional radar system for the Gray Eagle UAS. The STARLite system provides wide area, near real time Reconnaissance, Surveillance and Target Acquisition (RSTA) capabilities. It operates throughout the UAS flight mission profile in adverse weather and through battlefield obscurants. The Synthetic Aperture Radar (SAR) mode generates quality images for the battlefield commander for detection, classification and location of stationary commercial wheeled vehicle-size targets. The MTI mode detects moving ground targets, to include man-sized detection, and provides location information and performs cross-cue with the Electro-Optic/Infrared (EO/IR) sensors. STARLite is increasing its software capabilities based on Initial Operational Test and Evaluation (IOT&E) results which will increase automation and upgrade to a common Graphical User Interface (GUI) to align with the Common Operating Environment (COE) requirement to enable Sensor Processing and Exploitation (SPE). The SPE software enhancements will improve performance, reduce operator workload and enhance operator effectiveness.

Common Sensor Payload (CSP) - Electro Optical / Infra Red / Laser Designator (EO/IR/LD) provides High Definition (HD) Full Motion Video (FMV) in both the Electro Optical and Mid Wave IR spectrums with day/night capability to collect and display continuous imagery with the ability to designate targets of interest for attack by laser guided precision weapons. It is the EO/IR/LD sensor for Gray Eagle UAS which supports force applications, battlespace awareness, force protection, and net-centric operations across the battlefield to provide wide area, near real time RSTA capabilities. Additional initiatives will continue to focus on the transition of technologies directly supporting emerging requirements and the Army's Current and Future Force. CSP is being procured for the Gray Eagle UAS program and has potential application to other platforms.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>
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Project 11B: The Tactical Signals Intelligence (SIGINT) Payload (TSP) is a SIGINT sensor for the Gray Eagle that detects radio frequency (RF) emitters. The TSP system will provide a SIGINT capability to the tactical commander. The TSP system will be a modular, scalable payload using an architecture that is software reconfigurable to allow for growth and flexibility as technology, and as the adversaries use of technology, changes. This flexible architecture allows for third party software applications to be integrated into the TSP system. The TSP system processing, control and data dissemination is integrated into the Distributed Common Ground System - Army (DCGS-A) via the Operational Ground Station. It supports Manned/Unmanned (MUM) teaming with Brigade Combat Team ground SIGINT Terminal Guidance (STG) teams and manned airborne assets. The TSP system improves situational awareness and shortens the targeting cycle by detecting and identifying emitters associated with high value targets (HVTs). The TSP system is capable of processing conventional signals, standard military signals, and modern signals of interest. This includes detection, recognition, identification, direction finding, and high confidence geo-location.

Project 123: The UAS Joint Technology Center/Systems Integration Laboratory (JTC/SIL) is a Joint facility that develops, integrates, and supports the enhancement of its Multiple Unified Simulation Environment (MUSE) capability for Army systems and operational concepts. The JTC/SIL conducts prototype hardware and software development, builds the UAS Institutional Mission Simulator (IMS) trainers for the Shadow, Hunter, and Gray Eagle programs, and provides modeling and simulation support. The MUSE is a real-time, operator in-the-loop simulation that may be integrated with larger simulations in support of Army and Joint training and exercises. The MUSE is also employed as a Mission Rehearsal Tool for ongoing combat operations. This project funds the management of the JTC/SIL and MUSE enhancements. This system supports the Legacy to Objective transition path of the Transformation Campaign Plan (TCP).

B. Program Change Summary (\$ in Millions)	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>
Previous President's Budget	13.225	8.218	14.303	-	14.303
Current President's Budget	15.370	8.218	9.433	7.492	16.925
Total Adjustments	2.145	0.000	-4.870	7.492	2.622
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	2.145	0.000	-4.870	7.492	2.622

Change Summary Explanation

The FY2018 funding of \$4,700,000 was re-aligned in accordance to Project 11B scheduled OT Event in FY19.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>				Project (Number/Name) 11A / <i>Advanced Payload Develop & Spt (MIP)</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
11A: <i>Advanced Payload Develop & Spt (MIP)</i>	-	3.589	2.830	3.241	7.492	10.733	1.279	0.172	0.175	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Advanced Payloads Development project is a shared funding line between multiple Payload programs. These Payload programs support the Army's transformation by developing Reconnaissance, Surveillance and Target Acquisition (RSTA) and Intelligence, Surveillance and Reconnaissance (ISR) payload systems for Brigade Combat Teams, Divisions, and Corps Unmanned Aircraft Systems (UAS). This is in accordance with Headquarters Department of the Army (HQDA) and Training and Doctrine Command (TRADOC) UAS priorities. Additionally, this Program Element (PE) supports Future Advanced Payloads for Army UAS systems.

Small Tactical Radar - Lightweight (STARLite) ACAT III - Synthetic Aperture Radar/Moving Target Indicator (SAR/MTI) is a lightweight, high performance, all weather, multi-functional radar system for the Gray Eagle UAS. The STARLite system provides wide area, near real time RSTA capabilities. It operates throughout the UAS flight mission profile in adverse weather and through battlefield obscurants. The Synthetic Aperture Radar (SAR) mode generates quality images for the battlefield commander for detection, classification and location of stationary commercial wheeled vehicle-size targets. The MTI mode detects moving ground targets, to include man-sized detection, and provides location information and performs cross-cue with the Electro-Optic/Infrared (EO/IR) sensors. STARLite is increasing its software capabilities based on Initial Operational Test and Evaluation (IOT&E) results which will increase automation and upgrade to a common Graphical User Interface (GUI) to align with the Common Operating Environment (COE) requirement to enable Sensor Processing and Exploitation (SPE). The SPE software enhancements will improve performance, reduce operator workload and enhance operator effectiveness.

Common Sensor Payload (CSP)- ACAT III - Electro Optical / Infra-Red / Laser Designator (EO/IR/LD) provides Standard Definition (SD) (or High Definition (HD) as an upgrade.) Full Motion Video (FMV) in both the Electro Optical and Mid Wave IR spectrums with day/night capability to collect and display continuous imagery with the ability to designate targets of interest for attack by laser guided precision weapons. It is the EO/IR/LD sensor for Gray Eagle UAS which supports intelligence gathering, force applications, battlespace awareness, force protection, and net-centric operations across the battlefield to provide wide area, near real time RSTA capabilities. Additional initiatives will continue to focus on the transition of technologies directly supporting emerging requirements and the Army's Current and Future Force. CSP is being procured for the Gray Eagle UAS program and has potential application to other platforms. Additional updates to enhance the CSP's usability for the Warfighter are to begin develop the CSP as a metric sensor providing rapid and enhanced Target Location Accuracy (TLA) and reduce cognitive burden by providing improved situational awareness, while providing multiple fields of view in a simplified manner through Hardware (H/W) and Software (S/W) improvements

Fiscal Year (FY) 2018 base dollars in the amount of \$3.241 million is for STARLite SPE Software integration onto Gray Eagle and enhanced CSP to reduce cognitive burden on the Warfighter. FY 2018 OCO development dollars in the amount of \$7.492 million is for beginning the development of the CSP as a metric sensor to provide rapid and enhanced TLA for the Warfighter.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>	Project (Number/Name) 11A / <i>Advanced Payload Develop & Spt (MIP)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>Title: STARLite SPE</p> <p>Description: Software Development to improve STARLite SPE Development, Testing and Integration.</p> <p>FY 2016 Accomplishments: Continued Software Development for STARLite SPE</p> <p>FY 2017 Plans: Complete test and integration of SPE Software improvements onto Gray Eagle</p> <p>FY 2018 Base Plans: Complete test and integration of SPE (v.500) Software improvements onto Gray Eagle</p>	1.795	1.415	1.620	-	1.620
<p>Title: CSP Increased Usability</p> <p>Description: S/W development to increase the usability of the CSP. Development to increase the usability of the CSP while reducing cognitive burden on the Warfighter.</p> <p>FY 2016 Accomplishments: S/W development to increase the usability of the CSP.</p> <p>FY 2017 Plans: H/W and S/W enhancements to reduce cognitive burden on the Warfighter and program office management support</p> <p>FY 2018 Base Plans: H/W and S/W enhancements to reduce cognitive burden on the Warfighter and program office management support.</p> <p>FY 2018 OCO Plans: Develop the CSP as a metric sensor enabling rapid and enhanced Target Location Accuracy (TLA) and program office management support.</p>	1.794	1.415	1.621	7.492	9.113
Accomplishments/Planned Programs Subtotals	3.589	2.830	3.241	7.492	10.733

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>	Project (Number/Name) 11A / <i>Advanced Payload Develop & Spt (MIP)</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• A00020: MQ-1 PAYLOAD - UAS - A00020	-	-	-	-	-	-	-	-	-		
• A01003: SAR/MTI (MIP) - A01003	30.220	27.324	0.000	15.300	15.300	-	-	-	-	Continuing	Continuing
• A01005: CSP FMV (MIP) - A01005	68.472	26.729	4.410	22.400	26.810	-	-	-	-	Continuing	Continuing

Remarks

MQ-1 PAYLOAD - UAS - A00020 was a shared Aircraft Procurement, Army (APA) funding line for CSP, STARLite and Tactical Signals Intelligence (SIGINT) Payload (TSP).

STARLite (A01003), and CSP (A01005) are broken into individual lines within MQ-1Payload (MIP) (A01001).

SAR/MTI (MIP) - A01003: Procurement funding line for STARLite

CSP FMV (MIP) - A01005: Procurement funding line for CSP

D. Acquisition Strategy

STARLite SAR/MTI is a threshold requirement for the Gray Eagle UAS. The acquisition strategy for STARLite program was based on a full and open competition for the Army. Full Rate Production (FRP) was successfully achieved in June 2013. A follow-on production contract was awarded in April 2014 to procure all remaining STARLite Payloads required for the Gray Eagle platform. Based on Initial Operational test and Evaluation (IOT&E) results, STARLite is increasing its software capabilities to increase automation and upgrade to a common Graphical User Interface (GUI) and aligns SPE with the COE requirements. The SPE software enhancements will improve performance, reduce operator workload and enhance operator effectiveness. A competitive Research, Development, Test, and Evaluation (RDTE) funded contract was awarded to Northrop Grumman in October 2013 to perform trade studies and begin the development of the software improvements. Integration onto the Gray Eagle will be done via a sole source cost-plus fixed fee contract with the UAS prime contractor, General Atomics ASI.

Common Sensor Payload (CSP) EO/IR/LD enables the Gray Eagle to meet a KPP (Key Performance Parameter) requirement. The acquisition strategy for the CSP program was based on a full and open competition for the Army. A competitive contract was awarded in Nov 2007 to Raytheon for the build, integration, test and delivery of the CSP. Full Rate Production (FRP) was completed June 2013. A three (3) year system support contract was awarded in July 2015 for sustainment and upgrade of the CSP to include retrofitting standard definition sensors with high definition sensors and to perform RDT&E activities. The Enhanced EO/IR Capability Production Document, projected for approval in 1QFY17, defines additional KPP requirements for Full Motion Video (FMV) sensors. The first KPP increases detection, recognition, and identification requirements which can only be met with the High Definition (HD) variation of the CSP. Currently, select units have been fielded HD CSPs, with additional HD CSPs in production and retrofit. The second KPP requirement is for the CSP to be a metric sensor with rapid and enhanced Target Location Accuracy (TLA). The acquisition strategy for CSP in FY 2018 is to mature Software and Hardware efforts for CSP to reduce cognitive burdens on the Warfighter and begin to develop the CSP as a metric sensor providing rapid and enhanced TLA and through a sole source cost-plus-fixed-fee contract to Raytheon.

The acquisition strategy is to complete STARLite SPE software developmental test and integration onto Gray Eagle; begin development of the CSP as a metric sensor enabling rapid and enhanced Target Location Accuracy (TLA); and Non-Recurring Engineering (NRE) support to the Night Vision and Electronic Sensors Directorate

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army Date: May 2017

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
2040 / 7	PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>	11A / <i>Advanced Payload Develop & Spt (MIP)</i>

(NVESD) to continue enhancing CSP's usability for the Warfighter to reduce cognitive burden by providing improved situational awareness, while providing multiple fields of view in a simplified manner through Hardware (H/W) and S/W improvements.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>	Project (Number/Name) 11A / <i>Advanced Payload Develop & Spt (MIP)</i>
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Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
TSP Program Management	Various	PM ARES : Aberdeen, MD	11.255	-		-		-		-		-	0.000	11.255	0.000
CSP/STARLite Program Management	Various	PM RUS : Aberdeen, MD	8.524	-		-		-		-		-	0.000	8.524	0.000
CSP Program Management	MIPR	PM EOIR : Fort Belvoir, VA	0.000	0.090		0.100		0.108	Dec 2017	0.524	Dec 2017	0.632	Continuing	Continuing	Continuing
STARLite Program Mgmt Personnel	Various	PM SAI : Aberdeen, MD	1.000	-		0.150		0.617	Jan 2018	-		0.617	Continuing	Continuing	Continuing
Subtotal			20.779	0.090		0.250		0.725		0.524		1.249	-	-	-

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
CSP Development	C/CPFF	Raytheon : McKinney, TX	84.022	-		-		-		-		-	0	84.022	0
STARLite SPE Software Integration onto Gray Eagle/Improved Gray Eagle	SS/CPFF	General Atomics ASI : Potway, CA	0.000	1.295		1.265		1.003	Jun 2018	-		1.003	Continuing	Continuing	Continuing
CSP HW/SW Improvements Reduce Cognitive Burden	MIPR	Night Vision Labs : Fort Belvoir, VA	0.000	1.704		1.115		1.202	Mar 2018	-		1.202	Continuing	Continuing	Continuing
CSP Target Location Accuracy (TLA)	SS/CPFF	Raytheon : McKinney, TX	0.000	-		-		0.000		6.187	Jan 2018	6.187	Continuing	Continuing	Continuing
Subtotal			84.022	2.999		2.380		2.205		6.187		8.392	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>	Project (Number/Name) 11A / <i>Advanced Payload Develop & Spt (MIP)</i>
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Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
CSP TLA Integration (NRE)	SS/CPFF	PM MAE(General Automics) : San Diego, CA	0.000	-		-		0.000		0.781	Mar 2018	0.781	Continuing	Continuing	Continuing
Subtotal			0.000	-		-		0.000		0.781		0.781	-	-	-

Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
CSP Testing	MIPR	Various : Various	17.086	-		-		-		-		-	0.000	17.086	0.000
CSP HW/SW Improvements Reduce Cognitive Burden	MIPR	Night Vision Labs : Fort Belvoir, VA	0.000	-		0.200		0.311	Mar 2018	-		0.311	Continuing	Continuing	Continuing
STARLite YTC Software Development Testing	MIPR	YPG : Yuma Proving Ground	0.000	0.500		-		-		-		-	Continuing	Continuing	Continuing
STARLite IGE Testing	MIPR	Various : Various	13.441	-		-		-		-		-	0.000	13.441	0.000
Subtotal			30.527	0.500		0.200		0.311		-		0.311	-	-	-

	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		135.328	3.589	2.830	3.241	7.492	10.733	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>	Project (Number/Name) 11A / <i>Advanced Payload Develop & Spt (MIP)</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
CSP (EO/IR/LD) Production	CSP Production																											
CSP HD (EO/IR/LD) Production	CSP HD Production																											
CSP HD Retrofit	CSP HD Retrofit																											
CSP HW/SW Improvements Reduce Cognitive Burden Development	CSP HW/SW Development																											
CSP HW/SW Improvements Reduce Cognitive Burden Testing / Integrat	CSP HW/SW Testing / Integration																											
CSP TLA Development	CSP TLA Development																											
CSP TLA Testing/Integration	CSP TLA Testing/Integration																											
Improvements to STARLite Sensor Processing and Exploitation	Sensor Improvements																											
STARLite SPE SW Developmental Test	Developmental Test																											
STARLite (401) SW Integration Flight Test	SW Integration																											
STARLite (500) SPE SW Integration Flight Test	SW Integration																											
STARLite (501) SPE SW Integration Flight Test	SW Integration																											

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>	Project (Number/Name) 11A / <i>Advanced Payload Develop & Spt (MIP)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CSP (EO/IR/LD) Production	1	2008	2	2016
CSP HD (EO/IR/LD) Production	2	2013	2	2018
CSP HD Retrofit	4	2013	1	2019
CSP HW/SW Improvements Reduce Cognitive Burden Development	1	2016	2	2018
CSP HW/SW Improvements Reduce Cognitive Burden Testing / Integration	3	2017	2	2019
CSP TLA Development	2	2018	4	2018
CSP TLA Testing/Integration	2	2018	4	2018
Improvements to STARLite Sensor Processing and Exploitation	1	2014	3	2016
STARLite SPE SW Developmental Test	2	2016	1	2017
STARLite (401) SW Integration Flight Test	4	2016	1	2018
STARLite (500) SPE SW Integration Flight Test	3	2017	3	2018
STARLite (501) SPE SW Integration Flight Test	3	2018	3	2019

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>				Project (Number/Name) 11B / <i>Tsp Development (MIP)</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
11B: <i>Tsp Development (MIP)</i>	-	9.283	1.446	1.480	-	1.480	6.630	3.137	3.200	3.300	0.000	28.476
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Tactical Signals Intelligence (SIGINT) Payload (TSP) is a SIGINT sensor for the Gray Eagle that detects radio frequency (RF) emitters. The TSP system will provide a SIGINT capability to the tactical commander. The TSP system will be a modular, scalable payload using an architecture that is software reconfigured to allow for growth and flexibility as technology, and as the adversaries use of technology, changes. This flexible architecture allows for third party software applications to be integrated into the TSP system. The TSP system processing, control and data dissemination is integrated into the Distributed Common Ground System - Army (DCGS-A) via the Operational Ground Station. It supports Manned/Unmanned (MUM) teaming with Brigade Combat Team ground SIGINT Terminal Guidance (STG) teams and manned airborne assets. The TSP system improves situational awareness and shortens the targeting cycle by detecting and identifying emitters associated with high value targets (HVTs). The TSP system is capable of processing conventional signals, standard military signals, and modern signals of interest. This includes detection, recognition, identification, direction finding, and high confidence geo-location.

Fiscal Year (FY) 2018 Base funding in the amount of \$1.480 million will be used to complete engineering corrective actions and regression testing from DT/LUT testing and preparations for TSP Block 2.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Low Rate Initial Production (LRIP) Research and Development (R&D) Support.	9.283	1.446	1.480	-	1.480
Description: Low Rate Initial Production (LRIP) R&D: Logistics, Training, Testing and corrective action engineering support and test activities for TSP for ongoing system improvements.					
FY 2016 Accomplishments: Continued Testing of TSP Block 1 LRIP. Continued improvements of system performance on a continuous basis. Executed CFQT/PQT#2, Phase I IOT&E with required MQ-1C. Preparation being made for Urgent Material Release approval, and First Unit Equipped. Executed Initiate the Interim Contractor Logistics Support (ICLS) contract.					
FY 2017 Plans: Continues TSP Block 1 LRIP, support TSP integration into Improved Gray Eagle (IGE). Preparations to retest TSP system fixes from PQT#2 and Phase I IOT&E with scheduled DT/LUT Testing Event June 2017. Continue support of TSP Interim Contractor Logistics Support (ICLS).					
FY 2018 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>	Project (Number/Name) 11B / <i>Tsp Development (MIP)</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Executed corrective engineering actions resulting from DT/LUT Testing Event. Initiate the required development work for TSP Beyond Block 1 for Future upgrades. Continue support of TSP Interim Contractor Logistics Support (ICLS).					
Accomplishments/Planned Programs Subtotals	9.283	1.446	1.480	-	1.480

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• A00020: A00020 - MQ-1 Payload (MIP)	-	-	-	-	-	-	-	-	-	0.000	0.000
• A01004: A01004 - SIGINT (MIP)	49.661	37.682	1.500	-	1.500	3.397	3.460	3.406	3.474	0	102.580
• 0605766A: TSP Theater Net-Centric Geolocation (TNG) - PE0605766A, Project DX9: TNG funding included in Tactical Exploitation of National Capabilities (TENCAP) funding line.	-	-	-	-	-	1.000	1.800	1.000	-	1.000	4.800

Remarks
 MQ-1 PAYLOAD - UAS - A00020: Shared Aircraft Procurement, Army (APA) procurement funding line for CSP, STARLite, TSP, and Advanced Payloads.
 SIGINT (MIP) - A01004: Procurement funding line for TSP Payloads. Under Parent Line MQ-1 Payloads (MIP) - A01001.
 TSP Theater Net-Centric Geolocation (TNG) - PE0605766A, Project DX9: TNG funding included in Tactical Exploitation of National Capabilities (TENCAP) funding line.

D. Acquisition Strategy
 TSP is a threshold requirement for the MQ-1C Gray Eagle UAS. The TSP program completed the Engineering and Manufacturing Development (EMD) phase with a Milestone B decision in September 2011. The TSP Program EMD contract award was based on full-and-open competition with a period of performance that was completed in October 2015, and focused on integration and test onto the Gray Eagle platform, and integration and test of TSP software into the Operational Ground Station. The TSP EMD program is a derivative of systems that were fielded as a Quick Reaction Capability on the MQ-1C UAS and a variety of other manned platforms. The demonstrated scalability of these fielded materiel solutions allows the TSP EMD program to leverage effort that directly supports the TSP EMD program.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>	Project (Number/Name) 11B / <i>Tsp Development (MIP)</i>
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The TSP program entered the Low Rate Initial Production (LRIP) phase with a Milestone C decision that was approved on 2 May 2014. The TSP Program LRIP contract award was based on sole source selection with a period of performance that was completed on June 2016, and primarily focused on the obsolescence of the EMD phase assets via the required Engineering Change Proposals, and the first initial production of 30 TSP Payloads in support of the Gray Eagle Platform.

The TSP Block 1 is the current Program of Record capability. TSP Beyond Block 1 will address objectives and remaining deferred Block 1 threshold requirements as reflected in the approved Capability Production Document (CPD).

Improved Gray Eagle (IGE)- Program Manager Unmanned Aircraft Systems(PM UAS)received a Congressional plus up of \$49M President's Budget15(PB15) to procure Extended Range UAS which increases the CPD objective endurance requirements for the current GE configuration to an Improved Gray Eagle (IGE). TSP is scheduled for integration and testing on the IGE platform upon completion of the platform's Follow on Test Evaluation#2 scheduled 1QFY18.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>				Project (Number/Name) 123 / <i>Joint Technology Center System Integration</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
123: <i>Joint Technology Center System Integration</i>	-	2.498	3.942	4.712	-	4.712	4.748	4.954	5.101	5.231	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Unmanned Aircraft System (UAS) Joint Technology Center/System Integration Laboratory (JTC/SIL) is a Joint facility that develops, integrates, and supports the enhancement of its Multiple Unified Simulation Environment (MUSE) capability for Army systems and operational concepts. The JTC/SIL conducts prototype hardware and software development, builds the UAS Institutional Mission Simulator (IMS) trainers for the Shadow, Hunter, and Gray Eagle programs, and provides modeling and simulation support. The MUSE is a real-time, operator in-the-loop simulation that may be integrated with larger simulations in support of Army and Joint training exercises. The MUSE is also employed as a Mission Rehearsal Tool for ongoing combat operations. This project funds the management of the JTC/SIL and MUSE enhancements.

This system supports the Legacy to Objective transition path of the Transformation Campaign Plan (TCP).

Continued integration of Night Vision Image Generator (NVIG) into the Modeling & Simulation domain as it pertains to UAS simulation. Terrain, and model development for NVIG and Virtual Reality Scene Generator (VRSG) to increase fidelity. Support of theater level Exercises, Ulchi Freedom Guardian (UFG), Yama Sakura (YS) and Key Resolve (KR). Improvement of mapping capability for mission planning. Redesign of Windows Entity Server (WES) and NetLink to improve network routing, thus lessening bandwidth consumption. Incorporation of Common Image Generator Interface to provide an Image Generator (IG) agnostic solution thereby allowing for other IGs to be supported that are currently not supported. Continued implementation of tactical protocols into the simulation domain to enhance interoperability. Development of a Heads Up Display (HUD) designer application that will allow for the creation and modification of HUDs without having to touch the software baseline thereby reducing costs and increasing fidelity and speed of solution in theater. Redesign of generic 6 Degree of Freedom (DoF) application that will allow for creation of new platforms without touching code; again a reduction in costs and increased solution delivery speed.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Product Development	2.298	3.611	4.212	-	4.212
Description: Funding is provided for the following efforts.					
FY 2016 Accomplishments: Redesign Vignette Planning and Rehearsal Software (ViPRS) by implementing a Service Oriented Architecture (SOA) to facilitate external users developing generic solutions without Joint Technology Center System Integration Laboratory (JSIL) assistance and to optimize the software baseline to keep up with training					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>	Project (Number/Name) 123 / <i>Joint Technology Center System Integration</i>

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>audience requirements, thereby reducing the costs of travel and training. Redesign MUSE/ Air Force Synthetic Environment for regognizance and Surveillance (AFSERS) U2/GlobalHawk, Tactical Exploitation of National Capabilities (TENCAP), to meet the growing demands of the war fighter training audience and to optimize User Interface for ease of use, which will reduce training costs and the need for JSIL personnel to attend every event. Design and implement a Heads Up Display (HUD) capability for the UAS platforms that MUSE/ AFSERS simulates. This will reduce costs since HUD modifications will be able to be modified without having to implement code changes. Continued examination of all Graphical User Interfaces (GUIs) to ensure maximum usability for the war fighter.</p> <p>FY 2017 Plans: Re-design and implementation of Windows Entity Server (WES) and NetLink to maintain pace with ever expanding Military Exercises. Continued integration with Night Vision Electronics & Sensors Directorate's (NVEDS's), Night Vision Imagery Generator (NVIG). Implementation of a Weather server that will facilitate the injection of weather, into the modeling and simulation domain, for Military Exercises. 4586 tech insertion into MUSE for Command & Control (C2) to facilitate the testing of data feeds prior to using the C2 feed on the live asset. 4609 technical insertion into MUSE for video with embedded Key Line Value (KLV) to be compliant with standard video feeds and to work with US ally standard video feeds.</p> <p>FY 2018 Base Plans: Continued integration of Night Vision Image Generator (NVIG) into the Modeling & Simulation domain as it pertains to UAS simulation. Terrain, and model development for NVIG and Virtual Reality Scene Generator (VRSG) to increase fidelity. Support of theater level Exercises, Ulchi Freedom Guardian (UFG), Yama Sakura (YS) and Key Resolve (KR). Improvement of mapping capability for mission planning. Redesign of Windows Entity Server (WES) and NetLink to improve network routing, thus lessening bandwidth consumption. Incorporation of Common Image Generator Interface to provide an Image Generator (IG) agnostic solution thereby allowing for other IGs to be supported that are currently not supported. Continued implementation of tactical protocols into the simulation domain to enhance interoperability. Development of a Heads Up Display (HUD) designer application that will allow for the creation and modification of HUDs without having to touch the software baseline thereby reducing costs and increasing fidelity and speed of solution in theater. Redesign of generic 6 Degree of Freedom (DoF) application that will allow for creation of new platforms without touching code; again a reduction in costs and increased solution delivery speed.</p>					
<p>Title: Management Services</p> <p>Description: Funding is provided for the following efforts.</p>	0.200	0.331	0.500	-	0.500

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305204A / <i>Tactical Unmanned Aerial Vehicles</i>	Project (Number/Name) 123 / <i>Joint Technology Center System Integration</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<i>FY 2016 Accomplishments:</i> Continue coordination and oversight of MUSE product development.					
<i>FY 2017 Plans:</i> Continue coordination and oversight of MUSE product development.					
<i>FY 2018 Base Plans:</i> Continue coordination and oversight of MUSE product development.					
Accomplishments/Planned Programs Subtotals	2.498	3.942	4.712	-	4.712

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• PE 0305206F Air Force: <i>PE 0305206F Air Force</i>	3.475	3.841	3.419	-	3.419	3.479	3.544	3.607	3.672	Continuing	Continuing

Remarks
The JTC/SIL and the MUSE receive funding from the Air Force. This effort is a continuing effort in support of Service UAS programs.

D. Acquisition Strategy
Continued MUSE development will be accomplished through a combination of Government in-house functional directorate support using a variety of existing contract vehicles.

E. Performance Metrics
N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	20.725	11.799	5.080	15.000	20.080	11.887	19.351	7.473	13.264	Continuing	Continuing
EH2: EMARSS ADV DEV (MIP)	-	1.740	0.000	0.000	-	0.000	3.205	3.218	0.000	2.011	Continuing	Continuing
EH3: EMARSS Payloads ADV DEV (MIP)	-	3.532	0.130	2.111	-	2.111	6.702	14.638	6.473	6.674	Continuing	Continuing
EH4: ARL ADV DEV (MIP)	-	5.100	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
EH5: ARL Payloads ADV DEV (MIP)	-	10.353	11.669	2.969	15.000	17.969	1.980	1.495	1.000	4.579	Continuing	Continuing

Note
 This program is not a New Start and funding transferred from Program Element (PE) 0605626.

A. Mission Description and Budget Item Justification

Airborne Reconnaissance Low - Enhanced (ARL-E) is a worldwide self-deployable airborne Intelligence Surveillance Reconnaissance (ISR) system designed for timely, accurate, assured support to tactical forces over the full spectrum of operations. This system is a De Havilland DHC-8 aircraft replacing the DHC-7 in accordance with the Aerial ISR (AISR) 2020 Strategy. ARL-E will enhance the ARL-M sensor capability sets through the procurement of new and refurbished sensors to meet the ARL-E Capabilities Production Document (CPD) requirements. It provides a persistent capability to include: Broad-Area Surveillance and/or Focused Stare on Target Areas of Interest (Point or Objective Targets), Electro-Optical/Infrared (EO/IR)/Full-Motion Video (FMV) , Multi-Mode Radar, Robust Communications Intelligence (COMINT), on-Board Collection, Analysis, Sensor Cross Cue and dissemination through Distributed Common Ground System-Army (DCGS-A) Enabled workstations. ARL-E will be assigned to the U.S. Army Intelligence and Security Command's Aerial ISR Brigade providing AISR support to combatant commanders. For the overall system, the Army Acquisition Objective and the Army Procurement Objective, is nine (9). The Mission Equipment Package (MEP) objective is eight (8).

The Enhanced Medium Altitude Reconnaissance and Surveillance System (EMARSS) is the Army's next generation C-12 based, direct support, manned airborne intelligence collection, processing, and targeting support system. It provides a persistent capability to detect, locate, classify/identify, and track surface targets with a high degree of timeliness and accuracy. EMARSS will be assigned to the U.S. Army Intelligence and Security Command's Aerial Exploitation Battalions, providing Aerial Intelligence, Surveillance and Reconnaissance support to combatant commanders. The Army Acquisition Objective for EMARSS is 36 systems, with an Army Procurement Objective of 24, to include the following variants: eight (8) EMARSS-G (Geo-INT); four (4) EMARSS-V (Vehicle and Dismount Exploitation Radar, VaDER); eight (8) EMARSS-M (Multi-INT); and four (4) EMARSS-S (SIGINT).

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305206A / <i>Airborne Reconnaissance Systems</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	22.870	11.799	3.133	-	3.133
Current President's Budget	20.725	11.799	5.080	15.000	20.080
Total Adjustments	-2.145	0.000	1.947	15.000	16.947
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-2.145	0.000	1.947	15.000	16.947

Change Summary Explanation

Fiscal Year (FY) 2018 Base funds increase is a result of a funds realignment to support EMARSS Light Imaging Detection and Ranging (LiDAR) enhancement.
 Fiscal Year (FY) 2018 OCO funds increase is a result of a funds realignment to support ARL New Signal Development.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems				Project (Number/Name) EH2 / EMARSS ADV DEV (MIP)			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EH2: EMARSS ADV DEV (MIP)	-	1.740	0.000	0.000	-	0.000	3.205	3.218	0.000	2.011	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Enhanced Medium Altitude Reconnaissance and Surveillance System (EMARSS) is the Army's next generation C-12 based, direct support, manned airborne intelligence collection, processing, and targeting support system. It provides a persistent capability to detect, locate, classify/identify, and track surface targets with a high degree of timeliness and accuracy. EMARSS will be assigned to the U.S. Army Intelligence and Security Command's Aerial Exploitation Battalions, providing Aerial Intelligence, Surveillance and Reconnaissance support to combatant commanders. The Army Acquisition Objective for EMARSS is 36 systems, with an Army Procurement Objective of 24, to include the following variants: eight (8) EMARSS-G (Geo-INT); four (4) EMARSS-V (Vehicle and Dismount Exploitation Radar, VaDER); eight (8) EMARSS-M (Multi-INT); and four (4) EMARSS-S (SIGINT).

This funding line supports non-recurring engineering (NRE), development of supplemental type certificates (STC), testing, integration and Modifications in Service of Army Aerial, Intelligence, Surveillance and Reconnaissance (AISR) systems. Funding provides for Department of Defense (DoD) mandated safety equipment to meet current and evolving International Standards. It also enhances aircraft communications, navigations and surveillance (CNS); aircraft survivability equipment (ASE) and the integration of the AISR mission equipment package (MEP) as well as obsolescence issues involved with the conversion of Liberty Project Aircraft (LPA) to the EMARSS Program of Record (POR), in regards to the Navy AAR-47 converting to Army AAR-57, Blue Force Tracker (BFT) to Blue Force Tracker-2 (BFT-2) and Common Missile Warning Systems (CMWS) upgrades.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Non-Recurring Engineering	1.740	-	-	-	-
Description: This funding line supports NRE, development of STC, testing and integration of Army AISR systems. Funding provides for DoD mandated safety equipment to meet current and evolving International Standards. It also enhances aircraft CNS, ASE and the integration of the AISR MEP as well as obsolescence issues involved with the LPA in regards to the Navy AAR-47 changing to Army AAR-57, BFT to BFT-2.					
FY 2016 Accomplishments: Provided for all NRE and testing for conversion of initial Quick Reaction Capability (QRC) systems into the EMARSS POR. Upgraded communication and MEP will ensure continued worldwide deployability and over match dominance for AISR.					
Accomplishments/Planned Programs Subtotals	1.740	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems	Project (Number/Name) EH2 / EMARSS ADV DEV (MIP)
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• Aerial Common Sensors (ACS): A02005	96.500	-	-	-	-	-	-	-	-	0	96.500
• EMARSS SEMA Mods (MIP): A02112	13.669	55.897	15.279	36.000	51.279	21.139	4.416	3.011	2.282	Continuing	Continuing
• EMARSS Payloads (MIP): AZ2054	13.670	17.097	7.279	-	7.279	21.138	4.418	4.482	10.200	Continuing	Continuing
• EMARSS Payloads Adv Dev (MIP): 375206-EH3	3.532	0.130	2.133	-	2.133	6.772	14.792	6.543	6.674	Continuing	Continuing
• ACS EMARSS (MIP): 655626 AC5	0.002	-	-	-	-	-	-	-	-	0	0.002

Remarks

The EMARSS RDTE efforts are found in the following two project lines; 0305206AEH2 EMARSS ADV DEV (MIP) (Fixed Wing Project Office) and 0305206AEH3 EMARSS Payloads ADV DEV (Project Manager Sensors - Aerial Intelligence). The supporting procurement lines are A02112 and AZ2054. Separate funding lines support the Army Acquisition Executive's directive, codified in the October 28, 2011 memorandum, to assign overall acquisition lead for manned airborne intelligence systems to Program Executive Officer for Aviation; and overall sensor, processing, exploitation, and dissemination responsibilities to Program Executive Officer for Intelligence, Electronic Warfare, and Sensors.

D. Acquisition Strategy

The acquisition strategy, supported by the EMARSS CPD, is to design and test 24 systems as well as provide enhancements to the following sensor capabilities in order to maintain relevancy to the Warfighter: Electro-optical/Infrared (EO/IR)/Full Motion Video (FMV); Communications Intelligence (COMINT); Wide Area Aerial Surveillance (WAAS); Light Imaging Detection and Ranging (LiDAR) and improved Synthetic Aperture Radar / Moving Target Indicator (SAR/MTI) radar; line-of-site (LOS) and beyond line-of-site (BLOS) communications; and Processing Exploitation and Dissemination (PED) supporting two Distributed Common Ground System - Army (DCGS-A) enabled operator workstations. The EMARSS fleet of 24 systems will consist of the following variants: eight (8) EMARSS-G (Geo-INT); four (4) EMARSS-V (Vehicle and Dismount Exploitation Radar, VaDER); eight (8) EMARSS-M (Multi-INT); and four (4) EMARSS-S (SIGINT).

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems				Project (Number/Name) EH3 / EMARSS Payloads ADV DEV (MIP)			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EH3: EMARSS Payloads ADV DEV (MIP)	-	3.532	0.130	2.111	-	2.111	6.702	14.638	6.473	6.674	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The EMARSS RDTE efforts are found in the following two (2) project lines; 0305206AEH2 EMARSS ADV DEV (MIP) (Fixed Wing Project Office) and 0305206AEH3 EMARSS Payloads ADV DEV (Project Manager Sensors - Aerial Intelligence). The supporting procurement lines are A02112 and AZ2054. Separate funding lines support the Army Acquisition Executive's directive, codified in the October 28, 2011 memorandum, to assign overall acquisition lead for manned airborne intelligence systems to Program Executive Officer for Aviation; and overall sensor, processing, exploitation, and dissemination responsibilities to Program Executive Officer for Intelligence, Electronic Warfare, and Sensors.

A. Mission Description and Budget Item Justification

The Enhanced Medium Altitude Reconnaissance and Surveillance System (EMARSS) is the Army's next generation C-12 based, direct support, manned airborne intelligence collection, processing, and targeting support system. It provides a persistent capability to detect, locate, classify/identify, and track surface targets with a high degree of timeliness and accuracy. EMARSS will be assigned to the U.S. Army Intelligence and Security Command's Aerial Exploitation Battalions, providing Aerial Intelligence, Surveillance and Reconnaissance support to combatant commanders. The Army Acquisition Objective for EMARSS is 36 systems, with an Army Procurement Objective of 24, to include the following variants: eight EMARSS-G (Geo-INT); four EMARSS-V (Vehicle and Dismount Exploitation Radar, VaDER); eight EMARSS-M (Multi-INT); and four EMARSS-S (SIGINT).

This funding line supports enhancements to the following sensor capabilities in order to maintain relevancy to the Warfighter: Electro-Optical/Infrared (EO/IR)/Full Motion Video (FMV); Communications Intelligence (COMINT); Signals Intelligence (SIGINT); Wide Area Aerial Surveillance (WAAS); Light Imaging Detection and Ranging (LiDAR) and improved Synthetic Aperture Radar / Moving Target Indicator (SAR/MTI) radar; Line-Of-Site (LOS) and Beyond Line-Of-Sight (BLOS) communications; and Processing Exploitation and Dissemination (PED) supporting two Distributed Common Ground System - Army (DCGS-A) enabled operator workstations.

Fiscal Year (FY) 2018 funding in the amount of \$2.111 million provides LiDAR Enhancement and Mission Equipment Packages (MEP) and PED Sensor Engineering Support.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: EMARSS - Sensor Enhancement	2.762	-	1.893	-	1.893
Description: Research, Development, Test, and Evaluation (RDTE) funded LiDAR, SIGINT and Airborne Wide Area Persistent Surveillance System (AWAPSS) sensor enhancement.					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems	Project (Number/Name) EH3 / EMARSS Payloads ADV DEV (MIP)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p><i>FY 2016 Accomplishments:</i> Research, Development, Test, and Evaluation (RDTE) funded LiDAR, SIGINT and Airborne Wide Area Persistent Surveillance System (AWAPSS) sensor enhancement.</p> <p><i>FY 2018 Base Plans:</i> RDTE funds LiDAR Enhancement Engineering Change Proposals (ECPs) and contractor system support.</p>					
<p><i>Title:</i> EMARSS - Sensor Engineering Support</p> <p><i>Description:</i> Matrix Government and Matrix Contractor engineering support for sensor enhancements.</p> <p><i>FY 2016 Accomplishments:</i> Funds Matrix Government and Matrix Contractor engineering support for sensor enhancements.</p> <p><i>FY 2017 Plans:</i> Funds Matrix Government and Matrix Contractor engineering support for sensor enhancements.</p> <p><i>FY 2018 Base Plans:</i> Funds Matrix Contractor engineering support for sensor enhancements.</p>	0.347	0.130	0.126	-	0.126
<p><i>Title:</i> Program Management Support</p> <p><i>Description:</i> Program Management Office (PMO) support and travel, as well as Systems Engineering and Technical Assistance (SETA) support.</p> <p><i>FY 2016 Accomplishments:</i> PMO support and travel, as well as SETA support.</p> <p><i>FY 2018 Base Plans:</i> PMO government support and travel.</p>	0.298	-	0.092	-	0.092
<p><i>Title:</i> EMARSS - Test and Evaluation</p> <p><i>Description:</i> SIGINT Testing resulting from SIGINT Enhancements.</p> <p><i>FY 2016 Accomplishments:</i> Sensor specific testing resulting from engineering design and development.</p>	0.125	-	-	-	-
Accomplishments/Planned Programs Subtotals	3.532	0.130	2.111	-	2.111

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems	Project (Number/Name) EH3 / EMARSS Payloads ADV DEV (MIP)
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• Aerial Common Sensor: A02005	96.500	-	-	-	-	-	-	-	-	0	96.500
• EMARSS SEMA: A02112	13.669	55.897	15.279	36.000	51.279	21.139	4.416	3.011	2.282	Continuing	Continuing
• EMARSS MEP/PED Procurement: AZ2054	13.670	17.097	3.279	4.000	7.279	21.138	4.418	4.482	10.200	Continuing	Continuing
• EMARSS SEMA: 375206 EH2	1.740	-	-	-	-	3.205	3.218	-	2.011	Continuing	Continuing
• ACS EMARSS (MIP): 655626 AC5	0.002	-	-	-	-	-	-	-	-	0	0.002

Remarks
The EMARSS RDTE efforts are found in the following two (2) project lines; 0305206AEH2 EMARSS ADV DEV (MIP) (Fixed Wing Project Office) and 0305206AEH3 EMARSS Payloads ADV DEV (Project Manager Sensors - Aerial Intelligence). The supporting procurement lines are A02112 and AZ2054. Separate funding lines support the Army Acquisition Executive's directive, codified in the October 28, 2011 memorandum to assign overall acquisition lead for manned airborne intelligence systems to Program Executive Officer for Aviation and overall sensor, processing, exploitation, and dissemination responsibilities to Program Executive Officer for Intelligence, Electronic Warfare, and Sensors.

D. Acquisition Strategy

The acquisition strategy, supported by the EMARSS CPD, is to design and test 24 systems as well as provide enhancements to the following sensor capabilities in order to maintain relevancy to the Warfighter: EO/IR FMV; COMINT; WAAS; LiDAR and improved SAR/MTI radar; LOS and BLOS communications; and PED supporting two DCGS-A enabled operator workstations. The EMARSS fleet of 24 systems will consist of the following variants: eight EMARSS-G (Geo-INT); four EMARSS-V (Vehicle and Dismount Exploitation Radar, VaDER); eight EMARSS-M (Multi-INT); and four EMARSS-S (SIGINT).

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems	Project (Number/Name) EH4 / ARL ADV DEV (MIP)
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EH4: ARL ADV DEV (MIP)	-	5.100	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Airborne Reconnaissance Low - Enhanced (ARL-E) is a worldwide self-deployable airborne Intelligence Surveillance Reconnaissance (ISR) system designed for timely, accurate, assured support to tactical forces over the full spectrum of operations. This system is a De Havilland DHC-8 aircraft replacing the DHC-7 IAW the Aerial ISR (AISR) 2020 Strategy. ARL-E will enhance the ARL-M sensor capability sets through the procurement of new and refurbished sensors to meet the ARL-E Capabilities Production Document (CPD) requirements. It provides a persistent capability to include: Broad-Area Surveillance and/or Focused Stare on Target Areas of Interest (Point or Objective Targets), Electro-Optical/Infrared (EO/IR)/Full-Motion Video (FMV) , Multi-Mode Radar, Robust Communications Intelligence (COMINT), on-Board Collection, Analysis, Sensor Cross Cue and dissemination through Distributed Common Ground System-Army (DCGS-A) Enabled workstations. ARL-E will be assigned to the U.S. Army Intelligence and Security Command's Aerial ISR Brigade providing AISR support to combatant commanders. For the overall system, the Army Acquisition Objective and the Army Procurement Objective, is nine (9). The Mission Equipment Package (MEP) objective is eight (8).

This funding line supports non-recurring engineering (NRE), development of supplemental type certificates (STC), testing, and integration. Funding provides for Department of Defense (DoD) mandated safety equipment to meet current and evolving International Standards. It also enhances aircraft communications, navigations and surveillance (CNS); aircraft survivability equipment (ASE) and the integration of the AISR mission equipment package (MEP) as well as obsolescence issues involved with the conversion of Quick Reaction Capability (QRC) to the ARL-E Program of Record (POR).

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Non-Recurring Engineering	5.100	-	-	-	-
Description: Funding will provide for NRE and the technical drawing package associated with the Department of Army mandated installation of ASE on a DeHavilland dash 8 and the associated validation testing required for the installed ASE. This funding will also be utilized for the associated system level testing after the final sensor installation on the ARL-E DeHavilland dash 8 replacement platforms.					
FY 2016 Accomplishments: Provided funding for the Department of Army mandated ASE compliance and total system level testing for the ARL-E DeHavilland dash 8 replacement Program of Record aircraft. These aircraft will provide the Department of Army with a state of the art AISR platform ready for worldwide deployment in support of national interest.					
Accomplishments/Planned Programs Subtotals	5.100	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems	Project (Number/Name) EH4 / ARL ADV DEV (MIP)

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

Line Item	FY 2016	FY 2017	FY 2018	FY 2018	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Cost To	
			Base	OCO	Total					Complete	Total Cost
• ARL SEMA (MIP): A02109	-	-	-	-	-	12.103	12.294	9.796	2.214	Continuing	Continuing
• ARL SEMA Mods (MIP): A02110	48.302	6.793	11.650	-	11.650	7.929	6.973	8.503	10.987	Continuing	Continuing
• ARL Payloads (MIP): AZ2050	68.540	74.380	59.938	-	59.938	19.320	23.265	4.470	80.000	Continuing	Continuing
• ARL Payloads ADV DEV (MIP): 375206-EH5	12.498	11.669	3.000	15.000	18.000	2.000	1.511	1.011	4.579	Continuing	Continuing

Remarks

Note: The Airborne Reconnaissance Low- Enhanced (ARL-E) RDTE efforts are found in the following two (2) project lines; 0305206AEH4 ARL ADV DEV (MIP) (Fixed Wing Project Office) and 0305206AEH5 ARL Payloads ADV DEV (Project Manager Sensors - Aerial Intelligence). The supporting procurement lines are A02110 and AZ2050. Separate funding lines support the Army Acquisition Executive's directive, codified in the October 28, 2011 memorandum, to assign overall acquisition lead for manned airborne Intelligence systems to Program Executive Officer for Aviation; and overall sensor, processing, exploitation, and dissemination responsibilities to Program Executive Officer for Intelligence, Electronic Warfare, and Sensors.

D. Acquisition Strategy

ARL-E will enhance the ARL-M sensor capability sets through the procurement of new and refurbished sensors to meet the ARL-E CPD requirements. It provides a persistent capability to include: Broad-Area Surveillance and/or Focused Stare on Target Areas of Interest (Point or Objective Targets), EO/IR FMV, COMINT, on-Board Collection, Analysis, Sensor Cross Cue and dissemination through DCGS-A Enabled workstations.

The development and testing of Long Range radar (LRR) is required to replace the current ARL Phoenix Eye Radar to increase performance and meet the improved requirements of the Appendix J Payload for the approved ARL-E CPD. The remainder will fund software development to enhance COMINT collection capabilities. The software will be added to the existing COMINT systems to effectively prosecute high priority and emerging modern signal emitters.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems				Project (Number/Name) EH5 / ARL Payloads ADV DEV (MIP)			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EH5: ARL Payloads ADV DEV (MIP)	-	10.353	11.669	2.969	15.000	17.969	1.980	1.495	1.000	4.579	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Airborne Reconnaissance Low - Enhanced (ARL-E) is a worldwide self-deployable airborne Intelligence Surveillance Reconnaissance (ISR) system designed for timely, accurate, assured support to tactical forces over the full spectrum of operations. This system is a De Havilland DHC-8 aircraft replacing the DHC-7 IAW the Aerial ISR (AISR) 2020 Strategy. ARL-E will enhance the ARL-M sensor capability sets through the procurement of new and refurbished sensors to meet the ARL-E Capabilities Production Document (CPD) requirements. It provides a persistent capability to include: Broad-Area Surveillance and/or Focused Stare on Target Areas of Interest (Point or Objective Targets), Electro-Optical/Infrared (EO/IR)/Full-Motion Video (FMV) , Multi-Mode Radar, Robust Communications Intelligence (COMINT), on-Board Collection, Analysis, Sensor Cross Cue and dissemination through Distributed Common System-Army (DCGS-A) Enabled workstations. ARL-E will be assigned to the U.S. Army Intelligence and Security Command's Aerial ISR Brigade providing AISR support to combatant commanders. For the overall system, the Army Acquisition Objective and the Army Procurement Objective, is nine. The Mission Equipment Package (MEP) objective is eight.

Fiscal Year (FY) 2018 Base funding of \$2.969 million initiates the new signal enhancement development effort for Signal 4 to develop software, perform lab test, and perform flight test. This funding line supports continued software development to enhance COMINT collection capabilities to effectively prosecute high priority and emerging modern signal emitters. Signals for development can be fielded on ARL-E, Enhanced Medium Altitude Reconnaissance and Surveillance System (EMARSS), and Guardrail.

Fiscal Year (FY) 2018 OCO funding of \$15,000 million continues the new signal enhancement development effort for Signal 4, 4a, and 4b to develop software, perform lab test, and perform flight test. This funding line will also support the development and test of Signals 3 and 4 data and co-op capabilities.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Long Range Radar Development	6.053	-	-	-	-
Description: LRR Research and Development (R&D) Support					
FY 2016 Accomplishments: Initiate LRR prototype development.					
Title: Test Support to LRR	-	4.000	-	-	-
Description: Complete the LRR test					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems	Project (Number/Name) EH5 / ARL Payloads ADV DEV (MIP)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
FY 2017 Plans: Complete the LRR test and New Signal Upgrades					
Title: New Signals (COMINT/Software Upgrades)	4.300	7.669	2.969	15.000	17.969
Description: To develop software for Signals 3, 3a, 3b, 4, 4a, and 4b.					
FY 2016 Accomplishments: Initiate Signal 3 software development.					
FY 2017 Plans: Start Development of COMINT Software Upgrades					
FY 2018 Base Plans: Fiscal Year (FY) 2018 Base funding of \$2.969 million initiates the new signal enhancement development effort for Signal 4 to develop software, perform lab testing and flight testing.					
FY 2018 OCO Plans: Fiscal Year (FY) 2018 OCO funding of \$15.0 million continues the new signal enhancement development effort for Signal 4, 4a, and 4b to develop software, perform lab testing and flight testing. This funding line will also support the development and test of Signals 3 and 4 data and co-op capabilities.					
Accomplishments/Planned Programs Subtotals	10.353	11.669	2.969	15.000	17.969

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• AZ2050 ARL MODS (MIP): AZ2050	68.540	74.380	59.938	-	59.938	7.613	8.215	-	-	0.000	218.686
• Theater Net-Centric Geol: 0605766A-DX9	-	1.360	1.898	-	1.898	0.257	0.257	-	-	0	3.772
• A02109 ARL SEMA: A02109	-	-	-	-	-	12.103	12.294	9.796	-	0.000	34.193
• A02110 ARL SEMA MODS (MIP): A02110	48.302	6.793	11.650	-	11.650	19.636	22.023	-	-	Continuing	Continuing
• ARL ADV DEV (MIP): 0305206A-EH4	5.100	-	-	-	-	-	-	-	-	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems	Project (Number/Name) EH5 / ARL Payloads ADV DEV (MIP)

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

The Airborne Reconnaissance Low- Enhanced (ARL-E) RDTE efforts are found in the following two (2) project lines; 0305206AEH4 ARL ADV DEV (MIP) (Fixed Wing Project Office) and 0305206AEH5 ARL Payloads ADV DEV (Project Manager Sensors - Aerial Intelligence). The supporting procurement lines are A02110 and AZ2050. Separate funding lines support the Army Acquisition Executive's directive, codified in the October 28, 2011 memorandum, to assign overall acquisition lead for manned airborne Intelligence systems to Program Executive Officer for Aviation; and overall sensor, processing, exploitation, and dissemination responsibilities to Program Executive Officer for Intelligence, Electronic Warfare, and Sensors.

D. Acquisition Strategy

ARL-E will enhance the ARL-M sensor capability sets through the procurement of new and refurbished sensors to meet the ARL-E CPD requirements. It provides a persistent capability to include: Broad-Area Surveillance and/or Focused Stare on Target Areas of Interest (Point or Objective Targets), EO/IR FMV, COMINT, on-Board Collection, Analysis, Sensor Cross Cue and dissemination through DCGS-A Enabled workstations. The development and testing of LRR is required to replace the current ARL Phoenix Eye Radar to increase performance and meet the improved requirements of the Appendix J Payload for the approved ARL-E CPD. The remainder will fund software development to enhance COMINT collection capabilities. The software will be added to existing COMINT systems to effectively prosecute high priority and emerging modern signal emitters.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems	Project (Number/Name) EH5 / ARL Payloads ADV DEV (MIP)
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Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Long Range Radar Development	C/CPFF	Northrop Grumman : Linthicum Heights, MD	0.000	6.053	Mar 2016	-		-		-		-	0.000	6.053	0.000
New Signals (COMINT/ Software Upgrades)	C/CPFF	Boeing Argon : California	0.000	4.300	Dec 2015	7.669	Mar 2017	2.969	Mar 2018	12.000	Mar 2018	14.969	0.000	26.938	0.000
Subtotal			0.000	10.353		7.669		2.969		12.000		14.969	0.000	32.991	0.000

Remarks
 New Signals Contract: W15P7T-10-D-D420/ KZ01. Fiscal Year (FY) 2018 Base funding of \$2.969 million initiates the new signal enhancement development effort for Signal 4 to develop software to enhance the COMINT collection capabilities. This funding line supports continued software development to enhance COMINT collection capabilities to effectively prosecute high priority and emerging modern signal emitters.
 Fiscal Year (FY) 2018 OCO funding of \$12,000 million continues the new signal enhancement development effort for Signal 4, 4a, and 4b to develop software to enhance the COMINT collection capabilities. This funding line will also support the development of Signals 3 and 4 data and co-op capabilities.

Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 to LRR and New Signals (COMINT/ Software Upgrades)	C/CPFF	Boeing Argon/NG : Mountain View, CA/ Lithicum, MD	0.000	-		4.000	Nov 2016	0.000		3.000	Mar 2018	3.000	0.000	7.000	0.000
Subtotal			0.000	-		4.000		0.000		3.000		3.000	0.000	7.000	0.000

Remarks
 New Signals Contract: W15P7T-10-D-D420/ KZ01. Fiscal Year (FY) 2018 Base funding of \$2.969 million initiates the lab and flight test for Signal 4 software to see if it meets the requirements in the ARL-E CPD.
 Fiscal Year (FY) 2018 OCO remaining funding continues the lab and flight tests for Signal 4, 4a, and 4b software to see if it meets the requirements in the ARL-E CPD. This funding line will also support the testing of Signals 3 and 4 data and co-op capabilities.

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army							Date: May 2017						
Appropriation/Budget Activity 2040 / 7			R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems				Project (Number/Name) EH5 / ARL Payloads ADV DEV (MIP)						
	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	10.353		11.669		2.969		15.000		17.969	0.000	39.991	0.000

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems	Project (Number/Name) EH5 / ARL Payloads ADV DEV (MIP)
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022							
	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				
ARL-E Radar Development																																
(1) ARL-E Radar Testing	Radar Development								Radar Flight Testing																							
(2) ARL-E MEP Contract Award	ARL-E MEP Contract Award																															
ARL-E MEP Integration																																
(3) ARL-E System LUT	ARL-E MEP Integration																Test & Evaluation															
ARL-E New Signals Development and Test																	Development & Test															
ARL-E Signal 3 Development and Test									Signal Development and Test																							
ARL-E Signal 4 Development and Test	Signal Development and Test																															
ARL-E Signal 5 Development and Test	Signal Development and Test																															

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305206A / Airborne Reconnaissance Systems	Project (Number/Name) EH5 / ARL Payloads ADV DEV (MIP)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
ARL-E Radar Development	4	2015	2	2018
ARL-E Radar Testing	1	2018	1	2018
ARL-E MEP Contract Award	1	2016	1	2016
ARL-E MEP Integration	1	2016	4	2018
ARL-E System LUT	1	2019	1	2019
ARL-E New Signals Development and Test	2	2016	2	2020
ARL-E Signal 3 Development and Test	2	2016	3	2017
ARL-E Signal 4 Development and Test	3	2017	4	2018
ARL-E Signal 5 Development and Test	4	2018	2	2020

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0305208A / Distributed Common Ground/Surface Systems
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	25.592	32.284	24.700	-	24.700	46.400	59.745	62.101	41.161	Continuing	Continuing
956: Distributed Common Ground System (MIP)	-	8.923	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
D07: DCGS-A Common Modules (MIP)	-	16.669	32.284	24.700	-	24.700	46.400	59.745	62.101	41.161	Continuing	Continuing

Note

The Distributed Common Ground Systems - Army (DCGS-A) is a designated Major Automation Information System (MAIS) program.

A. Mission Description and Budget Item Justification

Distributed Common Ground System - Army (DCGS-A) is the Intelligence, Surveillance and Reconnaissance (ISR) System of Systems (SoS) for Joint, Interagency, Allied, Coalition, and National data analysis, sharing and collaboration. The core functions of DCGS-A are: the vertical and horizontal synchronization of ISR Processing, Exploitation and Dissemination (PED) efforts; operations in a networked environment at multiple security levels; the control of select Army and joint sensor systems; the fusion of all acquired data and information, and distribution of relevant red (threat), gray (non-aligned), and environmental (weather and terrain) information; and providing the Warfighters' early warning, targeting, and sensor ground station capabilities. DCGS-A provides a single integrated ISR ground processing system composed of common components that are interoperable with sensors, other information sources, all Warfighting Functions, and the Defense Information & Intelligence Enterprise (DI2E) and Intelligence Community Information Technology Enterprise (IC ITE). DCGS-A is fielded in Fixed, Mobile, and embedded configurations emphasizing the use of reach and split based operations by improving accessibility of data in order to reduce forward deployed footprint. As new software capabilities are integrated and tested, a continuing series of modifications will be integrated and fielded to units IAW the Army Resourcing Priority List (ARPL) process.

DCGS-A is designated as a Program of Record (PoR) within the Command Post Computing Environment (CP CE) of the Common Operating Environment (COE). DCGS-A provides the Single and Shareable Geospatial Foundation (SSGF) Cross Cutting Capability (CCC), and is defining the DCGS-A architecture to fit within the COE as described by the Assistant Secretary of the Army (Acquisition, Logistics, and Technology) (ASA(ALT)) COE Implementation Plan. This is in accordance with the G-3/5/7 priority to align all Army networks, procurements and enhancements under one COE and one vision leveraging intelligence community investments. PM DCGS-A continues to work with PM Mission Command (PM MC) to converge on CP CE Tactical Server Infrastructure (TSI) for FY19 fielding.

DCGS-A software is tailored by echelon and scalable to each unit's mission. DCGS-A provides commanders and staffs the ability to maintain an accurate and up to date understanding of the operational environment. The DCGS-A contribution to commanders' visualization and situational awareness, rapid planning, and the synchronization of all warfighting functions, enable Army units to operate within the enemy's decision cycle. This capability enhances tactical and operational maneuver and the conduct of full spectrum operations across the range of military operations from Humanitarian Assistance and Disaster Relief (HADR) to major combat operations and campaigns through all phases of the Joint Continuum of Military Operations.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305208A / <i>Distributed Common Ground/Surface Systems</i>
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The DCGS-A configurations range from laptops to systems integrated in tactical shelters and mounted on tactical vehicles to large commodity servers operating in a sanctuary based data center processing environments. The fundamental intent and tenet of this approach is to reduce forward deployed equipment/footprint by co-locating the advanced analytics capabilities within the DCGS-A baseline with the regional data centers, where the data is stored. This infrastructure consolidation simultaneously reduces processor and communications requirements in tactical units by limiting the number of large data files transported across tactical communications systems. Following a successful operational assessment and Milestone C in 2QFY12/Full Deployment Decision in 1QFY13, Follow-on Test & Evaluation in 3QFY15, the program is deploying DCGS-A Increment 1 Software Baseline throughout the Army.

FY2018 has no funding for Project 956.

FY2018 Base funding in the amount of \$24.700 million for D07, DCGS-A, will continue the iterative software releases that will increase the Processing, Exploitation, and Dissemination capability our Army requires. DCGS-A will continue critical updates to the Army's ISR PED and multi- intelligence planning, analysis, and production capabilities through the exploitation of Cloud Computing and advanced analytics capabilities. This approach will achieve Information Technology efficiencies through alignment with the Intelligence Community Information Technology Environment (IC ITE), while providing the incremental software updates required to remain current.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	25.592	32.284	39.537	-	39.537
Current President's Budget	25.592	32.284	24.700	-	24.700
Total Adjustments	0.000	0.000	-14.837	-	-14.837
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	-14.837	-	-14.837

Change Summary Explanation

FY 2018 decrease of \$14.837M to project D07 supports re-phasing of funds to support program restructure.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0305208A / <i>Distributed Common Ground/Surface Systems</i>				Project (Number/Name) 956 / <i>Distributed Common Ground System (MIP)</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
956: <i>Distributed Common Ground System (MIP)</i>	-	8.923	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Distributed Common Ground System - Army (DCGS-A) is the Intelligence, Surveillance and Reconnaissance (ISR) System of Systems (SoS) for Joint, Interagency, Allied, Coalition, and National data analysis, sharing and collaboration. The core functions of DCGS-A are: the vertical and horizontal synchronization of ISR Processing, Exploitation and Dissemination (PED) efforts; operations in a networked environment at multiple security levels; the control of select Army and joint sensor systems; the fusion of all acquired data and information, and distribution of relevant red (threat), gray (non-aligned), and environmental (weather and terrain) information; and providing the Warfighters' early warning, targeting, and sensor ground station capabilities. DCGS-A provides a single integrated ISR ground processing system composed of common components that are interoperable with sensors, other information sources, all Warfighting Functions. DCGS-A is fielded in Fixed, Mobile, and embedded configurations emphasizing the use of reach and split based operations by improving accessibility of data in order to reduce forward deployed footprint. As enhanced capabilities are developed and tested, a continuing series of software releases will be integrated into Army common/commodity hardware and fielded to units IAW the Army Resourcing Priority List (ARPL) process.

DCGS-A is designated as a Program of Record (PoR) within the Command Post Computing Environment (CP CE) of the Common Operating Environment (COE). DCGS-A provides the Single and Shareable Geospatial Foundation (SSGF) Cross Cutting Capability (CCC), and is defining the DCGS-A architecture to fit within the COE as described by the Assistant Secretary of the Army (Acquisition, Logistics, and Technology) (ASA(ALT)) COE Implementation Plan. This is in accordance with the G-3/5/7 priority to align all Army networks, procurements and enhancements under one COE and one vision leveraging intelligence community investments. PM DCGSA continues to work with PM Mission Command (PM MC) to converge on CP CE Tactical Server Infrastructure (TSI) for FY19 fielding.

DCGS-A software is tailored by echelon and scalable to each unit's mission. DCGS-A provides commanders and staffs the ability to maintain an accurate and up to date understanding of the operational environment. The DCGS-A contribution to commanders' visualization and situational awareness, rapid planning, and the synchronization of all warfighting functions, enable Army units to operate within the enemy's decision cycle. This capability enhances tactical and operational maneuver and the conduct of full spectrum operations across the range of military operations from Humanitarian and Disaster Relief (HADR) to major combat operations and campaigns through all phases of the Joint Continuum of Military Operations.

The DCGS-A configurations range from laptops to systems integrated in tactical shelters and mounted on tactical vehicles to large commodity servers operating in a sanctuary based data center processing environment. The fundamental intent and tenet of this approach is to reduce forward deployed equipment/footprint by co-locating the advanced analytics capabilities within the DCGS-A baseline with the regional data centers, where the data is stored. This infrastructure consolidation simultaneously reduces processor and communications requirements in tactical units by limiting the number of large data files transported across tactical communications systems. Following a successful operational assessment and Milestone C in 2QFY12/Full Deployment Decision in 1QFY13, Follow-on Test & Evaluation in 3Q FY15, the program is deploying DCGS-A Increment 1 Software Baseline throughout the Army.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305208A / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) 956 / <i>Distributed Common Ground System (MIP)</i>
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FY2018 has no funding for Project 956.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>Title: Design and Development of DCGS-A enterprise level net-centric architecture</p> <p>Description: Continue design and development of DCGS-A enterprise level net-centric architecture to include: Development & Integration of DCGS-A Software; Developmental Test/Operational Test, Mobile Basic Contract Deliverables, and Program Management support costs. Global Unified Data Environment (Cloud) - development - to create direct Data Ingest of varying intelligence data types and development of analytical tools to exploit single intelligence data, further enhancing Cloud Enterprise Account Management load distribution of enterprise level complex searches. Development of Cloud to Cloud Data Synchronization technologies and enhanced data management applications between Cloud and Edge nodes.</p> <p>FY 2016 Accomplishments: Corrected deficiencies discovered during the Follow-On Operational Test and Evaluation (FOT&E) and integrated software baselines that began fielding in 2016 on both SIPR and TS/SCI networks</p>	4.530	-	-	-	-
<p>Title: Matrix support including systems integration lab software support.</p> <p>Description: Matrix support including systems integration lab software support.</p> <p>FY 2016 Accomplishments: Utilized matrix support for systems integration lab software requirements.</p>	2.000	-	-	-	-
<p>Title: Army and Joint Testing/Development/Operational Test Support/Software Fixes</p> <p>Description: Ongoing Army and Joint interoperability testing and evaluation to include Operational Assessment (Network Integration Evaluation (NIE) Operational Assessment), Joint Interoperability Test Command, and Operational Test and Software Fixes</p> <p>FY 2016 Accomplishments: Supported completion of software fixes.</p>	1.500	-	-	-	-
<p>Title: Support Costs and Management Services</p> <p>Description: Funding is provided for the following effort/Project Management Support</p> <p>FY 2016 Accomplishments:</p>	0.893	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305208A / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) 956 / <i>Distributed Common Ground System (MIP)</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Supported program management office requirements.					
Accomplishments/Planned Programs Subtotals	8.923	-	-	-	-

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018 Base</u>	<u>FY 2018 OCO</u>	<u>FY 2018 Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• DCGS-A (MIP) Procurement: <i>BZ7316 - Procurement</i>	318.844	285.546	274.782	52.515	327.297	279.642	227.924	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Distributed Common Ground System-Army (DCGS-A) program was created in response to the Department of Defense (DoD) Distributed Common Ground/Surface System (DCGS) Mission Area Initial Capabilities Document (MA ICD) dated 13 Aug 2004, which captured the overarching requirements for an Intelligence, Surveillance, and Reconnaissance (ISR) Family of Systems (FoS) that will contribute to Joint and combined Warfighter needs. That ICD was updated as the Distributed Common Ground/Surface System (DCG/SS) Enterprise ICD, and approved by the Joint Requirements Oversight Council (JROC) 27 Feb 2009. The Army requirements were refined in the DCGS-A Capabilities Development Document (CDD), and approved by the JROC 31 Oct 2005. The DCGS-A program is currently in the Production and Deployment phase and was designated as a Major Automated Information System (MAIS) in OSD (AT&L) Memorandum, 29 Mar 2010.

DCGS-A is following an evolutionary acquisition approach to develop and field system capabilities over time to satisfy the requirements of the DCGS-A Capability Development Document (CDD). Following this approach, the first increment was defined and a Capability Production Document (CPD) was created with full consideration of all of the preceding supporting documents and analysis. As part of its initial staffing, a Cost Benefit Analysis was completed in support of the DCGS-A CPD. This analysis projected a significant cost avoidance/savings over the life cycle by not limiting the hardware configuration to a one size fits all unit types design but rather integrating the DCGS-A Software capabilities into common servers and other IT components fielded at that echelon. This approach was validated during the Milestone C and Full Deployment Decision process in FY2012 through the Office of the Secretary of Defense (OSD) Cost Assessment and Program Evaluation (CAPE) approval of the Economic Analysis. This Economic Analysis validated the cost savings achieved utilizing the acquisition approach outlined above.

PM DCGS-A has been designated as the Command Post Computing Environment (CPCE) Lead for PEO IEW&S. As such, DCGS-A is currently aligning it's architecture to fit within the Common Operating Environment (COE) as described by the ASA(ALT) COE Implementation Plan. This alignment is in accordance with the G-3/5/7 priority to align all Army networks, procurements, and enhancements under one COE and one vision. Our acquisition strategy supports this initiative as we continue to collapse PORs and reduce footprint following our capability migration path and iterative development of software releases which continue to increase capabilities to satisfy the remaining CPD requirements beyond Initial Minimal Capability. As DCGS-A continues the path through Increment 1 and beyond, each release will focus on

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army Date: May 2017

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
2040 / 7	PE 0305208A / <i>Distributed Common Ground/Surface Systems</i>	956 / <i>Distributed Common Ground System (MIP)</i>

the COE and continually align the Command Post activities with POR migration activities. The program office expects to continue as the DCGS-A System Integrator for software and hardware integration for Increment 1, and will continue to access multiple vendors by leveraging a variety of competitively awarded contracts.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0305208A / <i>Distributed Common Ground/Surface Systems</i>				Project (Number/Name) D07 / <i>DCGS-A Common Modules (MIP)</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
D07: <i>DCGS-A Common Modules (MIP)</i>	-	16.669	32.284	24.700	-	24.700	46.400	59.745	62.101	41.161	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Note: The Distributed Common Ground System - Army is designated a Major Automation Information System (MAIS) program.

A. Mission Description and Budget Item Justification

Distributed Common Ground System - Army (DCGS-A) is the Intelligence, Surveillance and Reconnaissance (ISR) System of Systems (SoS) for Joint, Interagency, Allied, Coalition, and National data analysis, sharing and collaboration. The core functions of DCGS-A are: the vertical and horizontal synchronization of ISR Processing, Exploitation and Dissemination (PED) efforts; operations in a networked environment at multiple security levels; the control of select Army and joint sensor systems; the fusion of all acquired data and information, and distribution of relevant red (threat), gray (non-aligned), and environmental (weather and terrain) information; and providing the Warfighters' early warning, targeting, and sensor ground station capabilities. DCGS-A provides a single integrated ISR ground processing system composed of common components that are interoperable with sensors, other information sources, all Warfighting Functions, compliant with standards providing the Defense Information & Intelligence Enterprise (DI2E) and Intelligence Community Information Technology Enterprise (IC ITE). DCGS-A is fielded in Fixed, Mobile, and embedded configurations emphasizing the use of reach and split based operations by improving accessibility of data in order to reduce forward deployed footprint. As enhanced commercial capabilities are integrated and tested, a continuing series of software releases will be provided into Army Common/commodity hardware and fielded to units IAW the Army Resourcing Priority List (ARPL) process.

DCGS-A is designated as a Program of Record (PoR) within the Command Post Computing Environment (CP CE) of the Common Operating Environment (COE). DCGS-A provides the Single and Shareable Geospatial Foundation (SSGF) Cross Cutting Capability (CCC), and is defining the DCGS-A architecture to fit within the COE as described by the Assistant Secretary of the Army (Acquisition, Logistics, and Technology) (ASA(ALT)) COE Implementation Plan. This is in accordance with the G-3/5/7 priority to align all Army networks, procurements and enhancements under one COE and one vision leveraging intelligence community investments. PM DCGS-A continues to work with PM Mission Command (PM MC) to converge on CP CE Tactical Server Infrastructure (TSI) for FY19 fielding.

DCGS-A provides technologically advanced Processing, Exploitation, and Dissemination (PED) capabilities through iterative software releases delivered in tailored and scalable mobile, fixed, and embedded configurations in all maneuver and maneuver support units from Company Intelligence Support Team to Army Service Component Command, and in select maneuver sustainment units battalion and above.

FY2018 Base funding in the amount of \$24.7 million will be utilized to identify the Army specifications and prepare to procure a data management architecture to meet the Army's requirements for the Brigade Combat Team echelon and above to replace the DCGS-A Brain. The architecture will consist of a ingest framework, persistence store, egress data service, fusion engine, and a visualization framework. This will continue to deliver critical updates to the Army's ISR PED and multi-intelligence planning, analysis, and production capabilities through the use of modern commercial item technologies and advanced analytic capabilities. This approach will achieve

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305208A / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) D07 / <i>DCGS-A Common Modules (MIP)</i>
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Information Technology efficiencies through the alignment with the Intelligence Community Information Technology Environment (IC ITE) and Joint Information Environment (JIE).

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>Title: Integrate and Test DCGS-A Software</p> <p>Description: Continue efforts to integrate and test DCGS-A software. DCGS-A will continue to expand on the capabilities provided by DCGS-A Increment 1 by adding capabilities at the Army and below echelons while providing new, enhanced, and leap-ahead Intelligence, Surveillance, and Reconnaissance (ISR) and Standard and Shareable Geospatial Foundation (SSGF) enterprise capabilities to align with the Intelligence Community (IC) and Army's Common Operating Environment (COE) and transformation objectives. DCGS-A and beyond will leverage the investment made in previous DCGS-A increments and include emerging technologies related to: Tasking of sensors; controlling select Army sensor systems; Processing, fusing, and Exploiting data and information; supporting knowledge generation; providing ground station capabilities; automated support to intelligence product generation; Disseminating information and intelligence about the threat, weather, and terrain at all echelons; automating intelligence synchronization, including ISR planning, reconnaissance and surveillance integration and assessment; supporting situation understanding; supporting targeting and effects; providing the Standard and Sharable Geospatial Foundation (SSGF) to COE Computing Environments (CEs). These requirements will be defined in the DCGS-A Requirements Data Package (RDP) and Capability Drops (CDs) as necessary to ensure DCGS-A provides the data, information, intelligence, situation awareness, and interoperability needed to support the Warfighter.</p> <p>FY 2016 Accomplishments: Continued to integrate and test DCGS-A software.</p> <p>FY 2017 Plans: Will continue to integrate and test DCGS-A software.</p> <p>FY 2018 Base Plans: Will continue to integrate and test DCGS-A Software.</p>	10.085	27.791	13.010	-	13.010
<p>Title: System reconfiguration</p> <p>Description: System Reconfiguration to enhance the systems to deliver higher performance to leverage industry enhancements/innovation.</p> <p>FY 2016 Accomplishments:</p>	2.300	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017		
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)			
2040 / 7	PE 0305208A / <i>Distributed Common Ground/Surface Systems</i>	D07 / <i>DCGS-A Common Modules (MIP)</i>			
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Continued System Reconfiguration to enhance the systems to deliver higher performance to leverage industry enhancements/innovation.					
Title: Matrix Support Government for Software Integration Description: Matrix Support Government for software integration to the target platforms. FY 2016 Accomplishments: Continued Matrix Support Government for software integration to the target platforms. FY 2017 Plans: Will continue Matrix Support Government for software integration to the target platforms. FY 2018 Base Plans: Will continue Matrix Support Government for software integration to the target platforms.	2.148	1.131	3.899	-	3.899
Title: Project Management Description: Project Management support to manage the cost, schedule, and performance metrics for the program. FY 2016 Accomplishments: Continued Project Management support. FY 2017 Plans: Will continue Project Management support. FY 2018 Base Plans: The program will prepare Acquisition Requirements Packages for solicitations to satisfy multiple capability drops.	1.136	1.641	2.118	-	2.118
Title: Army and Joint Testing/Development/Operational Test Support Description: Testing of DCGS-A FY 2016 Accomplishments: Testing of DCGS-A. FY 2018 Base Plans: Testing of DCGS-A.	1.000	-	2.090	-	2.090
Title: Training Support	-	1.316	3.203	-	3.203

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305208A / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) D07 / <i>DCGS-A Common Modules (MIP)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>Description: Training support - embedded computer based training (CBT) for the DCGS-A software.</p> <p>FY 2017 Plans: Will initiate training support - embedded computer based training (CBT) for the DCGS-A software.</p> <p>FY 2018 Base Plans: Continue training support - embedded computer based training (CBT) for the DCGS-A software.</p>					
<p>Title: Logistics Documentation</p> <p>Description: Logistics activities including maintenance task analysis, level of repair analysis, user manual, training support package, and MANPRINT activities.</p> <p>FY 2017 Plans: Will initiate logistics activities including task maintenance task analysis, level of repair analysis, user manual, training support package, and MANPRINT activities.</p> <p>FY 2018 Base Plans: Continue logistics activities including task maintenance task analysis, level of repair analysis, user manual, training support package, and MANPRINT activities.</p>	-	0.405	0.380	-	0.380
Accomplishments/Planned Programs Subtotals	16.669	32.284	24.700	-	24.700

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• B01001: <i>DCGS MIP</i>	-	-	-	-	-	-	68.136	323.961	298.233	Continuing	Continuing

Remarks
Note: The Distributed Common Ground System - Army is designated a Major Automation Information System (MAIS) program.

D. Acquisition Strategy
DCGS-A is an ACAT IAM, Major Automated Information System (MAIS) program. The DCGS-A program will consist of multiple software releases structured to meet DCGS-A User requirements. The DCGS-A program will follow the Information Technology (IT) Box concept for an agile acquisition strategy to iteratively provide and field Intelligence, Surveillance, and Reconnaissance (ISR) capabilities, hosted on Commercial off the Shelf (COTS) equipment/hardware, providing low risk, efficient, time- phased releases of capability to satisfy the Army's operational needs.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305208A / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) D07 / <i>DCGS-A Common Modules (MIP)</i>
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The DCGS-A capabilities under Increment 1 will be leveraged to the maximum extent where applicable to meet the future DCGS-A requirements set. The DCGS-A will also leverage the Increment 1 configuration platforms fielded across the Army.

DCGS-A is a collection of software packages (COTS, and GOTS products) selected to provide each Army echelon (from Battalion up to Echelon Above Corps (EAC)) the capability to synthesize and exploit intelligence data. DCGS-A delivers these software packages on COTS and GOTS hardware components, tailored to meet each Army Echelon's intelligence mission requirements. DCGS-A will deliver these capabilities by fielding software releases with incremental increases in capabilities with each release. DCGS-A is the Army's ISR Foundation Layer for Tasking, Processing, Exploitation, Dissemination (TPED) and development of situation understanding using intelligence information about the threat, weather, and terrain at all Army Echelons. DCGS-A provides the capabilities necessary for Commanders to access information, task organic sensors, and synchronize non-organic sensor assets with their organic assets. DCGS-A will continuously acquire and synthesize data and information from Joint, Interagency, Intergovernmental, and Multi-national (JIIM) sources to maintain an updated and accurate understanding of the operational environment to inform critical and time sensitive command decisions.

The DCGS-A software baseline will be updated and iteratively deployed to address emerging and prioritized operational requirements. PM DCGS-A, in coordination with the operational user community, will align releases with the technological readiness of targeted enhancements, and to support low-risk integration and test cycle times. The time phasing of planned content of each release will be based upon an assessment of available and projected technological solution sets. The DCGS-A software will be hardware agnostic so that the software can be deployed in any processing hardware equipment. This allows the DCGS-A software to be scalable and deployable in different hardware system configurations, as required by the Army at different echelons. The implementation of the latest COTS hardware procurement through the Army Common Hardware System (CHS) program with the established post-deployment hardware sparing, sustainment, and maintenance provisions, will result in significant cost efficiencies.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305208A / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) D07 / <i>DCGS-A Common Modules (MIP)</i>
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Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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	Allot	DCGS-A : APG, MD	1.054	1.136	Oct 2015	1.641	Oct 2016	2.118	Oct 2017	-		2.118	Continuing	Continuing	0.000
Milestone preparation; Activities; Trade Space Analysis (TSA)	MIPR	Various : Various	3.318	-		-		-		-		-	0.000	3.318	0.000
Subtotal			4.372	1.136		1.641		2.118		-		2.118	-	-	0.000

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Integrate & Test software	C/FP	Various : Various	1.836	10.085	Jun 2016	27.791	Jun 2017	13.010	Jan 2018	-		13.010	Continuing	Continuing	Continuing
System reconfiguration	C/FP	Various : Various	1.720	2.300	Nov 2015	-		-		-		-	Continuing	Continuing	0.000
Subtotal			3.556	12.385		27.791		13.010		-		13.010	-	-	-

Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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	Various : Various	1.657	2.148	Oct 2015	1.131	Oct 2016	3.899	Jan 2018	-		3.899	Continuing	Continuing	0.000
Training Development	MIPR	Various : Various	0.000	-		1.316	Jan 2017	3.203	Jan 2018	-		3.203	Continuing	Continuing	0.000
Logistics Documentation	MIPR	Various : Various	0.000	-		0.405	Jan 2017	0.380	Jan 2018	-		0.380	Continuing	Continuing	0.000
Subtotal			1.657	2.148		2.852		7.482		-		7.482	-	-	0.000

Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 & Integration Lab	MIPR	Various : Various	0.000	1.000	Oct 2015	-		2.090	Jan 2018	-		2.090	Continuing	Continuing	0.000
Subtotal			0.000	1.000		-		2.090		-		2.090	-	-	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army							Date: May 2017				
Appropriation/Budget Activity 2040 / 7			R-1 Program Element (Number/Name) PE 0305208A / <i>Distributed Common Ground/Surface Systems</i>				Project (Number/Name) D07 / <i>DCGS-A Common Modules (MIP)</i>				
	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract		
Project Cost Totals	9.585	16.669	32.284	24.700	-	24.700	-	-	-		

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305208A / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) D07 / <i>DCGS-A Common Modules (MIP)</i>
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
COTS Integration and Testing																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305208A / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) D07 / <i>DCGS-A Common Modules (MIP)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
COTS Integration and Testing	3	2017	4	2022

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0305219A / MQ-1 Gray Eagle UAV							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	22.285	30.970	9.574	-	9.574	0.000	0.000	0.000	0.000	0.000	62.829
MQ1: MQ-1 Gray Eagle - Army UAV (MIP)	-	22.285	30.970	9.574	-	9.574	0.000	0.000	0.000	0.000	0.000	62.829

A. Mission Description and Budget Item Justification

The MQ-1C Gray Eagle provides the Army with an extended range, multi-purpose (ERMP) unmanned aircraft system (UAS); capable of executing reconnaissance, security, attack, and intelligence collection missions in the range of military operations (ROMO). Sensors/payloads include an Electro-Optical/Infrared/Laser Designator (EO/IR/LD), Synthetic Aperture Radar/Moving Target Indicator (SAR/MTI), Signals Intelligence (SIGINT), and HELLFIRE missiles; providing a near all-weather mission capability. MQ-1C Gray Eagle is a dedicated, assured, multi-mission Unmanned Aircraft System (UAS) fielded to all Army Divisions, Intelligence and Security Command and Army Special Operations Command in support of the commander's warfighting priorities.

The Fiscal Year (FY) 2018 MQ-1 Gray Eagle funding of \$9.574 million will support Test and Evaluation efforts associated with the MQ-1C Gray Eagle Extended Range Engineering Change Proposal (ECP). The test effort will evaluate overall system level performance to ensure it meets developmental and operational requirements. The types of effort required include Environmental Testing, Electromagnetic Environmental Effects (E3) testing, transport/mobility testing, logistics demonstration, and Follow-On Operational Test and Evaluation (FOTE II).

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.000	13.470	0.000	-	0.000
Current President's Budget	22.285	30.970	9.574	-	9.574
Total Adjustments	22.285	17.500	9.574	-	9.574
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	22.285	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	17.500	9.574	-	9.574

Change Summary Explanation

The Fiscal Year (FY) 2016 MQ-1C Gray Eagle funding of \$22.285 million received 27 Sept 2016 will support the Longbow integration and address software obsolescence issues directly related to Airworthiness, Cyber Security and becoming Future Airborne Capability Environment (FACE) compliant.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305219A / MQ-1 Gray Eagle UAV	
<p>The Fiscal Year (FY) 2017 increase requests MQ-1C Gray Eagle funding of \$17.500 million to support development of Cyber Threat assessment activities and design and integration efforts.</p> <p>The Fiscal Year (FY) 2018 MQ-1C Gray Eagle funding of \$9.574 million will support Test and Evaluation efforts associated with the MQ-1C Gray Eagle Extended Range Engineering Change Proposal (ECP). The test effort will evaluate the changes to materiel (Extended Range Gray Eagle). The types of effort required include Environmental Testing, Electromagnetic Environmental Effects (E3) testing, transport/mobility testing, logistics demonstration, and Follow-On Operational Test and Evaluation (FOTE II).</p>		

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305219A / MQ-1 Gray Eagle UAV	Project (Number/Name) MQ1 / MQ-1 Gray Eagle - Army UAV (MIP)
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
MQ1: MQ-1 Gray Eagle - Army UAV (MIP)	-	22.285	30.970	9.574	-	9.574	0.000	0.000	0.000	0.000	0.000	62.829
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The MQ-1C Gray Eagle provides the Army with an extended range, multi-purpose (ERMP) unmanned aircraft system (UAS); capable of executing reconnaissance, security, attack, and intelligence collection missions in the range of military operations (ROMO). Sensors/payloads include an Electro-Optical/Infrared/Laser Designator (EO/IR/LD), Synthetic Aperture Radar/Moving Target Indicator (SAR/MTI), Signals Intelligence (SIGINT), and HELLFIRE missiles; providing a near all-weather mission capability. MQ-1C Gray Eagle is a dedicated, assured, multi-mission Unmanned Aircraft System (UAS) fielded to all Army Divisions, Intelligence and Security Command and Army Special Operations Command in support of the commander's warfighting priorities.

The Fiscal Year (FY) 2018 MQ-1 Gray Eagle funding of \$9.574 million will support Test and Evaluation efforts associated with the MQ-1C Gray Eagle Extended Range Engineering Change Proposal (ECP). The test effort will evaluate overall system level performance to ensure it meets developmental and operational requirements. The types of effort required include Environmental Testing, Electromagnetic Environmental Effects (E3) testing, transport/mobility testing, logistics demonstration, and Follow-On Operational Test and Evaluation (FOTE II).

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

	FY 2016	FY 2017	FY 2018
<p>Title: MQ-1C Gray Eagle Extended Range - Testing</p> <p>Description: MQ-1C ER Testing</p> <p>FY 2017 Plans: IGE Environmental Testing, E3 testing, and FOTE II.</p> <p>FY 2018 Plans: The FY2018 efforts will complete trans/mobility for Gray Eagle. Will complete required testing and evaluation of MQ1C Gray Eagle Extended Range system hardware.</p>	-	13.470	9.574
<p>Title: MQ-1C Gray Eagle Extended Range - Longbow Integration</p> <p>FY 2016 Accomplishments: Initial integration efforts by the Original Equipment Manufacturer (OEM) in support of the Longbow Integration effort into the MQ-1C Gray Eagle system.</p>	2.300	-	-
<p>Title: Common System Integration (CSI) Obsolescence</p> <p>FY 2016 Accomplishments:</p>	19.985	-	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305219A / MQ-1 Gray Eagle UAV	Project (Number/Name) MQ1 / MQ-1 Gray Eagle - Army UAV (MIP)
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Awarded Base contract for development of partitioning new software architecture in November 2016. Working with Contractor to support development and award of Option to the contact in March 2017.			
Title: Cyber Threat Assessment	-	17.500	-
FY 2017 Plans: The Fiscal Year (FY) 2017 increase of \$17.500 million in the MQ-1C Gray Eagle RDTE line will support development of Cyber Threat assessment activities and follow on design and integration efforts for M-code GPS integration and removable hard drives to more easily declassify the aircraft. The funding supports a Cyber Threat Assessment (penetration testing) to ensure maintenance of security posture which includes Information Assurance and Level of Rigor efforts and systems engineering/qualification testing development.			
Accomplishments/Planned Programs Subtotals	22.285	30.970	9.574

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u>	<u>Total Cost</u>
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	
• MQ-1 UAV / APA - Base: A00005	314.273	55.388	30.206	-	30.206	-	-	-	-	0.000	399.867
• Gray Eagle Mods: A00002	-	-	74.291	-	74.291	103.246	58.724	24.662	-	Continuing	Continuing
• MQ-1C Gray Eagle	-	-	39.362	-	39.362	18.492	6.965	4.577	5.475	Continuing	Continuing
MODS: 273744 EB6											

Remarks

D. Acquisition Strategy
An Extended Range Multi-Purpose (ERMP) Operational Requirement Document (ORD) was approved by the Joint Requirement Oversight Council (JROC) 6 Apr 2005. Milestone B occurred on 20 Apr 2005, and the System Development and Demonstration contract was awarded 8 Aug 2005, as a result of a competitive solicitation which included a vendor system capabilities demonstration. A Capabilities Production Document (CPD), version 8.7 was approved on 17 Jul 15. MQ-1C Gray Eagle completed FOTE 12 Jun 2015. On 14 Jul 2015, the trigger Configuration Steering Board (CSB) concurred with the Course of Action (COA) to validate the revised requirement for the Echelons Above Division (EAD) Gray Eagle and grant authorities through a new Acquisition Decision memorandum (ADM) to pursue the extended range capable Gray Eagle configuration. ER is an enhanced derivative of the MQ-1C Gray Eagle UAS and closes the capability gap by delivering extended surveillance coverage which supports Army RSTA missions in excess of 34 hours. ER's extended range provides the capacity for multi-intelligence payloads, precision strike capability, and reconnaissance in support of Special Operations Forces (SOF), Mission command from Aerial Intelligence Brigade (AIB) and U.S. Army Special Operations Command (USASOC). The Gray Eagle Research, Development, Test, and Evaluation (RDTE) acquisition strategy emphasis will be to complete Developmental test events (Environmental, E3, Transportability, & Performance Tests) to define and address system risks, followed by a FOTE II for the IGE.

E. Performance Metrics
N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0305232A / RQ-11 UAV
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	1.613	2.191	-	2.191	0.180	0.172	0.174	0.000	0.000	4.330
RA7: RQ-11 Raven (MIP)	-	0.000	1.613	2.191	-	2.191	0.180	0.172	0.174	0.000	0.000	4.330

A. Mission Description and Budget Item Justification

The Small Unmanned Aircraft System (SUAS) provides the battalion and below ground maneuver elements critical situational awareness and enhance force protection. The system provides the small unit commander an organic and responsive tactical Reconnaissance, Surveillance, and Target Acquisition capability through the ability to view real-time Full Motion Video and sensor data via the system ground control stations. Other compatible receivers, such as the One System Remote Video Terminal and appropriately equipped manned platforms may also receive the SUAS products.

A SUAS includes three hand-launched aircraft that do not require an improved launch/recovery location. In addition to the aircraft, the system contains ground control equipment, which includes an interoperable hand controller. The equipment is fully transportable in or on rucksack type packs that are organic to the unit. SUAS is transitioning to a Capabilities Production Document (CPD) that will utilize existing RQ-11 and RQ-20 in a system of systems fielding concept, with a Short Range Micro (SRM) option under consideration.

Justification: Fiscal Year (FY) 2018 Research, Development, Test, and Evaluation (RDTE) Base funding of \$2.191 million will be utilized for Program Management Engineering support and to meet CPD Increment II Block II related requirements. Specifically, to continue the research and development required to identify and baseline the SRM prototype solution for the Family of Small Unmanned Aircraft Systems effort. Options range from testing non developmental items produced by industry to researching what other government agencies have achieved in quad copter development and technology.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.000	1.613	1.652	-	1.652
Current President's Budget	0.000	1.613	2.191	-	2.191
Total Adjustments	0.000	0.000	0.539	-	0.539
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	0.539	-	0.539

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305232A / RQ-11 UAV	
<u>Change Summary Explanation</u> Increase in funding will primarily be used for Developmental Engineering for the investigation of non-developmental options for Short Range Micro		

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0305232A / RQ-11 UAV				Project (Number/Name) RA7 / RQ-11 Raven (MIP)			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
RA7: RQ-11 Raven (MIP)	-	0.000	1.613	2.191	-	2.191	0.180	0.172	0.174	0.000	0.000	4.330
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Small Unmanned Aircraft System (SUAS) provides the battalion and below ground maneuver elements critical situational awareness and enhance force protection. The system provides the small unit commander an organic and responsive tactical Reconnaissance, Surveillance, and Target Acquisition capability through the ability to view real-time Full Motion Video and sensor data via the system ground control stations. Other compatible receivers, such as the One System Remote Video Terminal and appropriately equipped manned platforms may also receive the SUAS products.

A SUAS includes three hand-launched aircraft that do not require an improved launch/recovery location. In addition to the aircraft, the system contains ground control equipment, which includes an interoperable hand controller. The equipment is fully transportable in or on rucksack type packs that are organic to the unit. SUAS is transitioning to a Capabilities Production Document (CPD) that will utilize existing RQ-11 and RQ-20 in a system of systems fielding concept, with a Short Range Micro (SRM) option under consideration.

Justification: Fiscal Year (FY) 2018 Research, Development, Test, and Evaluation (RDTE) Base funding of \$2.191 million will be utilized for Program Management Engineering support and to meet CPD Increment II Block II related requirements. Specifically, to continue the research and development required to identify and baseline the Short Range Micro (SRM) prototype solution for the Family of Small Unmanned Aircraft Systems effort. Options range from testing non developmental items produced by industry to researching what other government agencies have achieved in quad copter development and technology.

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

	FY 2016	FY 2017	FY 2018
Title: Program Management Support Description: Program Management Support FY 2017 Plans: Program Management Support FY 2018 Plans: Program Management Support	-	0.581	0.230
Title: Developmental Engineering Description: Developmental Engineering FY 2017 Plans:	-	0.927	1.876

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305232A / RQ-11 UAV	Project (Number/Name) RA7 / RQ-11 Raven (MIP)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Integration of the TOGA controller with an embedded mini Digital Datalink (DDL) radio to allow for mobile operations in support of employment of the SRM. Identify and update the interface control requirements for the TOGA controller as needed for SRM control. FY 2018 Plans: Completing the Short Range Micro (SRM) prototype materiel baseline			
Title: System Test and Evaluation Description: System Test and Evaluation FY 2017 Plans: Developmental Testing of the software changes in the TOGA Controller FY 2018 Plans: Complete the prototype testing of the SRM	-	0.105	0.085
Accomplishments/Planned Programs Subtotals	-	1.613	2.191

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RQ-11 (RAVEN) - A00010: RQ-11 (RAVEN) - A00010	-	-	-	-	-	-	-	-	-	-	-

Remarks
There is no procurement funding

D. Acquisition Strategy
SUAS Product Office executed a single award best value Indefinite Delivery Indefinite-Quantity (IDIQ) contract utilizing full and open competition. This contract provides affordable access for a fully staffed Technical, Management, Training, and Logistics organization, over a five-year period of performance (three year base period and two, single year options). The Government will make contract award based upon competitive source selection criteria.

E. Performance Metrics
N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0305233A / RQ-7 UAV
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	11.797	7.597	12.773	-	12.773	10.163	13.817	0.269	5.000	Continuing	Continuing
RQ7: RQ-7 Shadow UAV	-	11.797	7.597	12.773	-	12.773	10.163	13.817	0.269	5.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Tactical Unmanned Aerial System (TUAS) RQ-7 provides the Army Brigade Commander with dedicated Reconnaissance, Surveillance and Target Acquisition (RSTA), Intelligence, Battle Damage Assessment (BDA), and Force Protection. In line with the Army's Aviation Restructure Initiative (ARI) three Shadow Platoons are being integrated into the Combat Aviation Brigade's (CAB) Apache Reconnaissance Battalion. This will provide Aviation Brigades with Manned-Unmanned-Teaming (MUM-T) and enhanced Aerial Scout capabilities. The RQ-7B Shadow has logged over 1,050,000 flight hours, most of which were flown in support of Overseas Contingency Operations (OCO).

The full Shadow system consists of four air vehicles with payload, two Universal Ground Control stations, two Universal Ground Data Terminals, one Portable Ground Control Station with Portable Ground Data Terminal, Ground Support Equipment, two launchers, ten High Mobility Multipurpose Wheeled Vehicles (HMMWVs) with trailer(s), and a Light Medium Tactical Vehicle. Each system is equipped with one Maintenance Section Multifunctional (MSM) and is supported at the division level by a Mobile Maintenance Facility (MMF). The baseline fielded payload was the electro-optic infrared (EO/IR), but half of those have been replaced with a Laser Designator (LD) payload. All 104 systems required by the Army Procurement Objective (APO) have been procured. In 2010 the Army G8 established an RQ-7B Unmanned Aerial Vehicle (UAV) MODs program.

Justification: Fiscal Year (FY) 2018 RQ-7B UAS Base funding of \$12.773 million will be utilized in the following: 1) \$10.654M will be used to continue modifications for the RQ-7B UAS, 2) \$2.119M provides interoperability and enhancements for the One System Remote Video Terminal (OSRV). The \$10.645M for modifications of the RQ-7B UAS will continue development of the air vehicle modifications to allow operations in a Global Positioning System (GPS) denied environment. This is a phased, multi-year effort. Phase I (FY16) provided a trade study to determine the best hardware and software alternatives. Phase II (FY16) initiated the design and development through preliminary design review. Phase III (FY17) will complete design and development through critical design review and conduct engineering flight testing. Phase IV (FY18) will complete development, qualification, and developmental testing. RDTE also provides interoperability modifications that support Manned Unmanned Teaming with the AH-64 Apache Helicopter, and Test and Evaluation to support the capability improvements.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305233A / RQ-7 UAV
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	11.797	4.597	10.389	-	10.389
Current President's Budget	11.797	7.597	12.773	-	12.773
Total Adjustments	0.000	3.000	2.384	-	2.384
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	3.000	2.325	-	2.325
• Other Adjustments 1	0.000	0.000	0.061	-	0.061
• Other Adjustments 2	0.000	0.000	-0.002	-	-0.002

Change Summary Explanation

The additional funding in FY 2018 is for the GPS denied project, specifically to begin integration of the M-Code GPS receiver.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0305233A / RQ-7 UAV				Project (Number/Name) RQ7 / RQ-7 Shadow UAV			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
RQ7: RQ-7 Shadow UAV	-	11.797	7.597	12.773	-	12.773	10.163	13.817	0.269	5.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Tactical Unmanned Aerial System (TUAS) RQ-7 provides the Army Brigade Commander with dedicated Reconnaissance, Surveillance and Target Acquisition (RSTA), Intelligence, Battle Damage Assessment (BDA), and Force Protection. In line with the Army's Aviation Restructure Initiative (ARI) three Shadow Platoons are being integrated into the Combat Aviation Brigade's (CAB) Apache Reconnaissance Battalion. This will provide Aviation Brigades with Manned-Unmanned-Teaming (MUM-T) and enhanced Aerial Scout capabilities. The RQ-7B Shadow has logged over 1,050,000 flight hours, most of which were flown in support of Overseas Contingency Operations (OCO).

The full Shadow system consists of four air vehicles with payload, two Universal Ground Control stations, two Universal Ground Data Terminals, one Portable Ground Control Station with Portable Ground Data Terminal, Ground Support Equipment, two launchers, ten High Mobility Multipurpose Wheeled Vehicles (HMMWVs) with trailer(s), and a Light Medium Tactical Vehicle. Each system is equipped with one Maintenance Section Multifunctional (MSM) and is supported at the division level by a Mobile Maintenance Facility (MMF). The baseline fielded payload was the electro-optic infrared (EO/IR), but half of those have been replaced with a Laser Designator (LD) payload. All 104 systems required by the Army Procurement Objective (APO) have been procured. In 2010 the Army G8 established an RQ-7B Unmanned Aerial Vehicle (UAV) MODs program.

Justification: Fiscal Year (FY) 2018 RQ-7B UAS Base funding of \$12.773 million will be utilized in the following: 1) \$10.654M will be used to continue modifications for the RQ-7B UAS, 2) \$2.119M provides interoperability and enhancements for the One System Remote Video Terminal (OSRVT). The \$10.645M for modifications of the RQ-7B UAS will continue development of the air vehicle modifications to allow operations in a Global Positioning System (GPS) denied environment. This is a phased, multi-year effort. Phase I (FY16) provided a trade study to determine the best hardware and software alternatives. Phase II (FY16) initiated the design and development through preliminary design review. Phase III (FY17) will complete design and development through critical design review and conduct engineering flight testing. Phase IV (FY18) will complete development, qualification, and developmental testing. RDTE also provides interoperability modifications that support Manned Unmanned Teaming with the AH-64 Apache Helicopter, and Test and Evaluation to support the capability improvements.

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

	FY 2016	FY 2017	FY 2018
Title: Air Vehicle Improvements	2.426	4.967	5.543
Description: Air Vehicle Improvements			
FY 2016 Accomplishments: Continued development of MUM-T and software blocking. Initiated development of the ability to operate in GPS denied environment.			
FY 2017 Plans:			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305233A / RQ-7 UAV	Project (Number/Name) RQ7 / RQ-7 Shadow UAV		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
Continued development of the ability to operate in GPS denied environment. FY 2018 Plans: Complete development of the ability to operate in GPS denied environment. Continued development of MUM-T and software blocking.				
Title: Payload Improvements Description: Payload Improvements FY 2016 Accomplishments: Integration and demonstration of moving target indicator capability with TUAS SAR payload.		1.600	-	-
Title: Ground Equipment Improvements Description: Ground Equipment Improvements FY 2016 Accomplishments: Continues to fund Ground Equipment Improvements. Continues development of interoperability capabilities through use of Universal Ground Data Terminals and Universal Ground Control Stations, Network Security and System Vulnerability. FY 2018 Plans: Continues to fund Ground Equipment Improvements. Continues development of interoperability capabilities through use of Universal Ground Data Terminals and Universal Ground Control Stations. Network Security and System Vulnerability.		3.649	-	2.933
Title: Test and Evaluation Description: Test and Evaluation FY 2016 Accomplishments: Continues to fund test and evaluation of Air Vehicle and Ground Equipment Improvements. FY 2017 Plans: Continues to fund test and evaluation of Air Vehicle and Ground Equipment Improvements. FY 2018 Plans: Continues to fund test and evaluation of Air Vehicle and Ground Equipment Improvements.		0.787	0.492	0.900
Title: System Engineering/Program Management Description: System Engineering/Program Management FY 2016 Accomplishments:		1.377	0.819	1.278

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305233A / RQ-7 UAV	Project (Number/Name) RQ7 / RQ-7 Shadow UAV
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Continues to fund System Engineering/Program Management.			
FY 2017 Plans: Continues to fund System Engineering/Program Management.			
FY 2018 Plans: Continues to fund System Engineering/Program management			
Title: One System Remote Video Terminal (OSRVT) Description: OSRVT	1.958	1.319	2.119
FY 2016 Accomplishments: Funds the performance and interoperability improvements to the OSRVT.			
FY 2017 Plans: Continues to fund performance and interoperability improvements to the OSRVT.			
FY 2018 Plans: Continues to fund interoperability and performance improvements for OSRVT.			
Accomplishments/Planned Programs Subtotals	11.797	7.597	12.773

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

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• RQ-7 UAV MODS: A00018	89.694	81.584	83.160	-	83.160	60.068	5.404	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

A System Capability Demonstration (SCD) was conducted with four contractors. The results from the SCD in conjunction with proposal evaluations resulted in the competitive down select of a Best Value TUAS. A successful Milestone II Army Systems Acquisition Review Council (ASARC) was conducted 21 Dec 1999 and a Milestone III Decision was reached on 25 Sep 2002. The full rate production contract was awarded 27 Dec 2002 and in FY2009 the last of the authorized 104 systems was placed on contract. Continued development of the selected Tactical Unmanned Aerial Vehicle (TUAV) system will be accomplished through a series of modifications and retrofits such as Shadow v2, Communications Relay, Laser Designator, Block III engine, and reliability upgrades. Development/integration of these improved capabilities will be through individual efforts on an engineering services contract with Shadow contractors. Development of the Block III engine is being accomplished through a competitive process.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army Date: May 2017

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
2040 / 7	PE 0305233A / RQ-7 UAV	RQ7 / RQ-7 Shadow UAV

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305233A / RQ-7 UAV	Project (Number/Name) RQ7 / RQ-7 Shadow UAV
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Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
Base: Program Management	RO	PM UAS : Redstone Arsenal, AL	3.288	0.264	Nov 2015	0.110	Nov 2016	0.426		-		0.426	Continuing	Continuing	Continuing
Subtotal			3.288	0.264		0.110		0.426		-		0.426	-	-	-

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
OIF Improvements / Block Upgrades / Capability Improvements	SS/CPFF	AAI Corporation : Hunt Valley, MD	3.105	1.500	Feb 2016	-		-		-		-	0.000	4.605	0.000
System Engineering / Reliability Solutions	SS/CPFF	AAI Corporation : Hunt Valley, MD	2.025	-		-		-		-		-	Continuing	Continuing	0.000
Ground Equipment Improvements	C/CPFF	TBD: Competitive in FY18 : TBD: Competitive in FY18	16.900	2.398	Oct 2015	-		2.933	Dec 2017	-		2.933	Continuing	Continuing	Continuing
Block III Engine Development	C/CPFF	LSF : Redstone Arsenal, AL	30.725	-		-		-		-		-	0.000	30.725	0.000
Other Air Vehicle Improvements	C/CPFF	TBD: Competitive in FY18 : TBD: Competitive in FY18	16.377	0.266	Oct 2015	-		0.375	Dec 2017	-		0.375	Continuing	Continuing	Continuing
GPS Denied Development	C/CPFF	TBD: Competitive in FY18 : TBD: Competitive in FY18	0.000	1.500	Oct 2015	5.087	Dec 2016	5.168	Dec 2017	-		5.168	Continuing	Continuing	0.000
Payload Improvements	SS/CPFF	Various : Various	2.750	2.000	Feb 2016	-		-		-		-	0.000	4.750	0.000
One System Remote Video Terminal (OSRVT)	SS/CPFF	AAI Corporation, MD : AAI Corporation, MD	11.129	1.958	May 2016	1.319	Apr 2017	2.119	Dec 2017	-		2.119	Continuing	Continuing	Continuing
Subtotal			83.011	9.622		6.406		10.595		-		10.595	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305233A / RQ-7 UAV	Project (Number/Name) RQ7 / RQ-7 Shadow UAV
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Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Support	Various	Various : Various	1.893	0.656	Oct 2015	0.379	Dec 2016	0.284	Dec 2017	-		0.284	Continuing	Continuing	Continuing
Base: Government Engineering and Logistic Support	MIPR	Various : Various	0.946	0.328	Feb 2016	0.189	Nov 2016	0.568	Dec 2017	-		0.568	Continuing	Continuing	Continuing
Subtotal			2.839	0.984		0.568		0.852		-		0.852	-	-	-

Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
RQ-7 Developmental Testing of Product Development	Various	Various : Various	4.848	0.827	Oct 2015	0.413	Dec 2016	0.800		-		0.800	Continuing	Continuing	Continuing
RQ-7 Operational Testing of Product Developments	MIPR	Various : Various	0.300	0.100	Oct 2015	0.100	Dec 2016	0.100	Dec 2017	-		0.100	Continuing	Continuing	Continuing
OSRVT Developmental Testing	MIPR	Various : Various	0.100	-		-		-		-		-	0.000	0.100	0.000
OSRVT - Operational Testing	MIPR	Various : Various	2.033	-		-		-		-		-	0.000	2.033	0.000
Subtotal			7.281	0.927		0.513		0.900		-		0.900	-	-	-

	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	96.419	11.797	7.597	12.773	-	12.773	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305233A / RQ-7 UAV	Project (Number/Name) RQ7 / RQ-7 Shadow UAV
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
	Block III Engine Development	Block III ED																										
GPS Denied Development					GPS Denied																							
Interoperability Upgrades									IU																			
Software Block Upgrades									SBU																			
Reliability Improvements													RI															
OSRVT Increment II Interoperability Improvements									OSRVT																			

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305233A / RQ-7 UAV	Project (Number/Name) RQ7 / RQ-7 Shadow UAV
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Block III Engine Development	1	2015	3	2016
GPS Denied Development	3	2016	4	2018
Interoperability Upgrades	1	2015	4	2020
Software Block Upgrades	1	2015	4	2020
Reliability Improvements	1	2019	4	2020
OSRVT Increment II Interoperability Improvements	1	2013	4	2021

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0307665A / Biometrics Enabled Intelligence
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	8.854	2.537	6.036	8.573	0.000	0.000	0.000	0.000	0.000	17.427
<i>BI7: BIOMETRICS ENABLED INTELLIGENCE - MIP</i>	-	0.000	8.854	2.537	6.036	8.573	0.000	0.000	0.000	0.000	0.000	17.427

A. Mission Description and Budget Item Justification

Product Lead Biometrics Automated Toolset-Army (BAT-A) manages two Army biometric tactical collection devices, the Biometric Automated Toolset-Army (BAT-A) Kit and BAT-A Handheld (HH). These two devices support the Army Force Protection Mission and Identity Dominance Mission. The BAT-A system is the Army's biometric tactical collection devices which collect, match, store, and share biometric and contextual information on Known & Suspected Terrorists, potential adversaries, host nation personnel, and third country nationals. Recipients of collected information include DoD organizations, other U.S. government agencies, and Coalition Partners. The BAT-A devices are also used by non-Military Intelligence personnel (Infantry and Military Police). The capability was originally deployed as a Quick Reaction Capability (QRC) and has been deployed in a combat zone and other OCONUS contingency operations for the past decade. The current BAT-A systems will serve as the Army biometrics enduring capability through FY22. All research and development efforts are now concluded for BAT-A. PL BAT-A will continue to serve as the Office of Primary Responsibility as the BAT-A is now a Post Milestone C program of record in sustainment.

The FY18 Base Funding of \$2.537 million supports the program efforts to begin the transition phase from the current BAT-A POR configuration to the updated Next Generation Biometric Collection Capability (NXGBCC) to replace BAT-A. The NXGBCC will be a part of the DoD Biometric Enterprise to protect and support the warfighter and nation through global identity superiority. The NXGBCC shall collect, match, store, share, analyze, reference, and manage contextual data and biometrics. This includes iris, fingerprint, facial images, palm prints and voice on Known & Suspected Terrorists, potential adversaries, host nation personnel, and third country nationals to inform the warfighter in a decide/act response. Recipients of collected information include DoD organizations, other U.S. government agencies, and Coalition Partners.

The FY18 OCO funding provides continued support for Five Vigilant Pursuit System Sets (10 vehicles total plus equipment) are currently deployed in support of OFS and OIR. The Vigilant Pursuit System currently consists of 2 vehicles with integrated Multi-INT Collection, Processing, Exploitation, and Dissemination capability packages installed on MATVs.

FY18 OCO Funding of \$3.886 million supports developmental activities to create modularized, vehicle-independent and tailorable Multi-INT Collection, Processing, Exploitation, and Dissemination capability packages that can be installed and removed in a matter of minutes on any vehicle type to meet specific mission needs. Specific activities include hardware development for critical hardware components that cannot be commercially procured necessary to refactor the Multi-INT capability packages to work on any vehicle platform and software development necessary to replace/upgrade open source code that is no longer current/viable and is therefore more difficult and expensive to maintain or completely unusable.

Lastly for FY18, the OCO Funding of \$2.150 million supports the development of new software code & associated testing necessary to deliver an instance of the Biometric Intelligence Information Repository (I2AR) a replacement for the Biometrics Identity Intelligence Repository (BI2R -the unique software-based analytic

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0307665A / <i>Biometrics Enabled Intelligence</i>
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production system used by NGIC specifically to create the Biometric Enabled Watchlist for OFS and other worldwide missions) on the Intelligence Community Information Technology Environment (IC ITE) C2S cloud. The new, more capable software will facilitate automated information exchange with complimentary community programs resident on the IC ITE C2S cloud to support the production of a Biometrically Enabled Watchlist (BEWL) containing all available IC Biometrics and Identity Intelligence. The Army will execute this funding in FY18 and deliver capabilities within 12 months.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.000	7.104	0.000	-	0.000
Current President's Budget	0.000	8.854	2.537	6.036	8.573
Total Adjustments	0.000	1.750	2.537	6.036	8.573
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	1.750			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	2.537	6.036	8.573

Change Summary Explanation

FY17 funding change of \$1.750 million, reflected in the Request for Additional Appropriation March supplemental request, supports OSD(S&T) effort to develop a portable rapid DNA solution. This solution will meet the requirements of rapid DNA for JUONS CC-0548. United States Central Command (CENTCOM) submitted JUONS CC-0548 on 11 Dec 15 for enhanced biometric capabilities to support current operations. The Joint Requirements Oversight Council (JROC) validated 5 key requirements of JUONS CC-0548 on 3 June 2016 and identified the requirements as "key enablers" to existing JEON CCE-0008 (near Real-Time Identity Operations). The Joint Rapid Acquisition Cell (JRAC) assigned execution responsibility for the validated 5 key requirements in JUONS CC-0548 to the Army on 30 June 2016. The Army Acquisition Executive assigned OPR to Program Executive Officer for Intelligence, Electronic Warfare, and Sensors/Project Manager for DoD Biometrics on 13 September 2016.

FY18 Base funding of \$2.537 million is the initial effort to transition from the current BAT-A configuration to an updated Next Generation Biometric Collection Capability (NXGBCC). The NXGBCC will support the Army Force Protection and Identity Activities. The NXGBCC will be a part of the DoD Biometric Enterprise. The NXGBCC shall collect, match, store, share, analyze, reference, and manage contextual data and biometrics. This includes iris, fingerprint, facial images, palm prints and voice on Known & Suspected Terrorists, potential adversaries, host nation personnel, and third country nationals to inform the warfighter in a decide/act response. The NXGBCC is the successor to the Biometrics Automated Toolset-Army Program of Record capability.

FY18 OCO funding of \$3.886 million supports Five Vigilant Pursuit System Sets (10 vehicles total plus equipment) are currently deployed in support of OFS (two sets) and OIR (three sets). The Vigilant Pursuit System currently consists of 2 vehicles with integrated Multi-INT Collection, Processing, Exploitation, and Dissemination capability packages installed on MATVs. The funding supports developmental activities to create modularized, vehicle-independent and

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army Date: May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0307665A / Biometrics Enabled Intelligence
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tailable Multi-INT Collection, Processing, Exploitation, and Dissemination capability packages that can be installed and removed in a matter of minutes on any vehicle type to meet specific mission needs. Specific activities include hardware development for critical hardware components that cannot be commercially procured necessary to refactor the Multi-INT capability packages to work on any vehicle platform and software development necessary to replace/upgrade open source code that is no longer current/viable and is therefore more difficult and expensive to maintain or completely unusable. In addition, funding will support development efforts for modular open architectures to significantly reduce SWAP and enhance multi INT sensing, processing, collection and dissemination.

The remaining FY18 OCO funding of \$2.150 million supports the development of new software code & associated testing necessary to deliver an instance of the Biometric Intelligence Information Repository (I2AR) a replacement for the Biometrics Identity Intelligence Repository (BI2R -the unique software-based analytic production system used by NGIC specifically to create the Biometric Enabled Watchlist for OFS and other worldwide missions) on the Intelligence Community Information Technology Environment (IC ITE) C2S cloud. The new, more capable software will facilitate automated information exchange with complimentary community programs resident on the IC ITE C2S cloud to support the production of a Biometrically Enabled Watchlist (BEWL) containing all available IC Biometrics and Identity Intelligence. The Army will execute this funding in FY18 and deliver capabilities within 12 months.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0307665A / <i>Biometrics Enabled Intelligence</i>				Project (Number/Name) B17 / <i>BIOMETRICS ENABLED INTELLIGENCE - MIP</i>			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
<i>B17: BIOMETRICS ENABLED INTELLIGENCE - MIP</i>	-	0.000	8.854	2.537	6.036	8.573	0.000	0.000	0.000	0.000	0.000	17.427
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Product Lead Biometrics Automated Toolset-Army (BAT-A) manages two Army biometric tactical collection devices, the Biometric Automated Toolset-Army (BAT-A) Kit and BAT-A Handheld (HH). These two devices support the Army Force Protection Mission and Identity Dominance Mission. The BAT-A system is the Army's biometric tactical collection devices which collect, match, store, and share biometric and contextual information on Known & Suspected Terrorists, potential adversaries, host nation personnel, and third country nationals. Recipients of collected information include DoD organizations, other U.S. government agencies, and Coalition Partners. The BAT-A devices are also used by non-Military Intelligence personnel (Infantry and Military Police). The capability was originally deployed as a Quick Reaction Capability (QRC) and has been deployed in a combat zone and other OCONUS contingency operations for the past decade. The current BAT-A systems will serve as the Army biometrics enduring capability through FY22. All research and development efforts are now concluded for BAT-A. PL BAT-A will continue to serve as the Office of Primary Responsibility as the BAT-A is now a Post Milestone C program of record in sustainment.

The FY18 Base funding of \$2.537 million supports the program efforts to begin the transition phase from the current BAT-A POR configuration to the updated Next Generation Biometric Collection Capability (NXGBCC) to replace BAT-A. The NXGBCC will be a part of the DoD Biometric Enterprise to protect and support the warfighter and nation through global identity superiority. The NXGBCC shall collect, match, store, share, analyze, reference, and manage contextual data and biometrics. This includes iris, fingerprint, facial images, palm prints and voice on Known & Suspected Terrorists, potential adversaries, host nation personnel, and third country nationals to inform the warfighter in a decide/act response. Recipients of collected information include DoD organizations, other U.S. government agencies, and Coalition Partners.

The FY18 OCO funding provides continued support for Five Vigilant Pursuit System Sets (10 vehicles total plus equipment) are currently deployed in support of OFS and OIR. The Vigilant Pursuit System currently consists of 2 vehicles with integrated Multi-INT Collection, Processing, Exploitation, and Dissemination capability packages installed on MATVs.

FY18 OCO funding of \$3.886 million supports developmental activities to create modularized, vehicle-independent and tailorable Multi-INT Collection, Processing, Exploitation, and Dissemination capability packages that can be installed and removed in a matter of minutes on any vehicle type to meet specific mission needs. Specific activities include hardware development for critical hardware components that cannot be commercially procured necessary to refactor the Multi-INT capability packages to work on any vehicle platform and software development necessary to replace/upgrade open source code that is no longer current/viable and is therefore more difficult and expensive to maintain or completely unusable.

Lastly for FY18, the OCO funding of \$2.150 million supports the development of new software code & associated testing necessary to deliver an instance of the Biometric Intelligence Information Repository (I2AR) a replacement for the Biometrics Identity Intelligence Repository (BI2R -the unique software-based analytic

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0307665A / <i>Biometrics Enabled Intelligence</i>	Project (Number/Name) B17 / <i>BIOMETRICS ENABLED INTELLIGENCE - MIP</i>
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production system used by NGIC specifically to create the Biometric Enabled Watchlist for OFS and other worldwide missions) on the Intelligence Community Information Technology Environment (IC ITE) C2S cloud. The new, more capable software will facilitate automated information exchange with complimentary community programs resident on the IC ITE C2S cloud to support the production of a Biometrically Enabled Watchlist (BEWL) containing all available IC Biometrics and Identity Intelligence. The Army will execute this funding in FY18 and deliver capabilities within 12 months.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>Title: Army G2 Projects</p> <p>Description: Army G2 supports various development of intelligence capabilities currently used to support Operation Freedoms Sentinel (OFS) and Operation Inherent Resolve (OIR) including Vigilant Pursuit Systems, the Biometrics Intelligence Information Repository, and the Voice Identity Biometrics Exploitation System (VIBES) Quick Reaction Capability.</p> <p>FY 2017 Plans: blank</p> <p>FY 2018 Base Plans: N/A</p> <p>FY 2018 OCO Plans: Five Vigilant Pursuit System Sets (10 vehicles total plus equipment) are currently deployed in support of OFS and OIR. The Vigilant Pursuit System currently consists of 2 vehicles with integrated Multi-INT Collection, Processing, Exploitation, and Dissemination capability packages installed on MATVs. FY18 OCO funding of \$3.886 million provides for continued developmental activities to create modularized, vehicle-independent and tailorable Multi-INT Collection, Processing, Exploitation, and Dissemination capability packages that can be installed and removed in a matter of minutes on any vehicle type to meet specific mission needs. Specific activities include hardware development for critical hardware components that cannot be commercially procured necessary to refactor the Multi-INT capability packages to work on any vehicle platform and software development necessary to replace/upgrade open source code that is no longer current/viable and is therefore more difficult and expensive to maintain or completely unusable.</p> <p>FY2018 funding of \$2.150 million will be applied to the development of new software code & associated testing necessary to deliver an instance of the Biometric Intelligence Information Repository (I2AR) a replacement for the Biometrics Identity Intelligence Repository (BI2R -the unique software-based analytic production system used by NGIC specifically to create the Biometric Enabled Watchlist for OFS and other worldwide missions) on the Intelligence Community Information Technology Environment (IC ITE) C2S cloud. The new, more capable</p>	-	7.104	0.000	6.036	6.036

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0307665A / <i>Biometrics Enabled Intelligence</i>	Project (Number/Name) B17 / <i>BIOMETRICS ENABLED INTELLIGENCE - MIP</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
software will facilitate automated information exchange with complimentary community programs resident on the IC ITE C2S cloud to support the production of a Biometrically Enabled Watchlist (BEWL) containing all available IC Biometrics and Identity Intelligence. The Army will execute this funding in FY18 and deliver capabilities within 12 months.					
<p>Title: Next Generation Biometric Collection Capability (NXGBCC)</p> <p>Description: The Next Generation Biometric Collection Capability (NXGBCC) will be the successor program to the current BAT-A Program of Record.</p> <p>FY 2018 Base Plans: The FY18 Base funding of \$2.537 million will support program planning and pre-acquisition efforts for the Next Generation Biometric Collection Capability (NXGBCC).</p>	-	-	2.537	-	2.537
<p>Title: JUONS CC-0548</p> <p>Description: OSD(S&T) effort to develop a portable rapid DNA solution to meet the requirements for JUONS CC-0548.</p> <p>FY 2017 Plans: Current contractor will further develop and refine three portable DNA prototype solutions for JUONS CC-0548. The contractor is tasked to reduce the size and weight of the DNA prototype devices. Also, the contractor will begin initial operational fielding and test simulation for an operational or military utility assessment.</p>	-	1.750	-	-	-
Accomplishments/Planned Programs Subtotals	-	8.854	2.537	6.036	8.573

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

N/A

Remarks

D. Acquisition Strategy

The FY18 RDT&E Base acquisition strategy will solicit a contractor and will award a Technical Services contract. The objective of this task is to obtain the data, analysis, and trade-off methodology for the Materiel Developer to use in order to meet the NXGBCC requirement via a commercial-off-the-shelf biometric collection and communication capability that is cost effective and fielded in time to replace the BAT-A system. The primary activity that will be used to gather the data, analyze the data, and determine a trade-off methodology will be a technical study of commercially available biometrics collection and communications capabilities, using a functional and technical decomposition of the NXGBCC Capabilities Production Document (CPD) as the criteria set. The PMO will work with the TRADOC Capability Manager to

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0307665A / <i>Biometrics Enabled Intelligence</i>	Project (Number/Name) B17 / <i>BIOMETRICS ENABLED INTELLIGENCE - MIP</i>
<p>analyze the NXGBCC Capability Production Document (CPD) and determine the appropriate level of functional and technical requirements decomposition. The current acquisition strategy is to award the Technical Services contract during 2QFY18.</p> <p>FY17 RDT&E OCO acquisition strategy reflected from the supplemental request is for the current contractor to further develop and refine three portable DNA prototype solutions for JUONS CC-0548. The contractor will be tasked to reduce the size and weight of the DNA prototype devices. Also, funds will enable the contractor begin initial operational fielding and test simulation for an operational or military utility assessment. The planned delivery date of the prototypes is during 2QFY18.</p> <p>The FY18 RDT&E OCO acquisition strategy will continue to solicit a contractor to continue to develop activities for the Army Requirements Oversight Council (AROC) approved Vigilant Pursuit Quick Reaction Capability (QRC) to modularize the Multi-INT collection, processing, exploitation, and dissemination hardware and software to enhance usability from the Soldier perspective. A contractor will also be selected to finish developing and testing the I2AR capability to install and configure the capability on the IC ITE Cloud on the JWICS and SIPRNet domains.</p> <p>E. Performance Metrics N/A</p>		

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0310349A / Win-T Increment 2 - Initial Networking
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	3.649	4.867	4.723	-	4.723	5.833	5.804	13.535	13.952	0.000	52.363
EE7: WIN-T Increment 2 - Initial Networking	-	3.649	4.867	4.723	-	4.723	5.833	5.804	13.535	13.952	0.000	52.363

A. Mission Description and Budget Item Justification

Warfighter Information Network - Tactical Increment 2 (WIN-T Inc 2) provides the Army with On-The-Move (OTM) networking capability. The WIN-T Inc 2 network retains capabilities delivered by WIN-T Inc 1 and by leveraging proven Government and commercial technologies, adds greater network throughput and automated network management to optimize planning (to include spectrum use), initialization, monitoring and troubleshooting. WIN-T Inc 2 employs Satellite Communications OTM to extend the network in maneuver Brigade Combat Teams to Company-level through FY2018. Using equipment mounted on combat platforms, WIN-T Inc 2 delivers a mobile capability that reduces reliance on fixed infrastructure and allows key leaders to move on the battlefield while retaining situational awareness and mission command capabilities. Using the Highband Networking Radio, with the Highband Networking Waveform and high performance antennas, the WIN-T Inc 2 Line-of-Sight network offers an adaptive 30-Megabit per second aggregate throughput to key leaders in their Command Post or in their vehicle. The WIN-T Inc 2 network is self-forming, which means it automatically creates transmission paths based on terrain and environmental conditions; and self-healing, meaning that transmission paths will automatically re-route traffic to complete network transactions and calls even if one or more nodes break down or lose connectivity. This capability offers greater network reliability and better end-to-end connectivity than traditional point-to-point networks. WIN-T Inc 2 introduces the network management capability needed to keep mobile and dispersed forces networked through automated planning, initialization, monitoring, and troubleshooting. Finally, WIN-T Inc 2 adopts "Colorless Core" technology that encrypts both classified and unclassified user information in the network and minimizes the number of users on the "core" of the network. The Colorless Core allows commanders to utilize the tactical network without fear of the enemy intercepting information. Colorless Core is a technical insertion in the WIN-T Inc 1b network which enables information sharing between WIN-T Inc 1b and WIN-T Inc 2.

Inc 3 developed NetOps software and NetCentric Waveform (NCW) updates will be inserted into Inc 2 equipped units.

FY18 funds support development efforts for Technical Insertions, support Operational Testing (Joint Warfighting Assessment 18), and support Next Generation Point of Presence (PoP) and Soldier Network Extension (SNE) efforts.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0310349A / <i>Win-T Increment 2 - Initial Networking</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	3.800	0.000	0.000	-	0.000
Current President's Budget	3.649	4.867	4.723	-	4.723
Total Adjustments	-0.151	4.867	4.723	-	4.723
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.151	-			
• Adjustments to Budget Years	0.000	4.867	4.723	-	4.723

Change Summary Explanation

FY18 funds support development efforts for Technical Insertions, support Operational Testing (Joint Warfighting Assessment 18), and support Next Generation Point of Presence (PoP) and Soldier Network Extension (SNE) efforts.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0310349A / Win-T Increment 2 - Initial Networking				Project (Number/Name) EE7 / WIN-T Increment 2 - Initial Networking			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EE7: WIN-T Increment 2 - Initial Networking	-	3.649	4.867	4.723	-	4.723	5.833	5.804	13.535	13.952	0.000	52.363
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Warfighter Information Network - Tactical Increment 2 (WIN-T Inc 2) provides the Army with On-The-Move (OTM) networking capability. The WIN-T Inc 2 network retains capabilities delivered by WIN-T Inc 1 and by leveraging proven Government and commercial technologies, adds greater network throughput and automated network management to optimize planning (to include spectrum use), initialization, monitoring and troubleshooting. WIN-T Inc 2 employs Satellite Communications OTM to extend the network in maneuver Brigade Combat Teams to Company-level through FY2018. Using equipment mounted on combat platforms, WIN-T Inc 2 delivers a mobile capability that reduces reliance on fixed infrastructure and allows key leaders to move on the battlefield while retaining situational awareness and mission command capabilities. Using the Highband Networking Radio, with the Highband Networking Waveform and high performance antennas, the WIN-T Inc 2 Line-of-Sight network offers an adaptive 30-Megabit per second aggregate throughput to key leaders in their Command Post or in their vehicle. The WIN-T Inc 2 network is self-forming, which means it automatically creates transmission paths based on terrain and environmental conditions; and self-healing, meaning that transmission paths will automatically re-route traffic to complete network transactions and calls even if one or more nodes break down or lose connectivity. This capability offers greater network reliability and better end-to-end connectivity than traditional point-to-point networks. WIN-T Inc 2 introduces the network management capability needed to keep mobile and dispersed forces networked through automated planning, initialization, monitoring, and troubleshooting. Finally, WIN-T Inc 2 adopts "Colorless Core" technology that encrypts both classified and unclassified user information in the network and minimizes the number of users on the "core" of the network. The Colorless Core allows commanders to utilize the tactical network without fear of the enemy intercepting information. Colorless Core is a technical insertion in the WIN-T Inc 1b network which enables information sharing between WIN-T Inc 1b and WIN-T Inc 2.

Inc 3 developed NetOps software and NetCentric Waveform (NCW) updates will be inserted into Inc 2 equipped units.

FY18 funds support development efforts for Technical Insertions, support Operational Testing (JWA 18), and support Next Gen PoP and SNE efforts.

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

	FY 2016	FY 2017	FY 2018
Title: Product Development	-	3.970	2.938
Description: Product Development			
FY 2017 Plans: Development efforts for the Distributed Embedded SATCOM On-The-Move (OTM) Standard Terminal Architecture (DESSTA) for ABCTs.			
FY 2018 Plans:			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0310349A / Win-T Increment 2 - Initial Networking	Project (Number/Name) EE7 / WIN-T Increment 2 - Initial Networking

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
FY18 funds development efforts for Technical Insertions.			
Title: Test and Evaluation Description: Test and Evaluation FY 2016 Accomplishments: FY16 funds supported the Tactical Communications Node - Lite (TCN-L) and Network Operations and Security Center - Lite (NOSC-L) Safety Test and Performance Validation. FY 2017 Plans: FY17 funds support Operational Testing (CIE 17.2) and continues tech insertion of NetOps Build 5 and upgrade to NetCentric Waveform (NCW) 10.x. FY 2018 Plans: FY18 funds support Operational Testing (JWA 18) and support Next Gen PoP and SNE efforts.	3.042	0.473	1.354
Title: Management Services Description: Provides system engineering and program management support FY 2016 Accomplishments: Continued system engineering and program management support. FY 2017 Plans: Continues system engineering and program management support. FY 2018 Plans: Continues system engineering and program management support.	0.607	0.424	0.431
Accomplishments/Planned Programs Subtotals	3.649	4.867	4.723

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• WIN-T Inc 2: WIN-T Inc 2 Procurement	416.463	291.933	420.492	-	420.492	404.632	415.375	362.540	408.344	Continuing	Continuing
• WINT Inc 2 OCO: WIN-T Inc 2 OCO	-	1.288	-	-	-	-	-	-	-	0	1.288

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0310349A / Win-T Increment 2 - Initial Networking	Project (Number/Name) EE7 / WIN-T Increment 2 - Initial Networking

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• Inc 2 Spares: WIN-T Inc 2 Procurement Spares	39.532	19.808	23.935	-	23.935	23.932	23.930	25.419	30.718	Continuing	Continuing

Remarks

D. Acquisition Strategy

The current Initial Production contract was awarded in 2010 for procurement of Low Rate Initial Production Lots. Lots 1-5a were procured prior to the Full Rate Production (FRP) decision review. Approval for full rate production was granted at the Defense Acquisition Board on 11 May 2015. Lots 5b/6 were the first full rate production lots procured. Lot 7 was procured in 2Q FY 2016. Lot 8 will be procured in 4Q FY2017 and is expected to be the final lot buy under the current contract. The PMO is negotiating a Follow-On Production Contract through alpha-contracting sessions. This Follow-On Production Contract will be used for Lots 9, 10 and 11 with additional follow-on contracts awarded to support the remaining program procurement requirements.

Inc 3 developed NetOps software and NetCentric Waveform was tested at Network Integration Evaluation (NIE) 16.2 event and will be inserted into Inc 2 equipped units.

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0708045A / End Item Industrial Preparedness Activities							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	58.503	62.287	60.877	-	60.877	59.083	61.671	62.889	64.419	0.000	429.729
E25: Mfg Science & Tech	-	46.503	62.287	60.877	-	60.877	59.083	61.671	62.889	64.419	0.000	417.729
EA2: MANTECH INITIATIVES (CA)	-	12.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	12.000

A. Mission Description and Budget Item Justification

This Program Element (PE) develops and demonstrates manufacturing processes that enable improvements in producibility and affordability of emerging and enabling components and subsystems of Army air, ground, Soldier, medical, and command/control/communications systems. Initiatives within the PE result in cost savings and reduced risk of transitioning military-unique manufacturing processes into production. Project E25 fosters the transfer of new/improved manufacturing technologies to the industrial base, including manufacturing efforts that have potential for high payoff across the spectrum of Army systems.

Work in this PE is related to, and fully coordinated with, PE 0603710A (Night Vision Advanced Technology), PE 0602303A (Missile Technology), PE 0602105A (Materials Technology), PE 0602618A (Ballistics Technology), PE 0602601A (Combat Vehicle and Automotive Technology), and PE 0603005A (Combat Vehicle and Automotive Advanced Technology) and PE 0602705A (Electronics and Electronic Devices).

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this PE is performed by the Army Research, Development, and Engineering Command (RDECOM) and efforts are executed by the Army Research Laboratory (ARL) and appropriate Army Research, Development, and Engineering Centers (RDECs).

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	60.422	62.287	61.300	-	61.300
Current President's Budget	58.503	62.287	60.877	-	60.877
Total Adjustments	-1.919	0.000	-0.423	-	-0.423
• Congressional General Reductions	-	-	-	-	-
• Congressional Directed Reductions	-	-	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	-	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-	-	-	-	-
• SBIR/STTR Transfer	-1.919	-	-	-	-
• Adjustments to Budget Years	0.000	0.000	-0.441	-	-0.441

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0708045A / <i>End Item Industrial Preparedness Activities</i>
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• Civ Pay Adjustment	0.000	0.000	0.018	-	0.018
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Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: EA2: *MANTECH INITIATIVES (CA)*

Congressional Add: *Congressional Interest Item funding for Mantech Initiatives.*

	FY 2016	FY 2017
	12.000	-
Congressional Add Subtotals for Project: EA2	12.000	-
Congressional Add Totals for all Projects	12.000	-

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0708045A / End Item Industrial Preparedness Activities					Project (Number/Name) E25 / Mfg Science & Tech		
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
E25: Mfg Science & Tech	-	46.503	62.287	60.877	-	60.877	59.083	61.671	62.889	64.419	0.000	417.729
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project develops and demonstrates manufacturing processes that enable improvements in producibility and affordability of emerging and enabling components and subsystems of Army air, ground, lethality, Soldier, medical and command/control/communications/intelligence systems. Focus is on components and subsystems such as advanced armor, power and energy devices, rotors, sensors, displays, propellants and gun tubes. In addition, work is conducted to advance the state of the art in processing and fabrication techniques for coatings, multifunctional materials and structural elements for Army specific applications.

Work supports all Army S&T portfolios. Work in this PE is related to and fully coordinated with PE 0602105A (Materials Technology), PE 0602211A (Aviation Technology), PE 0602303A (Missile Technology), PE 0602601A (Combat Vehicle and Automotive Technology), PE 0602618A (Ballistics Technology), PE 0602705A (Electronics and Electronic Devices), PE 0603003 (Aviation Advanced Technology), PE 0603005A (Combat Vehicle and Automotive Advanced Technology) and PE 0603710A (Night Vision Advanced Technology).

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering S&T focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Army Research, Development and Engineering Command (RDECOM) and efforts are executed by the Army Research Laboratory (ARL) and appropriate Army Research, Development and Engineering Centers (RDECs).

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

	FY 2016	FY 2017	FY 2018
Title: Air Systems	2.598	5.401	1.557
Description: This effort funds manufacturing technology advances needed for more affordable manned and unmanned aircraft components and subsystems. Work focuses on addressing challenges in areas such as engine performance and life, ballistically tolerant fuel bladders and composite transmission sumps, reliable component integration/attachment, structural durability at low weight, and reduced corrosion.			
FY 2016 Accomplishments: Demonstrated and tested improved manufacturing techniques and tooling for ballistically tolerant fuel bladders; developed direct digital manufacturing processes for production of high value propulsion and power generation gas turbine engine components for improved performance and weight savings; developed AH-64 composite sump alternate design and manufacturing processes to reduce cost and improve performance.			
FY 2017 Plans:			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0708045A / <i>End Item Industrial Preparedness Activities</i>	Project (Number/Name) E25 / <i>Mfg Science & Tech</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>Will complete component and engine testing of additively manufactured articles resulting in increased performance and reduced weight of the T700 platform; will transition three prototype AH-64 composite sumps of reduced weight and cost to PM Apache along with associated manufacturing metrics; will complete the demonstration of manufacturing techniques and tooling for ballistically tolerant fuel bladders including fit check, drop testing , pressure test, slosh & vibe tests on full scale article.</p> <p>FY 2018 Plans: Will transition to UHPO for qualification testing direct digitally manufactured helicopter engine components of additively manufactured articles resulting in increased performance and reduced weight of the T700 platform.</p>				
<p>Title: Ground Maneuver</p> <p>Description: This effort funds manufacturing technology advances needed for more affordable components and subsystems for tactical and combat vehicles and weapons systems. Work focuses on addressing challenges in areas such as advanced armor, gun barrel life, insensitive propellants, precision munitions and vehicle power devices.</p> <p>FY 2016 Accomplishments: Demonstrated and transitioned improved machining and post-processing techniques to improve the yield and decrease the cost of tungsten-based warhead penetrators; transitioned a multi-threat armor manufacturing capability to TRADOC Maneuver Centers of Excellence to inform requirements and to TARDEC to support Combat Vehicle Prototyping and Future Fighting Vehicle; developed equipment for pultrusion of 2D ceramic tile-based armors, matured automated material consolidation techniques for vehicle armor solutions; developed and demonstrated gear machining and finishing processes and optimized assembly processes to increase throughput and yield while decreasing the cost for power-take-off systems; optimized and demonstrated improved assembly processes resulting in improved quality control, reduced assembly times and re-work issues, increased throughput and reduced cost of fuel cells for ground vehicle and soldier-borne applications; demonstrated mature Wide-Band Gallium Nitride MMIC (Monolithic Microwave Integrated Circuit) manufacturing process in the application of weapon system arrays; continued with manufacturing capability development using magnesium to enable more affordable lightweight weapon components; developed an economical mass production process for 7.62mm Advanced Armor Piercing (ADVAP) tungsten carbide penetrators with complex geometry systems; developed and tested a family of coating materials and application processes for low cost infrared signature management solutions; researched development of a scaled up process to produce high energy density safe 5 volt lithium-ion batteries; investigated development of a manufacturing pilot line capability for adaptive armor modules; developed lower cost material fabrication processes and superior material performance as insulation for rocket nozzles.</p> <p>FY 2017 Plans: Will conduct pilot line fabrication of ceramic tile-based armors utilizing automated material consolidation techniques for vehicle armor solutions; will demonstrate and transition a gear machining pilot line capability at MRL 8 associated with cost-effective power-take-off systems to PM-ABCT; will demonstrate magnesium alloy manufacturing processes, to include additive</p>		11.480	16.221	18.244

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0708045A / End Item Industrial Preparedness Activities	Project (Number/Name) E25 / Mfg Science & Tech		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>manufacturing, on novel vehicle and small arms components; will demonstrate, validate and implement an instrumented bullet assembly process for producing XM1158 projectiles; will mature final formulations, confirm batch productions, and perform validations of paint products used for infrared management solutions; will mature a cathode coating process and enhance electrolyte optimization in the production of high energy density safe 5 volt lithium-ion batteries; will continue maturation of a manufacturing line and associated processes for adaptive protection modules; will demonstrate an automated, optimized and flexible process for manufacturing light weight, longer lasting aluminum Metal Matrix Composites (MMC); will demonstrate an agile manufacturing cell capable of efficiently welding thicker plate materials for improved protection for armored multi-purpose vehicle and other vehicles; will mature a lithium-ion battery assembly line leveraging multiple battery form factors leading to reduced cost and increased throughput; will complete the manufacturing process and demonstration maturity of Wide-Band Gallium Nitride MMIC's for non-lethal weapon systems arrays.</p> <p>FY 2018 Plans: Will fabricate hatch and ramps for demonstration on selected vehicles, document and transition magnesium alloy ballistic specifications; will demonstrate a cathode coating process and enhanced production of high energy density safe 5 volt lithium-ion batteries for use in Army ground vehicle systems; will prove out and deliver a manufacturing line and associated processes for adaptive protection modules; will transition improved rocket nozzle insulation processes to PM Precision Fires; will construct an agile manufacturing cell and sensor suite to demonstrate efficient welding of thicker plate materials used for armored multi-purpose and other vehicles; will continue development of a lithium-ion battery pilot line leveraging multiple battery form factors leading to reduced cost and increased throughput; will research novel joining technology processes that will replace existing steel components leading to lighter heavy combat vehicles.</p>				
<p>Title: Lethality (Formerly Precision Munitions and Armament Systems)</p> <p>Description: The Lethality Systems focus area consists of Advanced Weapon Systems, Fire Control, Logistics, Emerging Technologies and Advanced Energetics and Warheads.</p> <p>FY 2016 Accomplishments: Validated the manufacturing process to reduce the cost and time associated with applying Ta-10W liners for 7.62mm and 50 caliber chromium-free gun barrels; demonstrated selected high volume, cost effective, manufacturing processes for micro-electro-mechanical systems (MEMS) scale safe-and-arms components; demonstrated and transitioned processing parameters for loading new ALIMX-101 reduced-sensitivity melt-pour and auxiliary charge explosive systems; developed an affordable manufacturing solution for complex missile seeker components that will shape the missile industry towards cost effective all weather seekers.</p> <p>FY 2017 Plans: Will define manufacturing methods for new imaging technologies associated with the development of affordable multi-mode, all weather missile seekers; will characterize thermal and mechanical pre-impregnated material properties of rocket nozzle</p>		7.408	6.235	11.100

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0708045A / <i>End Item Industrial Preparedness Activities</i>	Project (Number/Name) E25 / <i>Mfg Science & Tech</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>insulation; will mature an automated, scaled-up manufacturing process for programmable initiators addressing requirements for Family of Scatterable Munitions (FASCAM); will demonstrate a cost-effective, high throughput, Spark Plasma Sintering process to reduce cost and lead-times for large caliber cannon broaches and ordnance metal cutting tools; will demonstrate an additive manufacturing process capable of printing energetic inks for next generation hand grenades and small munitions.</p> <p>FY 2018 Plans: Will improve manufacturing methods, conduct materials analysis and demonstrate more efficient production processes that enable multi-mode missile seekers; will build and test prototype programmable initiators of an automated, scaled-up manufacturing process addressing requirements for Family of Scatterable Munitions (FASCAM); will develop smart tooling and process models of a software based module capable of aiding production engineers across the organic industrial base and S&T community to verify and implement best value part manufacturing programs; will fabricate disk components and test components to demonstrate spark plasma sintering process to reduce costs and lead times for large caliber cannon broach cutting tools; will demonstrate processes on internal components that validate suitable energetic inks in the production of next generation hand grenades and small munitions; will mature the manufacturing processes for the fabrication of small format liquid reserve batteries which support small to medium caliber munitions and hand emplaced munitions; will mature waterjet milling to produce the rifling in large caliber cannon tubes in order to replace the expensive broaching process; will investigate advanced manufacturing techniques for small caliber lightweight cartridge cases.</p>				
<p>Title: Command, Control, Communications and Intelligence Systems</p> <p>Description: This effort funds manufacturing technology advances needed for more affordable components and subsystems for intelligence, surveillance, reconnaissance and targeting systems, mission command systems, electronic warfare and improved explosive device detect/defeat systems. Work focuses on addressing challenges in areas such as large format multi-color focal plane arrays, flexible displays, night vision sensors, target detectors, advanced antennas and sensors.</p> <p>FY 2016 Accomplishments: Executed pilot line runs and refined manufacturing process to reduce cost and power of miniaturized short-wave infrared cameras; demonstrated manufacturing processes to fabricate low-defect, flexible digital radiography panels and electronics for system demonstration; investigated design revisions for cost-effective manufacturing techniques of high definition cameras for sniper weapon sights and ground vehicles; developed and improved yield of packaging processes for millimeter wave devices used in radio frequency threat warning applications in air combat platforms; optimized manufacturing processes to improve yield and capability of large format longwave, dual -band infrared focal plane arrays for vision systems.</p> <p>FY 2017 Plans: Will refine manufacturing process and conduct qualification lot runs in the fabrication of infrared sensors used in the application of low-cost, miniaturized short-wave infrared cameras; will complete yield improvement processes and production qualifications</p>		7.850	15.159	11.678

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0708045A / <i>End Item Industrial Preparedness Activities</i>	Project (Number/Name) E25 / <i>Mfg Science & Tech</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>of focal plane arrays applicable to high definition cameras for sniper weapon sights and ground vehicles; will mature millimeter wave packaging improvements to include module development and antenna/module interface advancements of devices used in radio frequency threat warning applications in air combat platforms; will transition a production-ready, high yield manufacturing process for large format longwave, dual -band infrared focal plane arrays for vision systems; will mature a manufacturing process to produce ultra-thin, lightweight, wide-band conformal antennas; will conduct optimization for 3D, read-only integrated circuit manufacturing process resulting in sensors with improved sensitivity and dynamic range.</p> <p>FY 2018 Plans: : Will transition improved processes for 12um focal plane arrays used in high definition cameras to PM-SSL; will deliver to PM ASE millimeter wave packaging improvements to include module development and antenna/module interface advancements of devices used in radio frequency threat warning applications in air combat platforms; will continue optimization of a manufacturing process to produce ultra-thin, lightweight, wide-band conformal antennas; will continue refining and validating a 3D, read-only integrated circuit manufacturing process resulting in sensors with improved sensitivity and dynamic range; will improve assembly processes utilizing epoxies that resist high shocks & temperature cycling for weapon boresight systems.</p>				
<p>Title: Soldier Systems</p> <p>Description: This effort funds manufacturing technology advances needed for more affordable components and subsystems for combat feeding, aerial delivery of supplies, expeditionary basing, Soldier-borne sensors, clothing and protective equipment. Work focuses on addressing challenges in areas such as multifunctional fabrics for shelters, uniforms and portage equipment; affordable, non-contaminating packaging for rations; and lightweight materials for body armor.</p> <p>FY 2016 Accomplishments: Developed improved processing techniques to optimize mechanical properties of consolidated polyethylene films; demonstrated improved manufacturing processes to lower costs and achieve high volume production of the lower-cost flame retardant materials with biocidal modular insulation panels.</p> <p>FY 2017 Plans: Will develop and demonstrate a full scale manufacturing pilot along with test articles (flat panels, helmets, and torso plate prototypes) developed from polyethylene films; will optimize and transition a high-volume pilot manufacturing process for lower-cost flame retardant materials with biocidal modular insulation panels to PM Force Sustainment Systems; will mature a scaled-up, low cost, high yield, high throughput manufacturing process of gallium arsenide based solar cells enabling light weight, portable Soldier power sources; will mature a manufacturing process for low cost augmented reality eyepieces that provide the Soldier with high resolution imagery across a wide field of view for increased situational awareness.</p> <p>FY 2018 Plans:</p>		2.730	4.370	4.554

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0708045A / <i>End Item Industrial Preparedness Activities</i>	Project (Number/Name) E25 / <i>Mfg Science & Tech</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<p>Will transition to Soldier protection systems programs of record a full scale manufacturing pilot line developed for polyethylene films; will build a continuous reactor to demonstrate high yield manufacturing processes for gallium arsenide based solar arrays for portable Soldier power sources; will refine manufacturing processes in the production of low cost augmented reality eyepieces that provide the Soldier with high resolution imagery across a wide field of view for increased situational awareness.</p> <p>Title: Innovation Enablers (Formerly Advanced Manufacturing Initiatives)</p> <p>Description: This effort funds manufacturing technology advances needed for affordable model based manufacturing, network centric manufacturing data environments, collaborative manufacturing modeling and simulation, and advanced manufacturing technologies. Work focuses on addressing challenges in areas such as 3D technical data packages for armor systems; providing digital manufacturing capabilities to depots and laboratories, processes and models for data transfer and prototype production; and advanced laser manufacturing techniques for repairing components..</p> <p>FY 2016 Accomplishments: Demonstrated digital data driven manufacturing of prototype systems, deployed the use of standard machine language and protocols to monitor machine performance to predict quality issues and optimize production rates for high-volume items, and established and demonstrated the use of a common machine tool library for cross-Army utilization; developed and applied novel additive manufacturing techniques for validated repair procedures for selected high value aviation components; developed flexible and agile grenade specific manufacturing processes utilizing 2D and 3D printing and additive manufacturing technologies as applied to energetic materials with integrated electronics; developed and demonstrated additive fabrication and reclamation processes for use on Army components; expanded existing MBE efforts in techniques to capture, standardize and reuse tech data across weapon system product life cycles.</p> <p>FY 2017 Plans: Will mature application of dissimilar metals for repaired aviation components, integrating in-process quality assurance methods and procedures to maximize reliability of high-value aviation components; will demonstrate and deliver processes and tooling requirements of 2D and 3D additively manufactured energetics and electronics for use in 40mm grenades; will begin the transfer of a laser enhanced net shaping (LENS) repair process to Anniston Army Depot in the qualification and reclamation of Army components; will mature Model Based Enterprise tools which include legacy technical data package updating, forensic manufacturing, and integration of DoD/Army requirements; will demonstrate a software based module capable of aiding production engineers across the organic industrial base and S&T community to verify and implement best value part manufacturing programs.</p> <p>FY 2018 Plans: Will complete delivery to PM MAS processes and tooling requirements of 2D and 3D additively manufactured energetics and electronics for use in 40mm grenades; will demonstrate a laser enhanced net shaping repair process at Anniston Army Depot for</p>		12.837	14.301	12.643

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0708045A / <i>End Item Industrial Preparedness Activities</i>	Project (Number/Name) E25 / <i>Mfg Science & Tech</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
the qualification and reclamation of Army components; will perform modeling and simulation for cold spray repair processes to reduce the sustainment cost of Army weapon systems.				
<p>Title: Medical</p> <p>Description: This effort funds manufacturing technology advances needed for more affordable process methods in addressing manufacturing of lighter weight multi-functional materials, biotechnology, vaccines, medical equipment power sources, and component ruggedization that directly address Soldier rehabilitation.</p> <p>FY 2016 Accomplishments: Researched development of a modernized, scaled-up production process addressing spray drying and encapsulation methods of the Adenovirus vaccine.</p> <p>FY 2017 Plans: Will demonstrate a modernized, scaled-up production process addressing spray drying and encapsulation methods of the Adenovirus vaccine.</p> <p>FY 2018 Plans: Will produce test batches in the development of a modernized, scaled-up production process addressing spray drying and encapsulation methods of the Adenovirus vaccine.</p>		1.600	0.600	1.101
Accomplishments/Planned Programs Subtotals		46.503	62.287	60.877
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: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0708045A / End Item Industrial Preparedness Activities	Project (Number/Name) E25 / Mfg Science & Tech
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Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
TBD	C/Various	TBD : TBD	0.000	-		-		0.018		-		0.018	0.000	0.018	0.000
Subtotal			0.000	-		-		0.018		-		0.018	0.000	0.018	0.000

Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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			
TBD	Various	TBD : TBD	185.418	46.503		62.287		60.859		-		60.859	0.000	355.067	0.000
Subtotal			185.418	46.503		62.287		60.859		-		60.859	0.000	355.067	0.000

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract		
Project Cost Totals			185.418	46.503		62.287		60.877		-		60.877	0.000	355.085	0.000

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0708045A / End Item Industrial Preparedness Activities	Project (Number/Name) E25 / Mfg Science & Tech
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
N/A																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0708045A / <i>End Item Industrial Preparedness Activities</i>	Project (Number/Name) E25 / <i>Mfg Science & Tech</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
N/A	1	2016	4	2016

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0708045A / End Item Industrial Preparedness Activities				Project (Number/Name) EA2 / MANTECH INITIATIVES (CA)			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EA2: MANTECH INITIATIVES (CA)	-	12.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	12.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This effort accelerates manufacturing technology for more affordable electronic warfare, communications and sensors systems components and subsystems to include radio frequency amplifiers, antennas, and focal plane arrays. This effort accelerates and supplements manufacturing technology for more affordable components and subsystems for tactical and combat vehicles and weapon systems. Work focuses benefit from working to develop and scale up the manufacturing process for nano-tungsten carbide powders and high-volume single-crystal tungsten rod manufacturing processes. This effort accelerates and supplements manufacturing technology for more advanced manufacturing and enterprise solutions. Work focuses on accelerating model based manufacturing to specific organic Army facilities and novel ways of applying additive manufacturing and monitoring material powder beds and process controls during additive manufacturing part build for weapon system components.

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

	FY 2016	FY 2017
Congressional Add: Congressional Interest Item funding for Mantech Initiatives.	12.000	-
FY 2016 Accomplishments: Developed and matured pixel design & processing capabilities for III-V dual-band midwave/longwave infrared focal plane arrays; established an additive manufacturing technology capability/process necessary to fabricate RF amplifiers for electronic warfare applications; accelerated techniques for metaferrite material deposition to enable earlier manufacturing maturation of ultra-thin antennas for communications systems. Utilized nano-tungsten carbide to demonstrate processes to produce higher performance penetrators for next generation small caliber ammunition; demonstrated tungsten single crystal processes for kinetic energy ammunition. Accelerated development of an inspection system for deposition metal laser sintering additive manufacturing process in conjunction with Army ManTech ongoing efforts; investigated and demonstrated model based engineering processes to advance Rock Island Arsenal's design/build/repair capability; developed an additive manufacturing production process for the 40mm low velocity training round and M320 grenade launcher.		
Congressional Adds Subtotals	12.000	-

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

N/A

Remarks

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0708045A / End Item Industrial Preparedness Activities	Project (Number/Name) EA2 / MANTECH INITIATIVES (CA)

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 1203142A / SATCOM Ground Environment (SPACE)
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	11.959	-	11.959	19.425	10.484	10.647	10.827	Continuing	Continuing
FE1: Dscs-Dcs (Phase II)	-	0.000	0.000	6.756	-	6.756	5.986	6.054	6.207	6.372	Continuing	Continuing
FE2: MILSATCOM System Engineering	-	0.000	0.000	4.203	-	4.203	4.439	4.430	4.440	4.455	0.000	21.967
FE4: Enroute Mission Command	-	0.000	0.000	1.000	-	1.000	9.000	0.000	0.000	0.000	0.000	10.000

Note

This is not a new start - program realignment from 0303142 APE to reflect the new Major Force Program 12 (MFP12) Space.

A. Mission Description and Budget Item Justification

FE1: Dscs-Dcs (Phase II):

This project provides funds to develop Satellite Communication (SATCOM) ground subsystem equipment and software in support of Joint Chiefs of Staff (JCS) validated Mission Command Network and Systems requirements for the worldwide Defense Enterprise Wideband SATCOM System (DEWSS). DEWSS is composed of the Super High Frequency (SHF) Defense Satellite Communications System (DSCS) and Wideband Global SATCOM (WGS) programs, which are required to support legacy, interim and emerging communication space architectures and future Force requirements. Expansion of the WGS constellation and upgrades to both DSCS and WGS are vital to support the Army's emerging power projection and rapid deployment role. DSCS and WGS provide multiple channels of tactical end-to-end connectivity and interoperability with strategic networks and national decision-makers, satisfying JCS network operations

FE2: Military Satellite Communications (MILSATCOM)System Engineering (SE):

Military Satellite Communications (MILSATCOM)System Engineering (SE) assures that tactical Army Satellite Communications (SATCOM) and SATCOM On-The-Move (SOTM) systems are engineered to legally and efficiently operate worldwide. MILSATCOM SE shapes Joint SATCOM systems' design efforts, standards development and planning processes. MILSATCOM SE represents the Army's tactical interests within DoD, Commercial & International forums to ensure affordable and scalable future SATCOM capabilities for maneuver forces. These efforts, performed by MILSATCOM SE, lead to savings for the overall Army in the out years.

FE4 / Enroute Mission Command:

Mission Description and Budget Item Justification:

Enroute Mission Command (EMC) supports the Global Response Force (GRF) and other Army units with the requirement to conduct Airborne forced entry operations with the ability to conduct mission command, to include mission planning and rehearsal, while enroute on board US Air Force Air Mobility Command (AMC) aircraft. EMC provides a modernization to enroute communications to enable broadband reach-back data capability utilizing military or commercial networks with adequate bandwidth support required by Mission Command and Intelligence applications. EMC will provide commanders with the ability to obtain and share near real-time information regarding intelligence, situational awareness and command and control information while enroute to their objective. The ability to adjust plans and strategize utilizing the latest Intel data will give the GRF the information dominance needed to execute their mission once they arrive at their objective.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203142A / SATCOM Ground Environment (SPACE)
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Due to rephasing of FY17 OPA funding into FY18/19, program was restructured in Dec 2015. MDA addressed schedule issues (Oct 2016) by authorizing to field a Ku FISA FOC (4QFY17) and complete a Modification Word Order (MWO), adding Ka FISA capability, post Ku FISA FOC.

FY18 funding supports the Ka solution requirement of Wideband Global System (WGS) Terminal and Modem Certification. The certification process will ensure that terminals conform to the minimum performance and operational control requirements as defined in the WGS Ka-Band Terminal Certification Requirements Document.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	11.959	-	11.959
Total Adjustments	0.000	0.000	11.959	-	11.959
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	11.959	-	11.959

Change Summary Explanation

Program realignment from 0303142 APE to reflect the new Major Force Program 12 (MFP12) Space.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date: May 2017**

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) FE1 / Dscs-Dcs (Phase II)
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
FE1: Dscs-Dcs (Phase II)	-	0.000	0.000	6.756	-	6.756	5.986	6.054	6.207	6.372	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

As result of the new Major Force Program 12 (MFP12) Space Configuration, OSD directed this funding line replace 0303142A 253 in FY18 and beyond.

A. Mission Description and Budget Item Justification

This project provides funds to develop Satellite Communication (SATCOM) ground subsystem equipment and software in support of Joint Chiefs of Staff (JCS) validated Mission Command Network and Systems requirements for the worldwide Defense Enterprise Wideband SATCOM System (DEWSS). DEWSS is composed of the Super High Frequency (SHF) Defense Satellite Communications System (DSCS) and Wideband Global SATCOM (WGS) programs, which are required to support legacy, interim and emerging communication space architectures and future Force requirements. Expansion of the WGS constellation and upgrades to both DSCS and WGS are vital to support the Army's emerging power projection and rapid deployment role. DSCS and WGS provide multiple channels of tactical end-to-end connectivity and interoperability with strategic networks and national decision-makers, satisfying JCS network operations in support of the President, JCS, combatant commanders, military departments, Department of State and other government departments and agencies.

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

	FY 2016	FY 2017	FY 2018
Title: SATCOM Terminal Digital IF Implementation Analysis	-	-	1.964
Description: SATCOM Terminal Digital IF Implementation Analysis			
FY 2018 Plans: Develop interfaces necessary to fully integrate Digital IF technology into DoD gateway architecture. Complete IA accreditation and finalize interoperability tests and certifications.			
Title: Electromagnetic Interference Mitigation Analysis	-	-	2.661
Description: Electromagnetic Interference Mitigation Analysis			
FY 2018 Plans: Investigate and develop solutions to support satellite communications operating in a contested environment. Perform interoperability and IA accreditation tests. Integrate solutions into DoD gateway satellite communications architecture.			
Title: Improve WSOC Situational Awareness	-	-	2.131
Description: Improve WSOC Situational Awareness			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) FE1 / Dscs-Dcs (Phase II)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
FY 2018 Plans: Investigate and develop solutions to advance the control capability of military and commercial Wideband Satellite payloads. Increased capability for planning, monitoring, and adapting satellite networks.			
Accomplishments/Planned Programs Subtotals	-	-	6.756

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• 20: Defense Enterprise Wideband SATCOM Systems (DEWSS) (BB8500)	172.306	143.805	161.383	-	161.383	125.787	135.036	117.599	141.392	Continuing	Continuing

Remarks

D. Acquisition Strategy

As result of the new Major Force Program 12 (MFP12) Space Configuration, OSD directed this funding line replace 0303142A 253 in FY18 and beyond.

This effort finances Project Manager, Defense Communications and Army Transmission Systems (PM DCATS) netcentric systems engineering, modem risk mitigation, and Risk Management Framework (RMF) support. Funding provides for SATCOM terminal upgrades, enhancement of baseband throughput capabilities, technology insertion and upgrades which enhance decision support capabilities, allowing for full utilization of Wideband Global SATCOM (WGS) capabilities. Both the Wideband SATCOM Operational Management System (WSOMS) and the Enterprise Wideband SATCOM Terminal System (EWSTS) Capability Production Documents (CPDs) contain Netcentric-Ready Key Performance Parameters (NR-KPPs) as required by CJCSI 6212.01C. Netcentric efforts are required to facilitate the migration from the current trunk-based communications systems to Internet Protocol (IP) based systems and to engineer, test and integrate IP based capabilities into EWSTS and WSOMS systems. Studies, risk mitigation, system integration and advanced demonstrations for Netcentric baseband and policy based control will accommodate technology insertion, data sharing, remote operations, architecture efforts and use of commercial technology, thus ensuring the life of the Defense Enterprise Wideband System (DEWSS) terminal family beyond 2025 and reducing lifecycle costs and enterprise requirements on the WGS and Defense Satellite Communication System (DSCS) satellites in the future.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 1203142A / SATCOM Ground Environment (SPACE)				Project (Number/Name) FE2 / MILSATCOM System Engineering			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
FE2: MILSATCOM System Engineering	-	0.000	0.000	4.203	-	4.203	4.439	4.430	4.440	4.455	0.000	21.967
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

FE2: Military Satellite Communications (MILSATCOM) System Engineering (SE) assures that tactical Army Satellite Communications (SATCOM) and SATCOM On-The-Move (SOTM) systems are engineered to legally and efficiently operate worldwide. MILSATCOM SE shapes Joint SATCOM systems' design efforts, standards development and planning processes. MILSATCOM SE represents the Army's tactical interests within DoD, Commercial & International forums to ensure affordable and scalable future SATCOM capabilities for maneuver forces. These efforts, performed by MILSATCOM SE, lead to savings for the overall Army in the out years.

FY17 and prior funding was aligned to 0303142A/456.

FY18 funds support the continued systems engineering required to support technology maturation, systems analysis, and planning associated with joint SATCOM development efforts including complying with the outcome of the Protected SATCOM communications Systems (PSCS). In addition, FY18 funding covers the Protected Tactical Service Field Demo Modem Testing, Narrowband (MUOS) Analysis of Alternatives (AoA), the follow-on Wideband AoA, Protected Tactical Service Field Demo, NCW Tool Development and Testing and other efforts that have impact on tactical Army use of military and commercial satellite constellations. These efforts have a direct impact in reducing technical and programmatic risk for the acquisition efforts for tactical Army SATCOM systems using these constellations.

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

	FY 2016	FY 2017	FY 2018
Title: Protected Communications System Engineering and WGS Communications	-	-	1.051
FY 2018 Plans: Product development for the Protected Communications and WGS Communications System Engineering to improve Ku/Ka antenna SWAP			
Title: System Engineering Support	-	-	2.552
FY 2018 Plans: In house Engineering Support, Contractor Support and System Architecture & Analysis			
Title: Testing and certification of critical SATCOM and Satellite-On-The-Move (SOTM) communication and network technologies	-	-	0.600
FY 2018 Plans: Testing and certification of critical SATCOM and SOTM communication and network technologies.			
Accomplishments/Planned Programs Subtotals	-	-	4.203

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) FE2 / MILSATCOM System Engineering

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

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• 0303142A/456: MILSATCOM System Engineering	0.908	4.287	-	-	-	-	-	-	-	0	5.195

Remarks

FY17 and prior funding was aligned to 0303142A/456.
 FY16 0.908M
 FY17 4.287M

D. Acquisition Strategy

This project funds advanced systems engineering, research, development, test and evaluation of new and emerging technologies to optimize terminal performance and communications control. Once the technologies are mature and deemed feasible, funding and management responsibility for implementation of the technology will transition to WIN-T and related PoRs.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) FE4 / Enroute Mission Command
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COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
FE4: Enroute Mission Command	-	0.000	0.000	1.000	-	1.000	9.000	0.000	0.000	0.000	0.000	10.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funds in this program element are for testing requirements. FY16/17 RDTE funds are on Program Element 0303142A/EK8 SATCOM Ground Environment (SPACE). Funds in FY18 and out have been realigned to support the establishment of the Major Force Program 12 (MFP12) Program Element 173142/FE4; program is not a New Start.

A. Mission Description and Budget Item Justification

Enroute Mission Command (EMC) supports the Global Response Force (GRF) and other Army units with the requirement to conduct Airborne forced entry operations with the ability to conduct mission command, to include mission planning and rehearsal, while enroute on board US Air Force Air Mobility Command (AMC) aircraft. EMC provides a modernization to enroute communications to enable broadband reach-back data capability utilizing military or commercial networks with adequate bandwidth support required by Mission Command and Intelligence applications. EMC will provide commanders with the ability to obtain and share near real-time information regarding intelligence, situational awareness and command and control information while enroute to their objective. The ability to adjust plans and strategize utilizing the latest Intel data will give the GRF the information dominance needed to execute their mission once they arrive at their objective.

Due to rephasing of FY17 OPA funding into FY18/19, program was restructured in Dec 2015. MDA addressed schedule issues (Oct 2016) by authorizing to field a Ku FISA FOC (4QFY17) and complete a Modification Word Order (MWO), adding Ka FISA capability, post Ku FISA FOC.

FY 2018 funding supports the Ka solution requirement of Wideband Global System (WGS) Terminal and Modem Certification. The certification process will ensure that terminals conform to the minimum performance and operational control requirements as defined in the WGS Ka-Band Terminal Certification Requirements Document.

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

	FY 2016	FY 2017	FY 2018
Title: EMC Testing	-	-	1.000
Description: Wideband Global System (WGS) Terminal and Modem Certification			
FY 2018 Plans: Wideband Global System (WGS) Terminal and Modem Certification.			
Accomplishments/Planned Programs Subtotals	-	-	1.000

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 1203142A / SATCOM Ground Environment (SPACE)	Project (Number/Name) FE4 / Enroute Mission Command
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• B08400: <i>Enroute Mission Command</i>	7.116	-	21.667	-	21.667	23.072	5.957	-	-	0	57.812

Remarks

D. Acquisition Strategy

The continued procurement of the EMC full operational capability follows DoDI 5000.02, 7 Jan 2015, Enclosure 13, Rapid Fielding of Capabilities. The Milestone Decision Authority (MDA) and project manager will tailor and streamline program strategy based on the required timelines to meet urgent need capability requirements. The Army Executive Agent signed an Acquisition Decision Memorandum (ADM) on 27 April 2015 delegating MDA to PEO C3T. The MDA signed an ADM on 11 May 2015 selecting the KuKa Antenna and Radome for the Full Operational Capability (FOC). An ADM was signed on 20 May 2015 granting approval to enter into production and deployment phase.

Due to rephasing of FY17 OPA funding into FY18/19, program was restructured in Dec 2015. MDA addressed schedule issues (Oct 2016) by authorizing to field a Ku FISA FOC (4QFY17) and complete a Modification Word Order (MWO), adding Ka FISA capability, post Ku FISA FOC.

Initial Operational Capability met in May 2015 with modification of five C-17s with satellite antennae and installation kits, and roll-on/roll-off, battalion level, Key Leader Node (KEN). FOC is 35 C-17s, eight Key Leader Enroute Node (KEN), and 24 company level Dependent Airborne Nodes (DAN), and a Command and Staff Palletized Airborne Node (CASPAN).

FY18 funding (173142 FE4) supports the Wideband Global System (WGS) Terminal and Modem Certification.

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 1208053A / Joint Tactical Ground System							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	10.228	-	10.228	11.594	10.851	11.131	12.843	Continuing	Continuing
FE7: Joint Tact Grd Station-P3I(MIP)	-	0.000	0.000	10.228	-	10.228	11.594	10.851	11.131	12.843	Continuing	Continuing

Note
Funding moved from PE 0208053A to PE 1208053A as directed by OSD to track Space Programs.

A. Mission Description and Budget Item Justification

The Joint Tactical Ground Station (JTAGS) is a post-production, ACAT III program and is designated as a DoD Space Program. JTAGS provides missile warning message data for the Air and Missile Defense (AMD) architecture and improves performance for Integrated Air and Missile Defense Fire Control Systems/Composite Army Air and Missile Defense Brigades.

JTAGS Block I system is a transportable information processing system, receiving and processing in-theater, direct down-linked data from Defense Support Program (DSP) and other Infrared (IR) satellites. JTAGS disseminates near real time warning, alerting, and cueing information on ballistic missile launches and other tactical events of interest throughout the theater using existing communication networks, providing critical support to Combatant Commanders in their Areas of Responsibility (AOR). Four OCONUS deployed JTAGS units constitute DoD's only in-theater system providing space-based missile warning. The fifth CONUS system is being used as an institutional trainer but is available as a deployable asset. JTAGS is designated as the in-theater element of the United States Strategic Command's Theater Event System (TES), supporting all Theater Missile Defense pillars, affording the shortest sensor to shooter connectivity. JTAGS funding was moved to a new PE as directed by OSD to track Space Programs.

The JTAGS Program Element (PE) supports development and test to meet JTAGS Operational Requirement(s) Document (ORD) thresholds using improved sensors and algorithms as Pre-Planned Product Improvements (P3I). The P3I Improvements will upgrade JTAGS to a new Block II configuration for operation with the next generation of Space Based Infrared System (SBIRS) satellites, and will improve warning tactical parameters and timeliness. JTAGS Block II is on contract for a two-Phase development effort. JTAGS Block II Phase 1 will be completed in FY17. JTAGS Block II Phase 2 activities are broken into three spirals to expedite getting critical capabilities fielded sooner. P3I Block II Phase 2 Spiral 1 delivers stereo SBIRS Geosynchronous scanner capability and Pseudo-Link 4 (P/L 4) data. Spiral 2 delivers Cobra Brass and "Walkers" data (FY2018-19). Spiral 3 delivers software tuning and testing to the Operational Requirements Document (ORD) (FY2019-20). JROC-Memos 197-12 and 113-13 supports the need to develop and field JTAGS Block II capabilities as soon as possible.

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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1208053A / <i>Joint Tactical Ground System</i>
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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	10.228	-	10.228
Total Adjustments	0.000	0.000	10.228	-	10.228
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	0.000	10.228	-	10.228

Change Summary Explanation

FY18 funding was realigned from PE 0208053A to PE 1208053A to provide greater transparency of OSD Space Programs.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 1208053A / Joint Tactical Ground System				Project (Number/Name) FE7 / Joint Tact Grd Station-P3I(MIP)			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
FE7: Joint Tact Grd Station-P3I(MIP)	-	0.000	0.000	10.228	-	10.228	11.594	10.851	11.131	12.843	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Joint Tactical Ground Station (JTAGS) is a post-production, ACAT III program and is designated as a DoD Space Program. JTAGS provides missile warning message data for the Air and Missile Defense (AMD) architecture and improves performance for Integrated Air and Missile Defense Fire Control Systems/Composite Army Air and Missile Defense Brigades.

JTAGS Block I system is a transportable information processing system, receiving and processing in-theater, direct down-linked data from Defense Support Program (DSP) and other Infrared (IR) satellites. JTAGS disseminates near real time warning, alerting, and cueing information on ballistic missile launches and other tactical events of interest throughout the theater using existing communication networks, providing critical support to Combatant Commanders in their Areas of Responsibility (AOR). Four OCONUS deployed JTAGS units constitute DoD's only in-theater system providing space-based missile warning. The fifth CONUS system is being used as an institutional trainer but is available as a deployable asset. JTAGS is designated as the in-theater element of the United States Strategic Command's Theater Event System (TES), supporting all Theater Missile Defense pillars, affording the shortest sensor to shooter connectivity. JTAGS funding was moved to a new PE as directed by OSD to track Space Programs.

The JTAGS Program Element (PE) supports development and test to meet JTAGS Operational Requirement(s) Document (ORD) thresholds using improved sensors and algorithms as Pre-Planned Product Improvements (P3I). The P3I Improvements will upgrade JTAGS to a new Block II configuration for operation with the next generation of Space Based Infrared System (SBIRS) satellites, and will improve warning tactical parameters and timeliness. JTAGS Block II is on contract for a two-Phase development effort. JTAGS Block II Phase 1 will be completed in FY17. JTAGS Block II Phase 2 activities are broken into three spirals to expedite getting critical capabilities fielded sooner. P3I Block II Phase 2 Spiral 1 delivers stereo SBIRS Geosynchronous scanner capability and Pseudo-Link 4 (P/L 4) data. Spiral 2 delivers Cobra Brass and "Walkers" data (FY2018-19). Spiral 3 delivers software tuning and testing to the Operational Requirements Document (ORD) (FY2019-20). JROC-Memos 197-12 and 113-13 supports the need to develop and field JTAGS Block II capabilities as soon as possible.

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

	FY 2016	FY 2017	FY 2018
Title: JTAGS Test and Evaluation Support	-	-	1.616
Description: Test and evaluation support for the JTAGS P3I Block II program			
FY 2018 Plans: Begin testing support of the JTAGS P3I Block II Phase 2 Spiral 2 development program			
Title: JTAGS Block II Phase 2	-	-	8.612

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 1208053A / <i>Joint Tactical Ground System</i>	Project (Number/Name) FE7 / <i>Joint Tact Grd Station-P3I(MIP)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018
Description: The JTAGS Block II Phase 2 development program is broken into three Spirals, to provide critical capabilities to the fielded JTAGS units faster. Also includes Government management/oversight of the JTAGS Block II program.			
FY 2018 Plans: Continue development efforts of the JTAGS Block II Phase 2 Spiral 2 program and Government management/oversight.			
Accomplishments/Planned Programs Subtotals	-	-	10.228

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 278053635: <i>Joint Tact Grd Station - P3I (MIP)</i>	28.015	12.649	-	-	-	-	-	-	-	0	40.664
• BZ8420000: <i>Joint Tactical Ground Station Mods (JTAGS)</i>	9.325	4.417	-	-	-	5.434	-	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

Under this program element, critical improvements will be developed making maximum use of Non-Developmental Items (NDI)/Commercial Off-The-Shelf (COTS) components. After design and integration, the system will be subject to thorough developmental and validation/verification testing to verify performance, operational effectiveness and suitability. P3I Improvements will upgrade JTAGS to a new Block II configuration for operation with the next generation of Space Based Infrared System (SBIRS) satellites, improving warning tactical parameters and timeliness. JTAGS Block II is on contract for a two-Phase development effort. JTAGS Block II Phase 2 is further divided into three spirals to provide critical capabilities to the fielded units faster. JTAGS Block II Phase 2 Spiral 1 delivers stereo SBIRS Geosynchronous scanner capability and Pseudo-Link 4 (P/L 4) data. Spiral 2 delivers Cobra Brass and "Walkers" data (FY2018-19). Spiral 3 delivers software tuning and testing to the Operational Requirements Document (ORD) (FY2019-20). JTAGS Block II Phase 2 is a Cost Plus Incentive Fee (CPIF) option on the JTAGS Block II (P3I) contract (W9113M-12-C-0055). The option will be exercised based on a contractor updated proposal and Government technical evaluation. JROC-Memos 197-12 and 113-13 direct fielding of JTAGS Block II capabilities as soon as possible.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 7				PE 1208053A / Joint Tactical Ground System				FE7 / Joint Tact Grd Station-P3I(MIP)							
Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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	Allot	MDSS Project Office : Radstone Arsenal AI	0.000	-		-		2.689	Oct 2017	-		2.689	0.000	2.689	0.000
Subtotal			0.000	-		-		2.689		-		2.689	0.000	2.689	0.000
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
JTAGS P3I Block II Phase 2 Development	Option/CPIF	Northop Grumman : Colorado Springs Co	0.000	-		-		4.590	Dec 2017	-		4.590	Continuing	Continuing	0.000
Subtotal			0.000	-		-		4.590		-		4.590	-	-	0.000
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Engineering Support	C/CPFF	TBD : Huntsville AL	0.000	-		-		1.333	Dec 2017	-		1.333	Continuing	Continuing	0.000
Subtotal			0.000	-		-		1.333		-		1.333	-	-	0.000
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Support (ATEC/AIC/JITC)	Various	Various : Various	0.000	-		-		1.616	May 2018	-		1.616	Continuing	Continuing	0.000
Subtotal			0.000	-		-		1.616		-		1.616	-	-	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army								Date: May 2017					
Appropriation/Budget Activity 2040 / 7				R-1 Program Element (Number/Name) PE 1208053A / <i>Joint Tactical Ground System</i>				Project (Number/Name) FE7 / <i>Joint Tact Grd Station-P3I(MIP)</i>					
	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	-		0.000		10.228		-		10.228	-	-	0.000

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 1208053A / Joint Tactical Ground System	Project (Number/Name) FE7 / Joint Tact Grd Station-P3I(MIP)
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Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
JTAGS P3I Block II Phase 2									JTAGS P3I Block II Mods program				JTAGS P3I Block II Phase 2 Spiral 3				Future Sensor Integration											
JTAGS P3I Block II Phase 2 Spiral 2 (Cobra Brass and Slow Walkers)									JTAGS P3I Block II Phase 2 Spiral 2																			
JTAGS P3I Block II Phase 2 Spiral 3 (tuning and testing to ORD)									JTAGS P3I Block II Phase 2 Spiral 3																			
Future Sensor Integration and Technology Refresh									Future Sensor Integration																			
									Future Sensor Integration																			

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 1208053A / <i>Joint Tactical Ground System</i>	Project (Number/Name) FE7 / <i>Joint Tact Grd Station-P3I(MIP)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
JTAGS P3I Block II Phase 2	1	2018	3	2021
JTAGS P3I Block II Phase 2 Spiral 2 (Cobra Brass and Slow Walkers)	1	2018	2	2019
JTAGS P3I Block II Phase 2 Spiral 3 (tuning and testing to ORD)	1	2019	3	2020
Future Sensor Integration and Technology Refresh	3	2020	4	2022