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**Department of Defense  
Fiscal Year (FY) 2021 Budget Estimates**

February 2020



**Army**

*Justification Book of*

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

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

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Army • Budget Estimates FY 2021 • RDT&E Program

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

For expenses necessary for basic and applied scientific research, development, test and evaluation, including maintenance, rehabilitation, lease, and operation of facilities and equipment, \$12,770,165,000.00 to remain available for obligation until September 30, 2022.

**COST STATEMENT**

The following Justification Books were prepared at a cost of \$460,861: Aircraft (ACFT), Missiles (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 5C, Budget Activity 6, Budget Activity 7, and Budget Activity 8.

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**FY 2021 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 2020.
  
2. **Relationship of the FY 2021 Budget Submitted to Congress to the FY 2020 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.

**New Start Programs:**

<b><i>Budget Activity</i></b>	<b><i>OSDPE / Project</i></b>	<b><i>Project Title</i></b>
02	0602115A / EB2	HIV Biomedical Technology
02	0602134A / CD2	Counter Improvised-Threat Advanced Studies
02	0602146A / AQ2	EW Techniques Technology
02	0602146A / AQ7	High Tempo Data Driven Decision Tools Technology
03	0603002A / MP3	Phys Chem Toxicity Assessment Sys Adv Tech
03	0603115A / EB3	HIV Medical Development
03	0603134A / CD3	Counter Improvised-Threat Simulation
03	0603463A / AQ8	High Tempo Data Driven Decision Tools Adv Tech
03	0603463A / AR8	Sensing in Contested Environments Adv Tech
03	0603463A / AU2	Optimization of Geospatial Data for Visualization
03	0603463A / AV1	GEOInt/Ops Logistics Integration-Planning Adv Tech
03	0603463A / AW6	Modular GPS Independent Sensors Advanced Tech
03	0603920A / CD5	Humanitarian Demining
04	0603804A / EW8	Armored Engineer Vehicles
04	0604115A / AX3	Technology Maturation Initiatives

04	0604134A / CD4	Counter Improvised-Threat Demonstration
05	0304270A / FJ5	Terrestrial Layer System (MIP)
05	0604601A / S64	Common Remotely Operated Wpn Sys (CROWS)
05	0604604A / BX8	Cold Weather All-Terrain Vehicle (CATV)
05	0604622A / E50	TRAILER DEVELOPMENT
05	0604802A / XT2	40mm Door Breach
05	0605145A / CD6	Medical Products and Support Systems Development
06	0605801A / M23	US Army Corps of Engineers Base Operations
06	0606105A / CD7	Medical Program-Wide Activities
07	0203802A / VV2	TOW
07	0607145A / FD5	Apache Product Improvement
07	0203802A / VT9	Lethal Miniature Aerial Missile System (LMAMS)

**Program Element/Project Restructures:**

<b><u>Budget Activity</u></b>	<b><u>Old OSDPE / Project: Title</u></b>	<b><u>New OSDPE / Project</u></b>
02	0602141A / AH5: Projectile and Multi-Function Warhead Technologies	0602143A/AY6, 0602145A/BK5
02	0602143A / AN1: Narrowband SATCOM Technology	0602146A/BZ6, 060346A/AN2
02	0602143A / BE1: Support Technology to Mission Command	0602146A/AQ9
02	0602144A / BL4: Countermine Technology	0602145A/BF9
02	0602145A / BH2: C4ISR Modular Autonomy Technology	0602145A/BF9
02	0602145A / BH7: Enhanced VETRONICS Technology	0602145A/BH5
02	0602145A / BJ3: Hydrogen Based Combat System Technology	0602145A/BH5
02	0602145A / BJ7: Detection of Explosive Hazards Technology	0602145A/BF9
02	0602146A / AN3: Non Traditional Waveforms Technology	0603463A/AP6
02	0602146A / AV7: Atmospheric Modeling and Meteorological Technology	0603772A/101
02	0602147A / AF5: Simulation and Aerostructures Technology	0602147A/AE7
02	0602147A / AF6: Structures Technology	0602147A/AE7
02	0602147A / AF7: Warhead Integration Technology	0602147A/AE7

02	0602147A / AF9: Precision and Accuracy Technology	0602147A/AE7
02	0602147A / AG1: Missile Electronics Technology	0602147A/AE7
02	0602147A / AG2: Information and Signal Processing Technology	0602147A/AE7
02	0602147A / AG8: Advanced Energetics Technology	0602141A/AH9
02	0602147A / AG9: Multiple Simul Engagement Technologies (MSET) Tech	0602148A/AK4
02	0602148A / AI7: Alternative Concept Engine Technology	0602148A/AM4
02	0602148A / AK1: UAS Survivability Technology	0603465A/AK3
02	0602148A / AK6: Advanced Rotorcraft Armaments Protection System Te	0603465A/AK7, 0633465A/CA8
02	0602148A / AM2: Aircraft and Aircrew Protection Technology	0602148A/AJ4
02	0602150A / AD7: Missile Fire Control Sensors Technology	0602150A/AD3
02	0602787A / 874: Cbt Casualty Care Tech	0602787A/MM4
03	0603002A / MG4: Tech Base/Enabling Res in Mil Occup Med Adv Tech	0603002A/MN7, MN9, MO3, MO8, MP3
03	0603002A / MM5: Tech Base/Enabling Res Combat Cas Care Adv Tech	0603002A/MN3, MN4, MN5, MO2, MO4, MO7
03	0603002A / MM9: Tech Base/Enabling Rsrch for Infect Dis Adv Tech	0603002A/MO9, 0602787A/MM8
03	0603002A / MN8: Drugs to Prevent and Treat Malaria Advanced Tech	0602787A/MM8
03	0603002A / MO3: Military Occupational Fitness Standards Adv Tech	0603002A/MN7
03	0603118A / AZ8: Soldier Squad Small Arms Armaments Adv Tech	0602143/AY8, 0603463A/AQ1
03	0603462A / BH3: C4ISR Modular Autonomy Advanced Technology	0603462A/BZ9
03	0603462A / BI1: Protection for Autonomous Systems Adv Tech	0603462A/BG7
03	0603462A / BJ6: Hydrogen Based Combat System Advanced Technology	0603462A/BH6
03	0603462A / BJ8: Detection of Explosive Hazards Advanced Technology	0602145A/BF9
03	0603463A / AR2: Energy Informed Operations Advanced Technology	0603465A/AM5
03	0603463A / AU6: Automated Analytics for Operational Environment AT	0602146/AT7
03	0603464A / AF4: Missile Simulation Advanced Technology	0602147/AF8
03	0603464A / AH3: Single Multi-mission Attack Missile Adv Tech	0603465A/AK5
03	0603464A / BS3: Strategic Missile Advanced Technology	0603464A/BY2
03	0603465A / AI6: Next Gen Tactical UAS TD Advanced Technology	0603465A
03	0603465A / AM3: Aircraft and Aircrew Protection Advanced Tech	0603465A/AJ5
03	0603466A / AC8: Low Cost Extended Range Air Defense Adv Tech	0603466A/AD4
04	1206120A / FJ8: Assured Positioning, Navigation and Timing (PNT)	0604120A/ED5, BV4

04	1206120A / FJ9: Dismounted A-PNT	0604120A/EH8
04	1206120A / FK2: Mounted A-PNT	0604120A/EJ2
04	1206120A / FK3: Anti-Jam Antenna	0604120A/EJ2
04	1206308A / FE5: Space And Missile Defense Integration	0603308A/990
04	0603639A / EB8: OWL for Small Caliber Ammunition	0604802A/EP4
04	0603639A / EC2: Adv Armor-Piercing (ADVAP) for Small Cal Ammo	0604802A/FL4
04	0603639A / EU3: .50 Caliber All-Purpose Tactical Cartridge (APTC)	0604802A/EU5
04	0604541A / BT1: Interoperability	0604541A/BT3, BT5
04	0604541A / BT4: Network Technology Maturation Initiatives (NTMI)	0604541A/BT5
05	0604798A / DY3: NIE Test & Evaluation	0604798A/DY7
05	0604798A / DZ6: Army Integration Management & Coordination	0605054A/FL7
06	0605326A / 33B: Soldier-Centered Analyses For Future Force	0605604A/675
07	1203142A / FE1: Dscs-Dcs (Phase II)	0303142A/253
07	1203142A / FE2: MILSATCOM System Engineering	0303142A/456
07	1203142A / FI8: Protected Anti-JAM Tactical SATCOM	0303142A/456
07	1208053A / FE7: Joint Tact Grd Station-P3I(MIP)	0208053A/635
07	0303028A / FG2: Counterintelligence & Human Intel Modernization	0607150A/BS5
07	0303028A / H13: Information Dominance Center (IDC) - Tiara	0607150A/BS5
07	0305232A / RA7: RQ-11 Raven (MIP)	0604101A/BR6, 0605205A/BR7

**Program Terminations (including transfers to Procurement and Sustainment):**

<b><u>Budget Activity</u></b>	<b><u>OSDPE / Project</u></b>	<b><u>Project Title</u></b>
02	0602146A / AN5	Protected SATCOM-WB Global SATCOM Inter Canc Tech
02	0602146A / AU5	Automated Analytics for Operational Environment
02	0602146A / AW5	Modular GPS Independent Sensors Technology
02	0602147A / AH2	Single Multi-mission Attack Missile (SMAM) Technol
02	0602213A / CY9	Decoy and Deterrence Technology
02	0602787A / VB4	System Biology And Network Science Technology
03	0603457A / 7CY	Decoy and Deterrence Advanced Technology

03	0603462A / BF5	Adv Lethality & Accuracy Sys for Med Cal Adv Tech
03	0603463A / AW2	Autonomous Navigation Advanced Technology
03	0603464A / AE6	Strategic Long Range Cannon Advanced Technology
03	0603465A / AI4	Joint Multi-Role (JMR) Demonstration Advanced Tech
03	0603465A / AL6	Degraded Vis Environ Mitigation (DVE-M) Adv Tech
04	1206120A / FK1	PSEUDOLITES
04	0603804A / G11	Adv Elec Energy Con Ad
04	0604115A / AX8	Adv Leth and Accuracy Sys for Med Calber (ALAS-MC)
04	0604644A / MR1	Mobile Intermediate Range Missile
05	0604201A / EW7	Degraded Visual Environment
05	0604601A / FI2	Lightweight 30mm Cannon
05	0604710A / L76	Dismounted Fire Support Laser Targeting Systems
05	0604802A / ED7	Advanced Multipurpose (AMP) Cartridge
05	0604802A / EU7	Enhanced Lethality Cannon Munitions
05	0604804A / FG4	Ultra-Lightweight Camouflage Net System (ULCANS)
05	0604804A / L43	ENGINEER SUPPORT EQUIPMENT - ED
05	0604827A / S65	Platoon Power Generator
05	0604852A / XU9	Active Protection System
05	0604854A / 509	LIGHTWEIGHT 155M HOWITZER
05	0605013A / 193	Medical Communications For Combat Casualty
05	0605013A / XV6	Army Leader Dashboard
05	0605029A / EQ2	IntegGrdSecSurvRespC(IGSSR-C)
05	0605034A / EQ4	Tactical Security System (TSS)
05	0605036A / EQ5	Combating Weapons of Mass Destruction (CWMD)
05	0605049A / XT4	Advanced Threat Detection System (ATDS)
05	0605053A / FB2	Man Transportable Robotic System (MTRS) Inc II
05	0605053A / FB9	MTRS Standardization
06	0605805A / 857	DoD Explosives Safety Standards
06	0606001A / FD4	Military Ground-Based CREW Technology
07	0303150A / C86	Army Global C2 System

07	0305233A / RQ7	RQ-7 Shadow UAV
07	0307665A / FL5	Next Gen Biometric Collection Capability (MIP)
07	0607138A / ES5	Fixed Wing Product Improvement Program
07	0607665A / DT2	Non-MIP Biometrics

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.



Department of Defense  
 FY 2021 President's Budget  
 Exhibit R-1 FY 2021 President's Budget  
 Total Obligational Authority  
 (Dollars in Thousands)

17 Jan 2020

Appropriation	FY 2019	FY 2020	FY 2020	FY 2020	FY 2020	FY 2020
	(Base + OCO)	Base Enacted	Emergency	OCO Enacted	OCO Enacted	Total Enacted (Base+Emerg+ OCO)
Research, Development, Test & Eval, Army	11,371,268	12,543,435		147,304		12,690,739
Total Research, Development, Test & Evaluation	11,371,268	12,543,435		147,304		12,690,739

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Appropriation	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Research, Development, Test & Eval, Army	12,587,343		182,824	182,824	12,770,167
Total Research, Development, Test & Evaluation	12,587,343		182,824	182,824	12,770,167



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17 Jan 2020

Summary Recap of Budget Activities	FY 2019	FY 2020	FY 2020	FY 2020	FY 2020	FY 2020
	(Base + OCO)	Base Enacted	Emergency	OCO Enacted	OCO Enacted	Total Enacted (Base+Emerg+ OCO)
Basic Research	491,263	574,484				574,484
Applied Research	1,553,764	1,259,374				1,259,374
Advanced Technology Development	1,561,576	1,531,516				1,531,516
Advanced Component Development & Prototypes	1,213,569	2,975,681		11,114		2,986,795
System Development & Demonstration	3,119,552	2,989,779		100,147		3,089,926
Management Support	1,710,179	1,368,475		1,875		1,370,350
Operational Systems Development	1,721,365	1,844,126		34,168		1,878,294
Software and Digital Technology Pilot Programs						
Total Research, Development, Test & Evaluation	11,371,268	12,543,435		147,304		12,690,739
Summary Recap of FYDP Programs						
General Purpose Forces	646,373	765,324				765,324
Intelligence and Communications	311,699	236,563		37,368		273,931
Research and Development	10,090,836	11,139,975		109,936		11,249,911
Central Supply and Maintenance	106,766	108,348				108,348
Administration and Associated Activities	358					
Space	209,281	285,952				285,952
Classified Programs	5,955	7,273				7,273
Total Research, Development, Test & Evaluation	11,371,268	12,543,435		147,304		12,690,739

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	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
<u>Summary Recap of Budget Activities</u>					
Basic Research	463,359				463,359
Applied Research	920,881		2,000	2,000	922,881
Advanced Technology Development	1,203,590				1,203,590
Advanced Component Development & Prototypes	3,421,608		2,520	2,520	3,424,128
System Development & Demonstration	3,199,798		97,825	97,825	3,297,623
Management Support	1,333,123		5,137	5,137	1,338,260
Operational Systems Development	1,998,539		75,342	75,342	2,073,881
Software and Digital Technology Pilot Programs	46,445				46,445
Total Research, Development, Test & Evaluation	12,587,343		182,824	182,824	12,770,167
<u>Summary Recap of FYDP Programs</u>					
General Purpose Forces	923,370		2,300	2,300	925,670
Intelligence and Communications	309,698		76,942	76,942	386,640
Research and Development	11,289,280		103,582	103,582	11,392,862
Central Supply and Maintenance	61,012				61,012
Administration and Associated Activities					
Space					
Classified Programs	3,983				3,983
Total Research, Development, Test & Evaluation	12,587,343		182,824	182,824	12,770,167

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 (Dollars in Thousands)

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Summary Recap of Budget Activities	FY 2019	FY 2020	FY 2020	FY 2020	FY 2020
	(Base + OCO)	Base Enacted	Emergency	OCO Enacted	Total Enacted (Base+Emerg+ OCO)
Basic Research	491,263	574,484			574,484
Applied Research	1,553,764	1,259,374			1,259,374
Advanced Technology Development	1,561,576	1,531,516			1,531,516
Advanced Component Development & Prototypes	1,213,569	2,975,681		11,114	2,986,795
System Development & Demonstration	3,119,552	2,989,779		100,147	3,089,926
Management Support	1,710,179	1,368,475		1,875	1,370,350
Operational Systems Development	1,721,365	1,844,126		34,168	1,878,294
Software and Digital Technology Pilot Programs					
Total Research, Development, Test & Evaluation	11,371,268	12,543,435		147,304	12,690,739
Summary Recap of FYDP Programs					
General Purpose Forces	646,373	765,324			765,324
Intelligence and Communications	311,699	236,563		37,368	273,931
Research and Development	10,090,836	11,139,975		109,936	11,249,911
Central Supply and Maintenance	106,766	108,348			108,348
Administration and Associated Activities	358				
Space	209,281	285,952			285,952
Classified Programs	5,955	7,273			7,273
Total Research, Development, Test & Evaluation	11,371,268	12,543,435		147,304	12,690,739

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17 Jan 2020

	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Summary Recap of Budget Activities					
Basic Research	463,359				463,359
Applied Research	920,881		2,000	2,000	922,881
Advanced Technology Development	1,203,590				1,203,590
Advanced Component Development & Prototypes	3,421,608		2,520	2,520	3,424,128
System Development & Demonstration	3,199,798		97,825	97,825	3,297,623
Management Support	1,333,123		5,137	5,137	1,338,260
Operational Systems Development	1,998,539		75,342	75,342	2,073,881
Software and Digital Technology Pilot Programs	46,445				46,445
Total Research, Development, Test & Evaluation	12,587,343		182,824	182,824	12,770,167
Summary Recap of FYDP Programs					
General Purpose Forces	923,370		2,300	2,300	925,670
Intelligence and Communications	309,698		76,942	76,942	386,640
Research and Development	11,289,280		103,582	103,582	11,392,862
Central Supply and Maintenance	61,012				61,012
Administration and Associated Activities					
Space					
Classified Programs	3,983				3,983
Total Research, Development, Test & Evaluation	12,587,343		182,824	182,824	12,770,167

Department of the Army  
 FY 2021 President's Budget  
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 (Dollars in Thousands)

17 Jan 2020

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

Program Line Element No	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted S (Base+Emerg+ OCO)
1	0601101A In-House Laboratory Independent Research	01	11,391				U
2	0601102A Defense Research Sciences	01	306,347	354,480			354,480 U
3	0601103A University Research Initiatives	01	62,813	87,858			87,858 U
4	0601104A University and Industry Research Centers	01	110,712	127,164			127,164 U
5	0601121A Cyber Collaborative Research Alliance	01		4,982			4,982 U
Basic Research			491,263	574,484			574,484
6	0602105A Materials Technology	02	79,432				U
7	0602115A Biomedical Technology	02					U
8	0602120A Sensors and Electronic Survivability	02	90,023				U
9	0602122A TRACTOR HIP	02	8,674				U
10	0602126A TRACTOR JACK	02	400				U
11	0602134A Counter Improvised-Threat Advanced Studies	02					U
12	0602141A Lethality Technology	02		69,961			69,961 U
13	0602142A Army Applied Research	02		30,819			30,819 U
14	0602143A Soldier Lethality Technology	02		145,900			145,900 U
15	0602144A Ground Technology	02		143,899			143,899 U
16	0602145A Next Generation Combat Vehicle Technology	02		263,547			263,547 U
17	0602146A Network C3I Technology	02		138,016			138,016 U

R-121PB: FY 2021 President's Budget (Published Version), as of January 17, 2020 at 11:58:58

Department of the Army  
 FY 2021 President's Budget  
 Exhibit R-1 FY 2021 President's Budget  
 Total Obligational Authority  
 (Dollars in Thousands)

17 Jan 2020

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

Line No	Program Element No	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	U
1	0601101A	In-House Laboratory Independent Research	01						U
2	0601102A	Defense Research Sciences	01	303,257				303,257	U
3	0601103A	University Research Initiatives	01	67,148				67,148	U
4	0601104A	University and Industry Research Centers	01	87,877				87,877	U
5	0601121A	Cyber Collaborative Research Alliance	01	5,077				5,077	U
		Basic Research		463,359				463,359	
6	0602105A	Materials Technology	02						U
7	0602115A	Biomedical Technology	02	11,835				11,835	U
8	0602120A	Sensors and Electronic Survivability	02						U
9	0602122A	TRACTOR HIP	02						U
10	0602126A	TRACTOR JACK	02						U
11	0602134A	Counter Improvised-Threat Advanced Studies	02	2,000				2,000	U
12	0602141A	Lethality Technology	02	42,425				42,425	U
13	0602142A	Army Applied Research	02	30,757				30,757	U
14	0602143A	Soldier Lethality Technology	02	125,435				125,435	U
15	0602144A	Ground Technology	02	28,047				28,047	U
16	0602145A	Next Generation Combat Vehicle Technology	02	217,565		2,000	2,000	219,565	U
17	0602146A	Network C3I Technology	02	114,404				114,404	U

R-121PB: FY 2021 President's Budget (Published Version), as of January 17, 2020 at 11:58:58

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

Program Line Element No	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted S (Base+Emerg+ OCO)	
18 0602147A	Long Range Precision Fires Technology	02		120,327			120,327	U
19 0602148A	Future Verticle Lift Technology	02		98,359			98,359	U
20 0602150A	Air and Missile Defense Technology	02		95,771			95,771	U
21 0602211A	Aviation Technology	02	80,424					U
22 0602213A	C3I Applied Cyber	02		18,947			18,947	U
23 0602270A	Electronic Warfare Technology	02	25,127					U
24 0602303A	Missile Technology	02	90,496					U
25 0602307A	Advanced Weapons Technology	02	43,454					U
26 0602308A	Advanced Concepts and Simulation	02	28,623					U
27 0602601A	Combat Vehicle and Automotive Technology	02	102,899					U
28 0602618A	Ballistics Technology	02	86,737					U
29 0602622A	Chemical, Smoke and Equipment Defeating Technology	02	4,884					U
30 0602623A	Joint Service Small Arms Program	02	11,890					U
31 0602624A	Weapons and Munitions Technology	02	379,833					U
32 0602705A	Electronics and Electronic Devices	02	98,855					U
33 0602709A	Night Vision Technology	02	33,218					U
34 0602712A	Countermine Systems	02	26,594					U
35 0602716A	Human Factors Engineering Technology	02	23,755					U
36 0602720A	Environmental Quality Technology	02	15,364					U

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18	0602147A	Long Range Precision Fires Technology	02	60,553			60,553	60,553	U
19	0602148A	Future Verticle Lift Technology	02	96,484			96,484	96,484	U
20	0602150A	Air and Missile Defense Technology	02	56,298			56,298	56,298	U
21	0602211A	Aviation Technology	02						U
22	0602213A	C3I Applied Cyber	02	18,816			18,816	18,816	U
23	0602270A	Electronic Warfare Technology	02						U
24	0602303A	Missile Technology	02						U
25	0602307A	Advanced Weapons Technology	02						U
26	0602308A	Advanced Concepts and Simulation	02						U
27	0602601A	Combat Vehicle and Automotive Technology	02						U
28	0602618A	Ballistics Technology	02						U
29	0602622A	Chemical, Smoke and Equipment Defeating Technology	02						U
30	0602623A	Joint Service Small Arms Program	02						U
31	0602624A	Weapons and Munitions Technology	02						U
32	0602705A	Electronics and Electronic Devices	02						U
33	0602709A	Night Vision Technology	02						U
34	0602712A	Countermine Systems	02						U
35	0602716A	Human Factors Engineering Technology	02						U
36	0602720A	Environmental Quality Technology	02						U

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37	0602782A Command, Control, Communications Technology	02	51,685					U
38	0602783A Computer and Software Technology	02	14,622					U
39	0602784A Military Engineering Technology	02	96,922					U
40	0602785A Manpower/Personnel/Training Technology	02	17,157	20,873			20,873	U
41	0602786A Warfighter Technology	02	55,467					U
42	0602787A Medical Technology	02	87,229	112,955			112,955	U
	Applied Research		1,553,764	1,259,374			1,259,374	
43	0603001A Warfighter Advanced Technology	03	40,501					U
44	0603002A Medical Advanced Technology	03	94,575	83,030			83,030	U
45	0603003A Aviation Advanced Technology	03	165,035					U
46	0603004A Weapons and Munitions Advanced Technology	03	240,862					U
47	0603005A Combat Vehicle and Automotive Advanced Technology	03	171,448					U
48	0603006A Space Application Advanced Technology	03	48,542					U
49	0603007A Manpower, Personnel and Training Advanced Technology	03	6,270	11,038			11,038	U
50	0603009A TRACTOR HIKE	03	22,631					U
51	0603015A Next Generation Training & Simulation Systems	03	27,711					U
52	0603115A Medical Development	03						U

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37 0602782A	Command, Control, Communications Technology	02						U
38 0602783A	Computer and Software Technology	02						U
39 0602784A	Military Engineering Technology	02						U
40 0602785A	Manpower/Personnel/Training Technology	02	20,766				20,766	U
41 0602786A	Warfighter Technology	02						U
42 0602787A	Medical Technology	02	95,496				95,496	U
	Applied Research		920,881		2,000	2,000	922,881	
43 0603001A	Warfighter Advanced Technology	03						U
44 0603002A	Medical Advanced Technology	03	38,896				38,896	U
45 0603003A	Aviation Advanced Technology	03						U
46 0603004A	Weapons and Munitions Advanced Technology	03						U
47 0603005A	Combat Vehicle and Automotive Advanced Technology	03						U
48 0603006A	Space Application Advanced Technology	03						U
49 0603007A	Manpower, Personnel and Training Advanced Technology	03	11,659				11,659	U
50 0603009A	TRACTOR HIKE	03						U
51 0603015A	Next Generation Training & Simulation Systems	03						U
52 0603115A	Medical Development	03	27,723				27,723	U

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53 0603117A	Army Advanced Technology Development	03		66,338			66,338 U
54 0603118A	Soldier Lethality Advanced Technology	03		135,968			135,968 U
55 0603119A	Ground Advanced Technology	03		136,793			136,793 U
56 0603125A	Combating Terrorism - Technology Development	03	43,910				U
57 0603130A	TRACTOR NAIL	03	4,896				U
58 0603131A	TRACTOR EGGS	03	6,041				U
59 0603134A	Counter Improvised-Threat Simulation	03					U
60 0603270A	Electronic Warfare Technology	03	40,461				U
61 0603313A	Missile and Rocket Advanced Technology	03	92,404				U
62 0603322A	TRACTOR CAGE	03	16,845				U
63 0603457A	C3I Cyber Advanced Development	03		23,769			23,769 U
64 0603461A	High Performance Computing Modernization Program	03	211,457	224,755			224,755 U
65 0603462A	Next Generation Combat Vehicle Advanced Technology	03		260,535			260,535 U
66 0603463A	Network C3I Advanced Technology	03		142,899			142,899 U
67 0603464A	Long Range Precision Fires Advanced Technology	03		189,386			189,386 U
68 0603465A	Future Vertical Lift Advanced Technology	03		174,892			174,892 U

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53	0603117A	Army Advanced Technology Development	03	62,663				62,663	U
54	0603118A	Soldier Lethality Advanced Technology	03	109,608				109,608	U
55	0603119A	Ground Advanced Technology	03	14,795				14,795	U
56	0603125A	Combating Terrorism - Technology Development	03						U
57	0603130A	TRACTOR NAIL	03						U
58	0603131A	TRACTOR EGGS	03						U
59	0603134A	Counter Improvised-Threat Simulation	03	25,000				25,000	U
60	0603270A	Electronic Warfare Technology	03						U
61	0603313A	Missile and Rocket Advanced Technology	03						U
62	0603322A	TRACTOR CAGE	03						U
63	0603457A	C3I Cyber Advanced Development	03	23,357				23,357	U
64	0603461A	High Performance Computing Modernization Program	03	188,024				188,024	U
65	0603462A	Next Generation Combat Vehicle Advanced Technology	03	199,358				199,358	U
66	0603463A	Network C3I Advanced Technology	03	158,608				158,608	U
67	0603464A	Long Range Precision Fires Advanced Technology	03	121,060				121,060	U
68	0603465A	Future Vertical Lift Advanced Technology	03	156,194				156,194	U

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69 0603466A	Air and Missile Defense Advanced Technology	03		82,113			82,113 U
70 0603606A	Landmine Warfare and Barrier Advanced Technology	03	16,860				U
71 0603607A	Joint Service Small Arms Program	03	22,628				U
72 0603710A	Night Vision Advanced Technology	03	69,094				U
73 0603728A	Environmental Quality Technology Demonstrations	03	28,079				U
74 0603734A	Military Engineering Advanced Technology	03	100,359				U
75 0603772A	Advanced Tactical Computer Science and Sensor Technology	03	45,799				U
76 0603794A	C3 Advanced Technology	03	45,168				U
77 0603920A	Humanitarian Demining	03					U
	Advanced Technology Development		1,561,576	1,531,516			1,531,516
78 0603305A	Army Missile Defense Systems Integration	04	60,301	59,487			59,487 U
79 0603308A	Army Space Systems Integration	04					U
80 0603327A	Air and Missile Defense Systems Engineering	04	44,743	52,480		500	52,980 U
81 0603619A	Landmine Warfare and Barrier - Adv Dev	04	40,255	82,915			82,915 U
82 0603627A	Smoke, Obscurant and Target Defeating Sys-Adv Dev	04	19,852				U
83 0603639A	Tank and Medium Caliber Ammunition	04	40,358	77,696			77,696 U

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69	0603466A	Air and Missile Defense Advanced Technology	03	58,130				58,130	U
70	0603606A	Landmine Warfare and Barrier Advanced Technology	03						U
71	0603607A	Joint Service Small Arms Program	03						U
72	0603710A	Night Vision Advanced Technology	03						U
73	0603728A	Environmental Quality Technology Demonstrations	03						U
74	0603734A	Military Engineering Advanced Technology	03						U
75	0603772A	Advanced Tactical Computer Science and Sensor Technology	03						U
76	0603794A	C3 Advanced Technology	03						U
77	0603920A	Humanitarian Demining	03	8,515				8,515	U
		Advanced Technology Development		1,203,590				1,203,590	
78	0603305A	Army Missile Defense Systems Integration	04	11,062				11,062	U
79	0603308A	Army Space Systems Integration	04	26,230				26,230	U
80	0603327A	Air and Missile Defense Systems Engineering	04	26,482		500	500	26,982	U
81	0603619A	Landmine Warfare and Barrier - Adv Dev	04	64,092				64,092	U
82	0603627A	Smoke, Obscurant and Target Defeating Sys-Adv Dev	04						U
83	0603639A	Tank and Medium Caliber Ammunition	04	92,753				92,753	U

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84 0603645A	Armored System Modernization - Adv Dev	04	80,106	144,234			144,234 U
85 0603747A	Soldier Support and Survivability	04	8,067	6,514		3,000	9,514 U
86 0603766A	Tactical Electronic Surveillance System - Adv Dev	04	35,667	37,490			37,490 U
87 0603774A	Night Vision Systems Advanced Development	04	7,072	200,791			200,791 U
88 0603779A	Environmental Quality Technology - Dem/Val	04	14,190	19,561			19,561 U
89 0603790A	NATO Research and Development	04	3,564	5,406			5,406 U
90 0603801A	Aviation - Adv Dev	04	93,885	505,890			505,890 U
91 0603804A	Logistics and Engineer Equipment - Adv Dev	04	18,845	6,254		1,085	7,339 U
92 0603807A	Medical Systems - Adv Dev	04	38,371	36,975			36,975 U
93 0603827A	Soldier Systems - Advanced Development	04	30,384	26,113			26,113 U
94 0604017A	Robotics Development	04	70,745	84,381			84,381 U
95 0604020A	Cross Functional Team (CFT) Advanced Development & Prototyping	04	8,225				U
96 0604021A	Electronic Warfare Technology Maturation (MIP)	04		23,043			23,043 U
97 0604035A	Low Earth Orbit (LEO) Satellite Capability	04					U
98 0604100A	Analysis Of Alternatives	04	9,396	10,023			10,023 U

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84	0603645A	Armored System Modernization - Adv Dev	04	151,478			151,478	151,478	U
85	0603747A	Soldier Support and Survivability	04	5,841			5,841	5,841	U
86	0603766A	Tactical Electronic Surveillance System - Adv Dev	04	194,775			194,775	194,775	U
87	0603774A	Night Vision Systems Advanced Development	04	24,316			24,316	24,316	U
88	0603779A	Environmental Quality Technology - Dem/Val	04	13,387			13,387	13,387	U
89	0603790A	NATO Research and Development	04	4,762			4,762	4,762	U
90	0603801A	Aviation - Adv Dev	04	647,937			647,937	647,937	U
91	0603804A	Logistics and Engineer Equipment - Adv Dev	04	4,761			4,761	4,761	U
92	0603807A	Medical Systems - Adv Dev	04	28,520			28,520	28,520	U
93	0603827A	Soldier Systems - Advanced Development	04	26,138			26,138	26,138	U
94	0604017A	Robotics Development	04	121,207			121,207	121,207	U
95	0604020A	Cross Functional Team (CFT) Advanced Development & Prototyping	04						U
96	0604021A	Electronic Warfare Technology Maturation (MIP)	04	22,840			22,840	22,840	U
97	0604035A	Low Earth Orbit (LEO) Satellite Capability	04	22,678			22,678	22,678	U
98	0604100A	Analysis Of Alternatives	04	10,082			10,082	10,082	U

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99 0604101A	Small Unmanned Aerial Vehicle (SUAV) (6.4)	04						U
100 0604113A	Future Tactical Unmanned Aircraft System (FTUAS)	04	12,393	40,745			40,745	U
101 0604114A	Lower Tier Air Missile Defense (LTAMD) Sensor	04	84,981	379,772			379,772	U
102 0604115A	Technology Maturation Initiatives	04	91,749	179,676			179,676	U
103 0604117A	Maneuver - Short Range Air Defense (M-SHORAD)	04	75,711	42,900			42,900	U
104 0604118A	TRACTOR BEAM	04	52,894					U
105 0604119A	Army Advanced Component Development & Prototyping	04		112,806		4,529	117,335	U
106 0604120A	Assured Positioning, Navigation and Timing (PNT)	04						U
107 0604121A	Synthetic Training Environment Refinement & Prototyping	04	39,890	103,621			103,621	U
108 0604134A	Counter Improvised-Threat Demonstration, Prototype Development, and Testing	04						U
109 0604182A	Hypersonics	04		404,000			404,000	U
110 0604319A	Indirect Fire Protection Capability Increment 2-Intercept (IFPC2)	04	10,324					U
111 0604403A	Future Interceptor	04		2,000			2,000	U
112 0604541A	Unified Network Transport	04		29,700			29,700	U
113 0604644A	Mobile Medium Range Missile	04		5,000			5,000	U

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99 0604101A	Small Unmanned Aerial Vehicle (SUAV) (6.4)	04	1,378				1,378	U
100 0604113A	Future Tactical Unmanned Aircraft System (FTUAS)	04	40,083				40,083	U
101 0604114A	Lower Tier Air Missile Defense (LTAMD) Sensor	04	376,373				376,373	U
102 0604115A	Technology Maturation Initiatives	04	156,834				156,834	U
103 0604117A	Maneuver - Short Range Air Defense (M-SHORAD)	04	4,995				4,995	U
104 0604118A	TRACTOR BEAM	04						U
105 0604119A	Army Advanced Component Development & Prototyping	04	170,490				170,490	U
106 0604120A	Assured Positioning, Navigation and Timing (PNT)	04	128,125				128,125	U
107 0604121A	Synthetic Training Environment Refinement & Prototyping	04	129,547				129,547	U
108 0604134A	Counter Improvised-Threat Demonstration, Prototype Development, and Testing	04	13,831				13,831	U
109 0604182A	Hypersonics	04	801,417				801,417	U
110 0604319A	Indirect Fire Protection Capability Increment 2-Intercept (IFPC2)	04						U
111 0604403A	Future Interceptor	04	7,992				7,992	U
112 0604541A	Unified Network Transport	04	40,677				40,677	U
113 0604644A	Mobile Medium Range Missile	04						U

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114 0604785A	Integrated Base Defense (Budget Activity 4)	04		2,000		2,000	2,000 U
115 0305251A	Cyberspace Operations Forces and Force Support	04	52,817	52,102			52,102 U
116 1206120A	Assured Positioning, Navigation and Timing (PNT)	04	123,364	139,110			139,110 U
117 1206308A	Army Space Systems Integration	04	45,420	104,996			104,996 U
	Advanced Component Development & Prototypes		1,213,569	2,975,681		11,114	2,986,795
118 0604201A	Aircraft Avionics	05	31,401	8,414			8,414 U
119 0604270A	Electronic Warfare Development	05	56,310	59,539			59,539 U
120 0604328A	TRACTOR CAGE	05	27,050				U
121 0604601A	Infantry Support Weapons	05	74,629	87,179			87,179 U
122 0604604A	Medium Tactical Vehicles	05	3,905				U
123 0604611A	JAVELIN	05	5,250	14,997			14,997 U
124 0604622A	Family of Heavy Tactical Vehicles	05	11,182	13,125			13,125 U
125 0604633A	Air Traffic Control	05	11,580	5,781			5,781 U
126 0604642A	Light Tactical Wheeled Vehicles	05	1,013	2,965			2,965 U
127 0604645A	Armored Systems Modernization (ASM) - Eng Dev	05	359,017	285,136			285,136 U
128 0604710A	Night Vision Systems - Eng Dev	05	139,337	143,696			143,696 U
129 0604713A	Combat Feeding, Clothing, and Equipment	05	4,393	7,393			7,393 U

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114	0604785A Integrated Base Defense (Budget Activity 4)	04			2,020	2,020	2,020	U
115	0305251A Cyberspace Operations Forces and Force Support	04	50,525				50,525	U
116	1206120A Assured Positioning, Navigation and Timing (PNT)	04						U
117	1206308A Army Space Systems Integration	04						U
	Advanced Component Development & Prototypes		3,421,608		2,520	2,520	3,424,128	
118	0604201A Aircraft Avionics	05	2,764				2,764	U
119	0604270A Electronic Warfare Development	05	62,426				62,426	U
120	0604328A TRACTOR CAGE	05						U
121	0604601A Infantry Support Weapons	05	91,574				91,574	U
122	0604604A Medium Tactical Vehicles	05	8,523				8,523	U
123	0604611A JAVELIN	05	7,493				7,493	U
124	0604622A Family of Heavy Tactical Vehicles	05	24,792				24,792	U
125	0604633A Air Traffic Control	05	3,511				3,511	U
126	0604642A Light Tactical Wheeled Vehicles	05	1,976				1,976	U
127	0604645A Armored Systems Modernization (ASM) - Eng Dev	05	135,488				135,488	U
128	0604710A Night Vision Systems - Eng Dev	05	61,445				61,445	U
129	0604713A Combat Feeding, Clothing, and Equipment	05	2,814				2,814	U

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130 0604715A	Non-System Training Devices - Eng Dev	05	42,604	30,912			30,912 U
131 0604741A	Air Defense Command, Control and Intelligence - Eng Dev	05	208,965	33,502			33,502 U
132 0604742A	Constructive Simulation Systems Development	05	21,354	11,636			11,636 U
133 0604746A	Automatic Test Equipment Development	05	10,104	10,915			10,915 U
134 0604760A	Distributive Interactive Simulations (DIS) - Eng Dev	05	8,423	7,801			7,801 U
135 0604768A	Brilliant Anti-Armor Submunition (BAT)	05	6,568	20,000			20,000 U
136 0604780A	Combined Arms Tactical Trainer (CATT) Core	05	20,514	9,241			9,241 U
137 0604798A	Brigade Analysis, Integration and Evaluation	05	48,030	38,303			38,303 U
138 0604802A	Weapons and Munitions - Eng Dev	05	173,713	186,323			186,323 U
139 0604804A	Logistics and Engineer Equipment - Eng Dev	05	70,096	107,826			107,826 U
140 0604805A	Command, Control, Communications Systems - Eng Dev	05	15,366	12,595			12,595 U
141 0604807A	Medical Materiel/Medical Biological Defense Equipment - Eng Dev	05	45,054	48,264			48,264 U
142 0604808A	Landmine Warfare/Barrier - Eng Dev	05	39,261	37,108			37,108 U
143 0604818A	Army Tactical Command & Control Hardware & Software	05	163,229	129,974			129,974 U
144 0604820A	Radar Development	05	37,847	95,720			95,720 U

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130 0604715A	Non-System Training Devices - Eng Dev	05	28,036				28,036	U
131 0604741A	Air Defense Command, Control and Intelligence - Eng Dev	05	43,651		27,000	27,000	70,651	U
132 0604742A	Constructive Simulation Systems Development	05	10,150				10,150	U
133 0604746A	Automatic Test Equipment Development	05	5,578				5,578	U
134 0604760A	Distributive Interactive Simulations (DIS) - Eng Dev	05	7,892				7,892	U
135 0604768A	Brilliant Anti-Armor Submunition (BAT)	05	24,975				24,975	U
136 0604780A	Combined Arms Tactical Trainer (CAT) Core	05	3,568				3,568	U
137 0604798A	Brigade Analysis, Integration and Evaluation	05	19,268				19,268	U
138 0604802A	Weapons and Munitions - Eng Dev	05	265,811				265,811	U
139 0604804A	Logistics and Engineer Equipment - Eng Dev	05	49,694				49,694	U
140 0604805A	Command, Control, Communications Systems - Eng Dev	05	11,079				11,079	U
141 0604807A	Medical Materiel/Medical Biological Defense Equipment - Eng Dev	05	49,870				49,870	U
142 0604808A	Landmine Warfare/Barrier - Eng Dev	05	9,589				9,589	U
143 0604818A	Army Tactical Command & Control Hardware & Software	05	162,513				162,513	U
144 0604820A	Radar Development	05	109,259				109,259	U

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145 0604822A	General Fund Enterprise Business System (GFEB)	05	35,468	42,883			42,883 U
146 0604823A	Firefinder	05	25,856	17,294			17,294 U
147 0604827A	Soldier Systems - Warrior Dem/Val	05	10,044	4,803			4,803 U
148 0604852A	Suite of Survivability Enhancement Systems - EMD	05	50,380	85,198			85,198 U
149 0604854A	Artillery Systems - EMD	05	1,722	10,732			10,732 U
150 0605013A	Information Technology Development	05	74,551	88,689			88,689 U
151 0605018A	Integrated Personnel and Pay System-Army (IPPS-A)	05	158,807	102,073			102,073 U
152 0605028A	Armored Multi-Purpose Vehicle (AMPV)	05	107,521	83,830			83,830 U
153 0605029A	Integrated Ground Security Surveillance Response Capability (IGSSR-C)	05	3,104	6,699			6,699 U
154 0605030A	Joint Tactical Network Center (JTNC)	05	15,287	15,882			15,882 U
155 0605031A	Joint Tactical Network (JTN)	05	42,134	40,808			40,808 U
156 0605032A	TRACTOR TIRE	05	107,926				U
157 0605033A	Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E)	05	4,980	3,847			3,847 U
158 0605034A	Tactical Security System (TSS)	05	4,326	6,928			6,928 U
159 0605035A	Common Infrared Countermeasures (CIRCM)	05	32,025	23,179			23,179 U
160 0605036A	Combating Weapons of Mass Destruction (CWMD)	05	10,883	10,000			10,000 U

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145 0604822A	General Fund Enterprise Business System (GFEBs)	05	21,201				21,201	U
146 0604823A	Firefinder	05	20,008				20,008	U
147 0604827A	Soldier Systems - Warrior Dem/Val	05	6,534				6,534	U
148 0604852A	Suite of Survivability Enhancement Systems - EMD	05	82,459				82,459	U
149 0604854A	Artillery Systems - EMD	05	11,611				11,611	U
150 0605013A	Information Technology Development	05	142,678				142,678	U
151 0605018A	Integrated Personnel and Pay System-Army (IPPS-A)	05	115,286				115,286	U
152 0605028A	Armored Multi-Purpose Vehicle (AMPV)	05	96,594				96,594	U
153 0605029A	Integrated Ground Security Surveillance Response Capability (IGSSR-C)	05						U
154 0605030A	Joint Tactical Network Center (JTNC)	05	16,264				16,264	U
155 0605031A	Joint Tactical Network (JTN)	05	31,696				31,696	U
156 0605032A	TRACTOR TIRE	05						U
157 0605033A	Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E)	05	5,976				5,976	U
158 0605034A	Tactical Security System (TSS)	05						U
159 0605035A	Common Infrared Countermeasures (CIRCM)	05	23,321		2,300	2,300	25,621	U
160 0605036A	Combating Weapons of Mass Destruction (CWMD)	05						U

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161 0605038A	Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) Sensor Suite	05	14,517	6,054			6,054 U
162 0605041A	Defensive CYBER Tool Development	05	33,796	50,662			50,662 U
163 0605042A	Tactical Network Radio Systems (Low-Tier)	05	18,761	28,404			28,404 U
164 0605047A	Contract Writing System	05	40,341	17,082			17,082 U
165 0605049A	Missile Warning System Modernization (MWSM)	05	7,321	1,539			1,539 U
166 0605051A	Aircraft Survivability Development	05	56,067	55,057		77,420	132,477 U
167 0605052A	Indirect Fire Protection Capability Inc 2 - Block 1	05	92,674	194,366			194,366 U
168 0605053A	Ground Robotics	05	65,311	26,104			26,104 U
169 0605054A	Emerging Technology Initiatives	05	46,451	37,696			37,696 U
170 0605145A	Medical Products and Support Systems Development	05					0 U
171 0605203A	Army System Development & Demonstration	05	15,379	164,883		19,527	184,410 U
172 0605205A	Small Unmanned Aerial Vehicle (SUAV) (6.5)	05					0 U
173 0605380A	AMF Joint Tactical Radio System (JTRS)	05					0 U
174 0605450A	Joint Air-to-Ground Missile (JAGM)	05	12,440	6,585			6,585 U
175 0605457A	Army Integrated Air and Missile Defense (AIAMD)	05	318,850	208,638			208,638 U

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161 0605038A	Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) Sensor Suite	05	4,846				4,846	U
162 0605041A	Defensive CYBER Tool Development	05	28,544				28,544	U
163 0605042A	Tactical Network Radio Systems (Low-Tier)	05	28,178				28,178	U
164 0605047A	Contract Writing System	05	22,860				22,860	U
165 0605049A	Missile Warning System Modernization (MWSM)	05						U
166 0605051A	Aircraft Survivability Development	05	35,893		64,625	64,625	100,518	U
167 0605052A	Indirect Fire Protection Capability Inc 2 - Block 1	05	235,770				235,770	U
168 0605053A	Ground Robotics	05	13,710				13,710	U
169 0605054A	Emerging Technology Initiatives	05	294,739				294,739	U
170 0605145A	Medical Products and Support Systems Development	05	954				954	U
171 0605203A	Army System Development & Demonstration	05	150,201				150,201	U
172 0605205A	Small Unmanned Aerial Vehicle (SUAV) (6.5)	05	5,999				5,999	U
173 0605380A	AMF Joint Tactical Radio System (JTRS)	05						U
174 0605450A	Joint Air-to-Ground Missile (JAGM)	05	8,891				8,891	U
175 0605457A	Army Integrated Air and Missile Defense (AIAMD)	05	193,929				193,929	U

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176 0605625A	Manned Ground Vehicle	05		205,620			205,620 U
177 0605766A	National Capabilities Integration (MIP)	05	12,340	7,835			7,835 U
178 0605812A	Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph	05		7,232			7,232 U
179 0605830A	Aviation Ground Support Equipment	05	7,616	1,664			1,664 U
180 0303032A	TROJAN - RH12	05	5,721	3,936			3,936 U
181 0303267A	Auctioned Spectrum Relocation Fund	05	18,381				U
182 0303367A	Spectrum Access Research and Development	05	285				U
183 0304270A	Electronic Warfare Development	05	8,922	15,232		3,200	18,432 U
184 1205117A	Tractor Bears	05	23,170				U
	System Development & Demonstration		3,119,552	2,989,779		100,147	3,089,926
185 0604256A	Threat Simulator Development	06	46,732	42,117			42,117 U
186 0604258A	Target Systems Development	06	31,286	28,327			28,327 U
187 0604759A	Major T&E Investment	06	79,214	146,565			146,565 U
188 0605103A	Rand Arroyo Center	06	19,071	13,113			13,113 U
189 0605301A	Army Kwajalein Atoll	06	237,414	238,691			238,691 U
190 0605326A	Concepts Experimentation Program	06	30,667	36,922			36,922 U
191 0605502A	Small Business Innovative Research	06	303,386				U
192 0605601A	Army Test Ranges and Facilities	06	311,027	336,468			336,468 U

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176	0605625A Manned Ground Vehicle	05	327,732				327,732	U
177	0605766A National Capabilities Integration (MIP)	05	7,670				7,670	U
178	0605812A Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph	05	1,742				1,742	U
179	0605830A Aviation Ground Support Equipment	05	1,467				1,467	U
180	0303032A TROJAN - RH12	05	3,451				3,451	U
181	0303267A Auctioned Spectrum Relocation Fund	05						U
182	0303367A Spectrum Access Research and Development	05						U
183	0304270A Electronic Warfare Development	05	55,855		3,900	3,900	59,755	U
184	1205117A Tractor Bears	05						U
	System Development & Demonstration		3,199,798		97,825	97,825	3,297,623	
185	0604256A Threat Simulator Development	06	14,515				14,515	U
186	0604258A Target Systems Development	06	10,668				10,668	U
187	0604759A Major T&E Investment	06	106,270				106,270	U
188	0605103A Rand Arroyo Center	06	13,481				13,481	U
189	0605301A Army Kwajalein Atoll	06	231,824				231,824	U
190	0605326A Concepts Experimentation Program	06	54,898				54,898	U
191	0605502A Small Business Innovative Research	06						U
192	0605601A Army Test Ranges and Facilities	06	350,359				350,359	U

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193 0605602A	Army Technical Test Instrumentation and Targets	06	82,617	61,974			61,974 U
194 0605604A	Survivability/Lethality Analysis	06	39,886	35,075			35,075 U
195 0605606A	Aircraft Certification	06	3,796	3,461			3,461 U
196 0605702A	Meteorological Support to RDT&E Activities	06	9,495	6,233			6,233 U
197 0605706A	Matériel Systems Analysis	06	21,043	21,342			21,342 U
198 0605709A	Exploitation of Foreign Items	06	15,026	11,168			11,168 U
199 0605712A	Support of Operational Testing	06	52,139	52,723			52,723 U
200 0605716A	Army Evaluation Center	06	56,532	60,815			60,815 U
201 0605718A	Army Modeling & Sim X-Cmd Collaboration & Integ	06	2,708	2,527			2,527 U
202 0605801A	Programwide Activities	06	60,218	58,175			58,175 U
203 0605803A	Technical Information Activities	06	28,237	30,060			30,060 U
204 0605805A	Munitions Standardization, Effectiveness and Safety	06	66,678	54,458			54,458 U
205 0605857A	Environmental Quality Technology Mgmt Support	06	3,138	4,681			4,681 U
206 0605898A	Army Direct Report Headquarters - R&D - MHA	06	53,526	53,820			53,820 U
207 0606001A	Military Ground-Based CREW Technology	06	4,241	2,141			2,141 U
208 0606002A	Ronald Reagan Ballistic Missile Defense Test Site	06	60,808	62,069			62,069 U

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193 0605602A	Army Technical Test Instrumentation and Targets	06	48,475				48,475	U
194 0605604A	Survivability/Lethality Analysis	06	36,001				36,001	U
195 0605606A	Aircraft Certification	06	2,736				2,736	U
196 0605702A	Meteorological Support to RDT&E Activities	06	6,488				6,488	U
197 0605706A	Materiel Systems Analysis	06	21,859				21,859	U
198 0605709A	Exploitation of Foreign Items	06	7,936		1,000	1,000	8,936	U
199 0605712A	Support of Operational Testing	06	54,470				54,470	U
200 0605716A	Army Evaluation Center	06	63,141				63,141	U
201 0605718A	Army Modeling & Sim X-Cmd Collaboration & Integ	06	2,572				2,572	U
202 0605801A	Programwide Activities	06	87,472				87,472	U
203 0605803A	Technical Information Activities	06	26,244				26,244	U
204 0605805A	Munitions Standardization, Effectiveness and Safety	06	40,133				40,133	U
205 0605857A	Environmental Quality Technology Mgmt Support	06	1,780				1,780	U
206 0605898A	Army Direct Report Headquarters - R&D - MHA	06	55,045				55,045	U
207 0606001A	Military Ground-Based CREW Technology	06						U
208 0606002A	Ronald Reagan Ballistic Missile Defense Test Site	06	71,306				71,306	U

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209 0606003A	CounterIntel and Human Intel Modernization	06	2,636	1,050		1,875	2,925 U
210 0606105A	Medical Program-Wide Activities	06					U
211 0606942A	Assessments and Evaluations Cyber Vulnerabilities	06	88,300	4,500			4,500 U
212 0909980A	Judgment Fund Reimbursement	06	122				U
213 0909999A	Financing for Cancelled Account Adjustments	06	236				U
	Management Support		1,710,179	1,368,475		1,875	1,370,350
214 0603778A	MLRS Product Improvement Program	07	6,574	14,615			14,615 U
215 0603813A	TRACTOR PULL	07	4,067				U
216 0605024A	Anti-Tamper Technology Support	07	7,159	8,491			8,491 U
217 0607131A	Weapons and Munitions Product Improvement Programs	07	17,992	15,645			15,645 U
218 0607133A	TRACTOR SMOKE	07	12,357				U
219 0607134A	Long Range Precision Fires (LRPF)	07	152,573	156,682			156,682 U
220 0607135A	Apache Product Improvement Program	07	22,914				U
221 0607136A	Blackhawk Product Improvement Program	07	33,906	23,039			23,039 U
222 0607137A	Chinook Product Improvement Program	07	139,003	171,471			171,471 U
223 0607138A	Fixed Wing Product Improvement Program	07	2,146				U
224 0607139A	Improved Turbine Engine Program	07	173,766	206,434			206,434 U

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209 0606003A	CounterIntel and Human Intel Modernization	06	1,063		4,137	4,137	5,200	U
210 0606105A	Medical Program-Wide Activities	06	19,891				19,891	U
211 0606942A	Assessments and Evaluations Cyber Vulnerabilities	06	4,496				4,496	U
212 0909980A	Judgment Fund Reimbursement	06						U
213 0909999A	Financing for Cancelled Account Adjustments	06						U
	Management Support		1,333,123		5,137	5,137	1,338,260	
214 0603778A	MLRS Product Improvement Program	07	10,157				10,157	U
215 0603813A	TRACTOR PULL	07						U
216 0605024A	Anti-Tamper Technology Support	07	8,682				8,682	U
217 0607131A	Weapons and Munitions Product Improvement Programs	07	20,409				20,409	U
218 0607133A	TRACTOR SMOKE	07						U
219 0607134A	Long Range Precision Fires (LRPF)	07	122,733				122,733	U
220 0607135A	Apache Product Improvement Program	07						U
221 0607136A	Blackhawk Product Improvement Program	07	11,236				11,236	U
222 0607137A	Chinook Product Improvement Program	07	46,091				46,091	U
223 0607138A	Fixed Wing Product Improvement Program	07						U
224 0607139A	Improved Turbine Engine Program	07	249,257				249,257	U

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225 0607142A	Aviation Rocket System Product Improvement and Development	07	35,211	1,927			1,927 U
226 0607143A	Unmanned Aircraft System Universal Products	07	36,488	18,132			18,132 U
227 0607145A	Apache Future Development	07		5,448			5,448 U
228 0607150A	Intel Cyber Development	07					U
229 0607312A	Army Operational Systems Development	07		45,026			45,026 U
230 0607665A	Family of Biometrics	07	2,320	1,702			1,702 U
231 0607865A	Patriot Product Improvement	07	72,895	87,430			87,430 U
232 0203728A	Joint Automated Deep Operation Coordination System (JADOCs)	07	29,782	47,398			47,398 U
233 0203735A	Combat Vehicle Improvement Programs	07	321,513	277,633			277,633 U
234 0203743A	155mm Self-Propelled Howitzer Improvements	07	35,681	199,274			199,274 U
235 0203744A	Aircraft Modifications/Product Improvement Programs	07	13,629	9,278			9,278 U
236 0203752A	Aircraft Engine Component Improvement Program	07	146	144			144 U
237 0203758A	Digitization	07	6,077	5,270			5,270 U
238 0203801A	Missile/Air Defense Product Improvement Program	07	3,588	1,287			1,287 U
239 0203802A	Other Missile Product Improvement Programs	07	4,760				U
240 0203808A	TRACTOR CARD	07	34,050				U

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225	0607142A	Aviation Rocket System Product Improvement and Development	07	17,155				17,155	U
226	0607143A	Unmanned Aircraft System Universal Products	07	7,743				7,743	U
227	0607145A	Apache Future Development	07	77,177				77,177	U
228	0607150A	Intel Cyber Development	07	14,652				14,652	U
229	0607312A	Army Operational Systems Development	07	35,851				35,851	U
230	0607665A	Family of Biometrics	07	1,324				1,324	U
231	0607865A	Patriot Product Improvement	07	187,840				187,840	U
232	0203728A	Joint Automated Deep Operation Coordination System (JADOCs)	07	44,691				44,691	U
233	0203735A	Combat Vehicle Improvement Programs	07	268,919				268,919	U
234	0203743A	155mm Self-Propelled Howitzer Improvements	07	427,254				427,254	U
235	0203744A	Aircraft Modifications/Product Improvement Programs	07	11,688				11,688	U
236	0203752A	Aircraft Engine Component Improvement Program	07	80				80	U
237	0203758A	Digitization	07	4,516				4,516	U
238	0203801A	Missile/Air Defense Product Improvement Program	07	1,288				1,288	U
239	0203802A	Other Missile Product Improvement Programs	07	79,424		2,300	2,300	81,724	U
240	0203808A	TRACTOR CARD	07						U

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 (Dollars in Thousands)

17 Jan 2020

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

Program Line Element No	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
241 0205402A	Integrated Base Defense - Operational System Dev	07	8,000				U
242 0205410A	Materials Handling Equipment	07	1,132				U
243 0205412A	Environmental Quality Technology - Operational System Dev	07	249	10,000			10,000 U
244 0205456A	Lower Tier Air and Missile Defense (AMD) System	07	74,295	97,746			97,746 U
245 0205778A	Guided Multiple-Launch Rocket System (GMLRS)	07	113,471	117,294			117,294 U
246 0208053A	Joint Tactical Ground System	07					U
248 0303028A	Security and Intelligence Activities	07	40,002	13,845		12,904	26,749 U
249 0303140A	Information Systems Security Program	07	40,148	25,710			25,710 U
250 0303141A	Global Combat Support System	07	51,415	60,076			60,076 U
251 0303142A	SATCOM Ground Environment (SPACE)	07					U
252 0303150A	WWMCCS/Global Command and Control System	07	1,966	2,073			2,073 U
255 0305172A	Combined Advanced Applications	07	1,500				U
256 0305179A	Integrated Broadcast Service (IBS)	07	450	459			459 U
257 0305204A	Tactical Unmanned Aerial Vehicles	07	6,000	5,097		17,050	22,147 U
258 0305206A	Airborne Reconnaissance Systems	07	26,416	11,177		2,000	13,177 U
259 0305208A	Distributed Common Ground/Surface Systems	07	27,109	28,821			28,821 U
260 0305219A	MQ-1C Gray Eagle UAS	07		5,000			5,000 U

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17 Jan 2020

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

Program Line Element No	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	U C
241 0205402A	Integrated Base Defense - Operational System Dev	07						U
242 0205410A	Materials Handling Equipment	07						U
243 0205412A	Environmental Quality Technology - Operational System Dev	07	259				259	U
244 0205456A	Lower Tier Air and Missile Defense (AMD) System	07	166				166	U
245 0205778A	Guided Multiple-Launch Rocket System (GMLRS)	07	75,575				75,575	U
246 0208053A	Joint Tactical Ground System	07	9,510				9,510	U
248 0303028A	Security and Intelligence Activities	07		23,367		23,367	23,367	U
249 0303140A	Information Systems Security Program	07	29,270				29,270	U
250 0303141A	Global Combat Support System	07	86,908				86,908	U
251 0303142A	SATCOM Ground Environment (SPACE)	07	18,684				18,684	U
252 0303150A	WWMCCS/Global Command and Control System	07						U
255 0305172A	Combined Advanced Applications	07						U
256 0305179A	Integrated Broadcast Service (IBS)	07	467				467	U
257 0305204A	Tactical Unmanned Aerial Vehicles	07	4,051		34,100	34,100	38,151	U
258 0305206A	Airborne Reconnaissance Systems	07	13,283		15,575	15,575	28,858	U
259 0305208A	Distributed Common Ground/Surface Systems	07	47,204				47,204	U
260 0305219A	MQ-1C Gray Eagle UAS	07						U

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 (Dollars in Thousands)

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

Program Line Element No	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)	
261 0305232A	RQ-11 UAV	07	6,180	3,218			3,218	U
262 0305233A	RQ-7 UAV	07	17,863	7,817			7,817	U
263 0307665A	Biometrics Enabled Intelligence	07	6,524	2,000		2,214	4,214	U
264 0708045A	End Item Industrial Preparedness Activities	07	106,766	108,348			108,348	U
265 1203142A	SATCOM Ground Environment (SPACE)	07	9,927	34,169			34,169	U
266 1208053A	Joint Tactical Ground System	07	7,400	7,677			7,677	U
9999 999999999	Classified Programs		5,955	7,273			7,273	U
	Operational Systems Development		1,721,365	1,844,126		34,168	1,878,294	U
267 0608041A	Defensive CYBER - Software Prototype Development	08						U
	Software and Digital Technology Pilot Program							
Total Research, Development, Test & Eval, Army			11,371,268	12,543,435		147,304	12,690,739	

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 (Dollars in Thousands)

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

Program Line Element No	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	Se c
261	0305232A RQ-11 UAV	07						U
262	0305233A RQ-7 UAV	07						U
263	0307665A Biometrics Enabled Intelligence	07						U
264	0708045A End Item Industrial Preparedness Activities	07	61,012				61,012	U
265	1203142A SATCOM Ground Environment (SPACE)	07						U
266	1208053A Joint Tactical Ground System	07						U
9999	9999999999 Classified Programs		3,983				3,983	U
	Operational Systems Development		1,998,539		75,342	75,342	2,073,881	
267	0608041A Defensive CYBER - Software Prototype Development	08	46,445				46,445	U
	Software and Digital Technology Pilot Program		46,445				46,445	
Total Research, Development, Test & Eval, Army			12,587,343		182,824	182,824	12,770,167	

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

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127	05	0604645A	Armored Systems Modernization (ASM) - Eng Dev.....	239
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Constructive Simulation Systems Development	0604742A	132	05.....	368
Distributive Interactive Simulations (DIS) - Eng Dev	0604760A	134	05.....	408
Electronic Warfare Development	0604270A	119	05.....	26
Family of Heavy Tactical Vehicles	0604622A	124	05.....	194
Infantry Support Weapons	0604601A	121	05.....	52
JAVELIN	0604611A	123	05.....	187
Light Tactical Wheeled Vehicles	0604642A	126	05.....	230
Medium Tactical Vehicles	0604604A	122	05.....	172
Night Vision Systems - Eng Dev	0604710A	128	05.....	254
Non-System Training Devices - Eng Dev	0604715A	130	05.....	310

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / <i>Aircraft Avionics</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	31.401	8.414	2.764	-	2.764	7.285	3.259	2.508	0.000	Continuing	Continuing
C97: <i>ACFT Avionics</i>	-	16.114	4.937	1.928	-	1.928	6.358	2.226	1.263	0.000	Continuing	Continuing
EW7: <i>Degraded Visual Environment</i>	-	14.185	2.661	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	16.846
VU3: <i>Networking And Mission Planning</i>	-	1.102	0.816	0.836	-	0.836	0.927	1.033	1.245	0.000	0.000	5.959

**Note**

Project EW7 Degraded Visual Environment completed development and test efforts in Fiscal Year (FY) 2020.

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

The Fiscal Year (FY) 2021 budget estimate request funds the development of Aircraft Avionics systems required to horizontally and vertically integrate the battlefield and the integration of those systems into Army aircraft. Tasks in this Program Element support research, development, and test efforts in the Engineering and Manufacturing Development phases of these systems.

The Doppler Global Positioning System Navigation Set (DGNS) Upgrade program completes system engineering trade studies to reduce space, weight, and power with the introduction of new navigation support capabilities such as an inertial sensor interface card and Instrument Flight Rules map display. The DGNS upgrade includes Non-Recurring Engineering for the Computer Display Unit (CDU) which replaces the current CDU faceplate with a touch screen display, provides a moving navigation map capability, and optimizes pilot interface to promote safer flight operations. The CDU upgrade will support Assured-Position Navigation and Timing (A-PNT) operations in conjunction with additional system upgrades and upgrades to existing DGNS hardware in order to accommodate A-PNT in identified operational environments, and incorporates Military-Code (M-Code). This includes anti-jam antenna capabilities and supports the requirement to maintain A-PNT throughout operations.

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

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / <i>Aircraft Avionics</i>	
<p>The Multi-platform Anti-jam GPS Navigation Antenna (MAGNA) is a GPS anti-jam adaptive antenna system that will be capable of receiving legacy and modernized NAVSTAR GPS satellite signals. The MAGNA reduces the effect of GPS jamming by rejecting the interfering signals before they disrupt the GPS receiver enabling the Warfighter continued access to GPS-provided PNT in a GPS degraded environment.</p> <p>The Degraded Visual Environment (DVE) program portfolio includes the DVE Army Directed Requirement (DR) and the Environment Exploitation System (EES).</p> <p>The DVE DR is to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities. The DVE DR system provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions. The program completed development and test efforts in FY 2019.</p> <p>The EES program focuses on active and passive sensor technology, synthetic vision, sensor and software data fusion, imagery processing, user interface, and multicore processing technologies to enable current and future capabilities and innovative technical solutions for the Army aviation fleet.</p> <p>The Improved Data Modem (IDM) is the common solution for digitizing Army Aviation and is fielded on every modernized, rotary-wing Army aircraft, including the CH-47 Chinook, AH-64 Apache and UH-60 Black Hawk. The IDM provides the Army rotary wing fleet with critical communication capabilities, enables connectivity to multiple radios used by rotary-wing aircraft and the Blue Force Tracking transceiver, and provides the means for rapid data transfer. The Aviation Mission Common Server (AMCS) effort is a capability upgrade and replacement for the current Army IDM-401. The AMCS program will implement IDM and Common Operating Environment capabilities utilizing a flexible open systems architecture and distributed processing resources to perform an array of non-flight critical computing, data processing, radio and communications management, and graphics generation functions for the enduring and future Army Aviation fleet and de-couple non-flight critical mission system technology integration from flight critical components. The AMCS program will satisfy Army Future Airborne Capability Environment (FACE) requirements for hardware, software, and firmware and be able to satisfy cybersecurity requirements. The AMCS program will replace the current IDM-401 with a common server capability to support current IDM-401 functionality, provide enhanced data and graphics processing, and provide a FACE architecture through which Aviation platforms will be able to rapidly integrate technology upgrades required to keep pace with evolving threats. The AMCS program will enable the rapid insertion and update of capabilities into Army Aviation operations without requiring lengthy, costly and out of sync software updates to flight mission computers; resulting in affordable, synchronized integration and fielding of Aviation capabilities required for the Multi-Domain Battlefield. The AMCS program will be the center of the future Common Digital Backbone for the enduring and future Army Aviation fleets, and is the key enabler for Army Aviation Multi-Domain Operations.</p> <p>The Aviation Mission Planning System (AMPS) is a system used to conduct pre-mission and aircraft performance planning. It receives data from multiple sources and provides that data digitally to the aircraft to support aviation missions. AMPS is used for automated mission planning, risk assessment, and transfer of mission data to aviation platforms within an Aviation unit. This includes route generation, performance planning, communications planning, terrain analysis, data transfer, and mission rehearsal. These efforts include development and testing of a new underlying architecture to support the move of Army Aviation Mission Planning from the current structure to one that supports synchronization both vertically and horizontally between Aviation and Ground forces. It will allow aircrews to continually plan and update route, threat, and performance data throughout all phases of an Aviation mission. Development of a mobile aircraft performance planning/weight and balance calculator is currently underway and will be the first migration of AMPS capabilities to a mobile hardware agnostic environment.</p>		

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2021 Army	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / <i>Aircraft Avionics</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	32.253	29.164	7.673	-	7.673
Current President's Budget	31.401	8.414	2.764	-	2.764
Total Adjustments	-0.852	-20.750	-4.909	-	-4.909
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-20.750			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.852	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-4.909	-	-4.909

**Change Summary Explanation**

FY 2021 reflects a decrease in funding to better align with Army Aircraft Avionics requirements.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics				<b>Project (Number/Name)</b> C97 / ACFT Avionics			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
C97: ACFT Avionics	-	16.114	4.937	1.928	-	1.928	6.358	2.226	1.263	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Fiscal Year FY 2021 budget request funds the development of Aircraft Avionics systems required to horizontally and vertically integrate the battlefield and the integration of those systems into Army aircraft. Tasks in this Project support research, development, and test efforts in the Engineering and Manufacturing Development phases of these systems.

The Doppler Global Positioning System Navigation Set (DGNS) Upgrade program completes system engineering trade studies to reduce space, weight, and power with the introduction of new navigation support capabilities such as an inertial sensor interface card and Instrument Flight Rules map display. The DGNS upgrade includes Non-Recurring Engineering for the Computer Display Unit (CDU) which replaces the current CDU faceplate with a touch screen display, provides a moving navigation map capability, and optimizes pilot interface to promote safer flight operations. The CDU upgrade will support Assured-Position Navigation and Timing (A-PNT) operations in conjunction with additional system upgrades and upgrades to existing DGNS hardware in order to accommodate A-PNT in identified operational environments, and incorporates M-Code. This includes anti-jam antenna capabilities and supports the requirement to maintain A-PNT throughout operations.

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

The Multi-platform Anti-jam GPS Navigation Antenna (MAGNA) is a GPS anti-jam adaptive antenna system that will be capable of receiving legacy and modernized NAVSTAR GPS satellite signals. The MAGNA reduces the effect of GPS jamming by rejecting the interfering signals before they disrupt the GPS receiver enabling the Warfighter continued access to GPS-provided PNT in a GPS degraded environment.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> DGNS / A-PNT Assessment	1.849	0.965	-	-	-
<b>Description:</b> The DGNS Upgrade program completes system engineering trade studies to reduce space, weight, and power with the introduction of new navigation support capabilities such as inertial sensor interface card and Instrument Flight Rules (IFR) map display. It also prepares ECPs to the existing DGNS LRU as a result of those trade studies. The DGNS upgrade continues with execution of Non-Recurring Engineering for					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> C97 / ACFT Avionics
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>CDU and Signal Data Converter LRU ECP packages. The DGNS CDU Upgrade replaces the current CDU faceplate with a touch screen display, provides a moving navigation map capability and optimized pilot interface to augment existing IFR capability and promote safer flight operations. It also enables CDU support for A-PNT operations in conjunction with additional system LRU upgrades, including anti-jam antenna capabilities.</p> <p><b>FY 2020 Plans:</b> Completed Airworthiness Qualification of Resiliency &amp; Software Assurance Modification software modifications and completed Airworthiness Qualification of the Multi-platform Anti-jam GPS Navigation Antenna (MAGNA).</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY2021 decrease is due to completion of GPS anti-jam antenna efforts and MAGNA development.</p>					
<p><b>Title:</b> EAGLE Navigation System A-PNT Integration</p> <p><b>Description:</b> The EAGLE Navigation System A-PNT integration program assesses current capabilities in identified operational PNT environment levels and tests identified upgrades to existing EGI hardware to accommodate A-PNT in identified operational environments.</p> <p><b>FY 2020 Plans:</b> Completed M-Code integration into the EAGLE system and begun final EAGLE-M airworthiness qualification testing.</p> <p><b>FY 2021 Base Plans:</b> Continue EAGLE-M airworthiness qualification testing and Resiliency &amp; Software Assurance Modification integration onto legacy GPS receivers. Continue EAGLE M-code development.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decreases in FY 2021 due to completion of GPS anti-jam antenna - MAGNA Development in FY 2020.</p>	14.265	3.748	1.928	-	1.928
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638</p>	-	0.224	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	16.114	4.937	1.928	-	1.928

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• AA0723: Comms, Nav Surveillance	156.969	164.315	101.355	-	101.355	63.669	71.084	83.360	62.916	Continuing	Continuing
• AA0704: GATM - Rotary Wing Aircraft	26.848	30.966	12.180	-	12.180	9.034	7.668	6.141	4.933	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

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

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> C97 / ACFT Avionics
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PM Services (DGNS Upgrade/ DGNS A-PNT)	Various	Development Command Aviation & Missiles Center SED : Redstone Arsenal, AL	0.898	0.224	Oct 2018	0.047	Oct 2019	-		-		-	0.000	1.169	-
PM Services (EAGLE)	Various	Development Command Aviation & Missiles Center : Redstone Arsenal, AL	0.287	0.212	Oct 2018	0.047	Oct 2019	-		-		-	0.000	0.546	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.224		-		-		-	0.000	0.224	-
<b>Subtotal</b>			1.185	0.436		0.318		-		-		-	0.000	1.939	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DGNS A-PNT Assessment and Upgrade	SS/CPFF	BAE Systems : Wayne, NJ	6.621	1.100	Apr 2019	0.918		-		-		-	0.000	8.639	-
DGNS Anti-Jam Antenna Development - MAGNA	SS/CPFF	Mayflower Communications, Inc. : Bedford, MA	1.156	0.275	Nov 2018	-		-		-		-	0.000	1.431	-
EGI/EAGLE A-PNT Assessment and Upgrade/ M-Code Integration	SS/CPFF	Honeywell : Clearwater, FL	5.649	10.569	Mar 2019	3.701	Jan 2020	-		-		-	0.804	20.723	-
EGI Anti-Jam Antenna Development - MAGNA	SS/CPFF	Mayflower Communications, Inc. : Bedford, MA	7.514	3.165	Nov 2018	-		-		-		-	0.000	10.679	-
EGI/RSAM Development	SS/CPFF	Honeywell International : Clearwater, FL	-	-		-		0.928	Dec 2020	-		0.928	Continuing	Continuing	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604201A / Aircraft Avionics				C97 / ACFT Avionics							
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
EGI/EAGLE M-Code	SS/CPIF	Honeywell International : Clearwater, FL	-	-		-		0.930	Jun 2021	-		0.930	Continuing	Continuing	-
<b>Subtotal</b>			20.940	15.109		4.619		1.858		-		1.858	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
DGNS RSAM Flight Test Support	Various	Development Command Aviation & Missiles Center Engineering Directorate : Redstone Arsenal, AL	-	0.125	Mar 2019	-		-		-		-	0.000	0.125	-
EAGLE M-Code / EGI RSAM Flight Test Support	Various	Development Command Aviation & Missiles Center Engineering Directorate : Redstone Arsenal, AL	-	0.173	May 2019	-		0.035	Jun 2021	-		0.035	0.000	0.208	-
<b>Subtotal</b>			-	0.298		-		0.035		-		0.035	0.000	0.333	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
DGNS RSAM Airworthiness Qualification Testing	RO	Redstone Test Center : Redstone Arsenal, AL	-	0.125	Jul 2019	-		-		-		-	0.000	0.125	-



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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> C97 / ACFT Avionics
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
DGNS A-PNT Assessment and RSAM Upgrade																												
DGNS Anti-Jam Antenna Development																												
EGI/EAGLE A-PNT Assessment and Upgrade/ M-Code Integrati																												
EGI/EAGLE Anti-Jam Antenna Development																												
EGI/RSAM Development																												
EGI/EAGLE M-Code Development																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

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

Events	Start		End	
	Quarter	Year	Quarter	Year
DGNS A-PNT Assessment and RSAM Upgrade	3	2018	4	2020
DGNS Anti-Jam Antenna Development	4	2016	4	2019
EGI/EAGLE A-PNT Assessment and Upgrade/ M-Code Integration	2	2018	2	2021
EGI/EAGLE Anti-Jam Antenna Development	4	2016	4	2019
EGI/RSAM Development	2	2021	2	2025
EGI/EAGLE M-Code Development	4	2018	3	2023

**Note**

DGNS: Doppler Global Positioning System (GPS) Navigation Set  
A-PNT: Assured-Position Navigation and Timing  
RSAM: Resiliency & Software Assurance Modification  
M-Code: Military-Code  
EGI: Embedded GPS Inertial

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics				<b>Project (Number/Name)</b> EW7 / Degraded Visual Environment			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EW7: Degraded Visual Environment	-	14.185	2.661	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	16.846
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Project EW7 Degraded Visual Environment completed development and test efforts in Fiscal Year (FY) 2020.

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

The FY 2021 budget request funds the development and integration of the Environment Exploitation System (EES) on an Army aviation platform to mature sensor and Multi-Core Processing capabilities to meet emerging Army requirements.

The Degraded Visual Environment (DVE) project portfolio includes the DVE Army Directed Requirement (DR) and the EES.

The DVE DR is to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities. The DVE DR system provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions. Project EW7 Degraded Visual Environment completed development and test efforts in FY 2019.

The EES focuses on active and passive sensor technology, synthetic vision, sensor and software data fusion, imagery processing, user interface, and multicore processing technologies to enable current and future capabilities and innovative technical solutions for the Army aviation fleet.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Degraded Visual Environment (DVE)	14.185	2.540	-	-	-
<b>Description:</b> The DVE project portfolio includes the DVE Army DR and the EES.					
The DVE DR is to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities. The DVE DR system provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions. The program completed development and test efforts in support of the DVE DR in FY 2019.					
The EES program focuses on active and passive sensor technology, synthetic vision, sensor and software data fusion, imagery processing, user interface, and multicore processing technologies to enable current and future					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> EW7 / Degraded Visual Environment
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
capabilities and innovative technical solutions for the current Army aviation fleet to safely operate in DVE. The EES program will equip Combat Aviation Brigades with evolving modular DVE solutions creating revolutionary tactical advantages while increasing survivability.					
<b>FY 2020 Plans:</b> Completed application development for aviation mission common server, sensor characterization, and technology demonstration efforts.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decreases due to completion of application development for aviation mission common server, sensor characterization, and technology demonstration efforts.					
<b>Title:</b> FY 2020 SBIR/STTR Transfer	-	0.121	-	-	-
<b>Description:</b> Funding transferred in accordance with Title 15 USC ?638					
<b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638					
<b>Accomplishments/Planned Programs Subtotals</b>	14.185	2.661	-	-	-

<b>C. Other Program Funding Summary (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• A00713: Degraded Visual Environment	30.000	49.450	0.000	1.916	1.916	-	-	-	-	0.000	81.366

**Remarks**

**D. Acquisition Strategy**  
The DVE DR acquisition strategy for development leveraged a competitively awarded contract through the Technology Applications Program Office. The production contract also leverages a contract awarded through the Technology Applications Program Office. The Aviation Field Maintenance Directorate is performing the installation of the DVE DR system onto the designated aircraft. A disposition analysis of the DVE DR will inform future DVE requirements for both current and future Army aviation platforms.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> EW7 / Degraded Visual Environment
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PM Support for DR	Various	Various : Various	1.606	2.678	Mar 2020	-		-		-		-	0.000	4.284	-
PM Support for EES	Various	Various : Various	-	1.067	Jun 2019	0.220	Sep 2020	-		-		-	0.000	1.287	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.121		-		-		-	0.000	0.121	-
<b>Subtotal</b>			1.606	3.745		0.341		-		-		-	0.000	5.692	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Develop and qualify the A-Kit software and hardware for DR	MIPR	Aviation Development Directorate-Eustis : Ft. Eustis, Virginia	2.819	2.364	Aug 2019	-		-		-		-	0.000	5.183	-
Develop and qualify software and hardware for DR	MIPR	Combat Capabilities Development Command : Redstone Arsenal, AL	-	0.122	Aug 2019	-		-		-		-	0.000	0.122	-
Develop and qualify the software and hardware for EES	MIPR	Combat Capabilities Development Command : Redstone Arsenal, AL	-	0.063	Apr 2019	2.180	Mar 2020	-		-		-	0.000	2.243	-
Develop hardware configuration DVE EES	Various	various : various	-	4.436	Mar 2020	-		-		-		-	0.000	4.436	-
<b>Subtotal</b>			2.819	6.985		2.180		-		-		-	0.000	11.984	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> EW7 / Degraded Visual Environment
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<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Engineering, Logistics and Technical Support for DR	MIPR	Combat Capabilities Development Command : Redstone Arsenal, AL	1.411	0.671	Jul 2019	-		-		-		-	0.000	2.082	-
System Engineering, Logistics and Technical Support for EES	MIPR	Combat Capabilities Development Command : Redstone Arsenal, AL	-	0.487	Aug 2019	0.070	Mar 2020	-		-		-	0.000	0.557	-
<b>Subtotal</b>			1.411	1.158		0.070		-		-		-	0.000	2.639	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Airworthiness and Qualification Testing for DR	MIPR	Redstone Test Center, Aviation Applied Technology Directorate : Redstone Arsenal, AL	2.105	-		-		-		-		-	0.000	2.105	-
DVE DR System Assessment	MIPR	Fort Bliss Testing Center; Redstone Test Center : Fort Bliss, Texas; Redstone Arsenal, AL	-	2.297	Jun 2019	-		-		-		-	0.000	2.297	-
Airworthiness and Qualification Testing for EES	TBD	TBD : TBD	-	-		0.070	Mar 2020	-		-		-	0.000	0.070	-
<b>Subtotal</b>			2.105	2.297		0.070		-		-		-	0.000	4.472	N/A



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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> EW7 / Degraded Visual Environment
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Degraded Visual Environment Directed Requirement (DVE DR)																												
Operational Test																												
Production Decision																												
DVE Technology Development & Maturation																												
DVE-Mitigation Science & Technology Transition																												
AMCS/Environment Exploitation System (EES) Modular Capability Demonstration																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

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

Events	Start		End	
	Quarter	Year	Quarter	Year
Degraded Visual Environment Directed Requirement (DVE DR)	3	2017	4	2019
Critical Design Review	3	2018	3	2018
Operational Test	4	2019	4	2019
Production Decision	4	2019	4	2019
DVE Technology Development & Maturation	1	2018	4	2021
DVE-Mitigation Science & Technology Transition	4	2020	4	2020
AMCS/Environment Exploitation System (EES) Modular Capability Demonstration	4	2021	4	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics				<b>Project (Number/Name)</b> VU3 / Networking And Mission Planning			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
VU3: <i>Networking And Mission Planning</i>	-	1.102	0.816	0.836	-	0.836	0.927	1.033	1.245	0.000	0.000	5.959
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Fiscal Year (FY) 2021 budget estimate submission request funds the development of Networking and Mission Planning systems required to horizontally and vertically integrate the battlefield and the integration of those systems into Army aircraft. Tasks in this Project support research, development, and test efforts in the Engineering and Manufacturing Development phases of these systems.

The Improved Data Modem (IDM) is the common solution for digitizing Army Aviation and is fielded on every modernized, rotary-wing Army aircraft, including the CH-47 Chinook, AH-64 Apache and UH-60 Black Hawk. The IDM provides the Army rotary wing fleet with critical communication capabilities, enables connectivity to multiple radios used by rotary-wing aircraft and the Blue Force Tracking transceiver, and provides the means for rapid data transfer. The Aviation Mission Common Server (AMCS) effort is a capability upgrade and replacement for the current Army IDM-401. The AMCS program will implement IDM and Common Operating Environment capabilities utilizing a flexible open systems architecture and distributed processing resources to perform an array of non-flight critical computing, data processing, radio and communications management, and graphics generation functions for the enduring and future Army Aviation fleet and de-couple non-flight critical mission system technology integration from flight critical components. The AMCS program will satisfy Army Future Airborne Capability Environment (FACE) requirements for hardware, software, and firmware and be able to satisfy cybersecurity requirements. The AMCS program will replace the current IDM-401 with a common server capability to support current IDM-401 functionality, provide enhanced data and graphics processing, and provide a FACE architecture through which Aviation platforms will be able to rapidly integrate technology upgrades required to keep pace with evolving threats. The AMCS program will enable the rapid insertion and update of capabilities into Army Aviation operations without requiring lengthy, costly and out of sync software updates to flight mission computers; resulting in affordable, synchronized integration and fielding of Aviation capabilities required for the Multi-Domain Battlefield. The AMCS program will be the center of the future Common Digital Backbone for the enduring and future Army Aviation fleets, and is the key enabler for Army Aviation Multi-Domain Operations.

The Aviation Mission Planning System (AMPS) is a system used to conduct pre-mission and aircraft performance planning. It receives data from multiple sources and provides that data digitally to the aircraft to support aviation missions. AMPS is used for automated mission planning, risk assessment, and transfer of mission data to aviation platforms within an Aviation unit. This includes route generation, performance planning, communications planning, terrain analysis, data transfer, and mission rehearsal. These efforts include development and testing of a new underlying architecture to support the move of Army Aviation Mission Planning from the current structure to one that supports synchronization both vertically and horizontally between Aviation and Ground forces. It will allow aircrews to continually plan and update route, threat, and performance data throughout all phases of an Aviation mission. Development of a mobile aircraft performance planning/weight and balance calculator is currently underway and will be the first migration of AMPS capabilities to a mobile hardware agnostic environment.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Improved Data Modem (IDM)	1.102	0.778	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> VU3 / Networking And Mission Planning

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<p><b>Description:</b> The IDM provides digital connectivity among airborne and ground platforms and transmission of air-to-air target data between IDM equipped aircraft using existing radio and crypto equipment.</p> <p><b>FY 2020 Plans:</b> Begun development of an AMCS prototype that would bring a singular, common, Modular Open System Architecture integration interface to Aviation platforms enabling synchronized integration and fielding of Aviation enabling capabilities.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 funding has been realigned from IDM to a separate AMCS line to facilitate the efficient management of resources allocated to the AMCS effort. This includes a multi-core processor solution which will perform the functionality of the IDM-401 as well as provide the FACE compliant, modular open system architecture, digital backbone for current and future Army Aviation fleets.</p>					
<p><b>Title:</b> Aviation Mission Common Server (AMCS)</p> <p><b>Description:</b> AMCS is a capability upgrade and replacement for the IDM-401.</p> <p><b>FY 2021 Base Plans:</b> Perform airworthiness assessments and develop airworthiness documentation, multicore testing documentation, assess airworthiness requirements compliance, provide closing memos, produce airworthiness releases, and provide airworthiness support to the demonstration and test of the AMCS capability.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 funding has been realigned from IDM to a separate AMCS line to reflect the development and test of a new hardware solution which will perform the functionality of the IDM-401 as well as provide the FACE compliant, modular open system architecture, digital backbone for current and future Army Aviation fleets to enable rapid subsystem adaptability, shorten cycle time of new capability to the warfighter, and reduce software integration costs associated with the insertion of enabling Aviation technologies.</p>	-	-	0.836	-	0.836
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b></p>	-	0.038	-	-	-

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> VU3 / Networking And Mission Planning
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Funding transferred in accordance with Title 15 USC 7638					
<b>Accomplishments/Planned Programs Subtotals</b>	1.102	0.816	0.836	-	0.836

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• AA0712: Network And Mission Plan	118.614	98.236	77.432	-	77.432	42.391	50.477	43.275	41.057	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

This project is comprised of multiple systems supporting aircraft avionics. While the detailed acquisition strategy varies from program to program, the general strategy is for each individual program to complete the development and testing efforts in coordination with the aircraft platforms on integration issues, use the various contracts of the aircraft platforms original equipment manufacturers on integration efforts, and utilize the Aviation & Missile Research, Development, and Engineering Center for software development. The Product Office continues to look for other competitive options to decrease cost and schedule.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> VU3 / Networking And Mission Planning
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PM Support (IDM)	MIPR	PdM A2E2 : Redstone Arsenal, AL	0.050	-		0.022	Mar 2019	-		-		-	0.000	0.072	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.038		-		-		-	0.000	0.038	-
<b>Subtotal</b>			0.050	-		0.060		-		-		-	0.000	0.110	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Develop software for IDM	C/Various	Combat Communications Development Command, Aviation & Missile Center : Redstone Arsenal, AL	0.578	0.940		0.756	Mar 2019	-		-		-	0.000	2.274	-
Aviation Mission Common Server (AMCS)	C/Various	Combat Communications Development Command, Aviation & Missile Center : Redstone Arsenal, AL	-	-		-		0.803	Mar 2021	-		0.803	Continuing	Continuing	Continuing
<b>Subtotal</b>			0.578	0.940		0.756		0.803		-		0.803	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Engineering, Logistics, and Technical Support (IDM)	MIPR	Aviation Missile Research Development	0.172	0.162	Feb 2019	-		-		-		-	0.000	0.334	-



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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604201A / Aircraft Avionics	<b>Project (Number/Name)</b> VU3 / Networking And Mission Planning
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
AMCS Airworthiness Studies and Assessments	1 <small>Completion of Airworthiness Certification Plan Development</small>																											
AMCS/Environment Exploitation System (EES) Modular Capability Demonstration									2 <small>AMCS/EES DEMO</small>																			

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

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

Events	Start		End	
	Quarter	Year	Quarter	Year
Qualify ADEC Hardware and Software	2	2011	2	2018
Milestone B (ADEC)	4	2016	4	2016
Develop hardware and software (ACN)	1	2012	4	2016
Develop AMPS Software	1	2018	4	2018
Develop IDM Software	4	2018	4	2018
AMCS Airworthiness Studies and Assessments	2	2019	2	2019
AMCS/Environment Exploitation System (EES) Modular Capability Demonstration	4	2021	4	2021

**Note**

ACN: Aircraft Notebook  
 ADEC: Aviation Data Exploitation Capability  
 AMCS: Aviation Mission Common Server  
 AMPS: Aviation Mission Planning System  
 EES: Environment Exploitation System  
 IDM: Improved Data Modem

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / Electronic Warfare Development
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	56.310	59.539	62.426	-	62.426	28.229	8.671	7.902	14.208	0.000	237.285
<i>DX5: Electronic Warfare And Management Tool</i>	-	17.714	23.514	14.437	-	14.437	17.021	2.017	0.000	5.886	0.000	80.589
<i>DX6: Multi-Function Electronic Warfare (MFEW)</i>	-	30.113	30.574	45.791	-	45.791	9.010	4.523	5.745	6.720	0.000	132.476
<i>ET7: Radio Frequency Interference Mitigation</i>	-	0.949	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.949
<i>VS6: Integrated Electronic Warfare Systems</i>	-	7.534	5.451	2.198	-	2.198	2.198	2.131	2.157	1.602	0.000	23.271

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

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

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

Project DX5 - The Commander's tool to control, manage, and dominate the Electromagnetic Spectrum (EMS), EWPMT will provide the ability to conduct remote control & management of Electronic Warfare (EW) assets to execute offensive and defensive Electronic Attack, EW targeting and enable maneuver by synchronizing EW and Spectrum Management Operations (SMO) across Intelligence, Operations, and Signals in support of Multi-Domain Operations (MDO).

EWPMT is a Mission Command software application that enhances the Cyber Electromagnetic Activities (CEMA) element's ability to plan, coordinate, integrate and synchronize CEMA (Cyber, EW & Electromagnetic Spectrum Management (ESM)) with Mission Command Systems from Joint Task Force (JTF) to Battalion (BN). EWPMT Integrates the Electronic Attack (EA), Electronic Protect (EP), Electronic Warfare Support (ES), and Spectrum Management Operations functions in support of Brigade Combat Team (BCT) and Echelons Above Brigade (EAB) Electronic Warfare and CEMA Planning.

Project DX6 - The Multi-Function Electronic Warfare (MFEW) is a capability set that will provide BCT Commanders with an organic airborne offensive Electronic Warfare (EW) capability. MFEW variants empower Commanders to shape the Electromagnetic Spectrum (EMS) to their advantage. The MFEW Air Large system, when

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2021 Army	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>
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installed onto the Gray Eagle (GE) Unmanned Aerial System (UAS), will provide: 1) Offensive Electronic Attack (OEA) - Non-Kinetic Fires capability with the intent of denying, degrading, or disrupting enemy communications capability and non-communications emitters; 2) Electronic Warfare Support (ES) - Capability to search, intercept, identify, and locate or localize sources of intentional and unintentional radiated electromagnetic (EM) energy for the purpose of immediate threat recognition, targeting, planning, and execution of future operations; 3) Dissemination of Military Information Support Operations (MISO) products; and 4) Support of Offensive Cyber Operations (OCO) and Multi-Domain Operations.

Project ET7 - Radio Frequency Interference Mitigation (RIM) is a cross cutting capability to centrally manage and provide oversight to identify, define, test, and coordinate development of Radio Frequency (RF) interference mitigation material solutions to resolve mutual RF interference and electromagnetic fratricide for Spectrum Dependent Systems (SDS). FY19 is the last year of funding for project ET7.

Project VS6 - Counter Radio Controlled Improvised Explosive Device (RCIED) Electronic Warfare (CREW), provides protection of ground forces operating in vehicle convoys, single vehicles, and fixed locations in operational theaters, which enables freedom of movement across the depth and breadth of the operational environment. It is programmable with techniques to mitigate emerging threats. In order to keep pace with the threat evolution, development efforts will provide fielded CREW systems as well as other EW systems with techniques that mitigate the range of threats as required. These development efforts may include development of new techniques, integration of existing techniques, and hardware and software development and integration in order to pace the threat.

<b>B. Program Change Summary (\$ in Millions)</b>	<b><u>FY 2019</u></b>	<b><u>FY 2020</u></b>	<b><u>FY 2021 Base</u></b>	<b><u>FY 2021 OCO</u></b>	<b><u>FY 2021 Total</u></b>
Previous President's Budget	58.627	70.539	51.711	-	51.711
Current President's Budget	56.310	59.539	62.426	-	62.426
Total Adjustments	-2.317	-11.000	10.715	-	10.715
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-11.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-2.317	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	10.715	-	10.715

**Change Summary Explanation**

FY21 Increase of \$10,715K fully funds EWPMT CD4 requirements in the amount of \$6,186K and completion of MFEW Air Engineering and Manufacturing Development in the amount of \$4,529K.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>				<b>Project (Number/Name)</b> DX5 / <i>Electronic Warfare And Management Tool</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
DX5: <i>Electronic Warfare And Management Tool</i>	-	17.714	23.514	14.437	-	14.437	17.021	2.017	0.000	5.886	0.000	80.589
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Commander's tool to control, manage, and dominate the Electromagnetic Spectrum (EMS), EWPMT will provide the ability to conduct remote control & management of Electronic Warfare (EW) assets to execute offensive and defensive Electronic Attack, EW targeting and enable maneuver by synchronizing EW and Spectrum Management Operations (SMO) across Intelligence, Operations, and Signals in support of Multi-Domain Operations (MDO).

EWPMT is a Mission Command software application that enhances the Cyber Electromagnetic Activities (CEMA) element's ability to plan, coordinate, integrate and synchronize CEMA (Cyber, EW & Electromagnetic Spectrum Management (ESM)) with Mission Command Systems from Joint Task Force (JTF) to Battalion (BN). EWPMT Integrates the Electronic Attack (EA), Electronic Protect (EP), Electronic Warfare Support (ES), and Spectrum Management Operations functions in support of Brigade Combat Team (BCT) and Echelons Above Brigade (EAB) Electronic Warfare and CEMA Planning.

Justification:  
FY 2021 Base funds in the amount of \$14.437 million will continue Capability Drop 4 (CD4), allow for participation in Soldier Touch Points (STPs) events and evaluations to the maximum extent possible, and fund Increment 1 testing and support activities for the EWPMT program.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> EWPMT	17.714	22.447	14.437
<b>Description:</b> EWPMT is a Mission Command software application that enhances the CEMA element's ability to plan, coordinate, integrate and synchronize CEMA (Cyber, EW & ESM) with Mission Command Systems from Joint Task Force (JTF) to Battalion (BN). EWPMT Integrates the Electronic Attack (EA), Electronic Protect (EP), Electronic Warfare Support (ES) and Spectrum Management Operations functions in support of Brigade Combat Team (BCT) and Echelons Above Brigade (EAB) for Electronic Warfare and CEMA Planning.			
<b>FY 2020 Plans:</b> Complete CD3 testing and deliver CD3 baseline Continue CD4 development, test and support activities			
<b>FY 2021 Plans:</b> CD4 development and EWPMT Increment 1 Test and Evaluation Support (IOT&E) and FDD. Participate in Soldier Touch Points (STPs) events and evaluations.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX5 / <i>Electronic Warfare And Management Tool</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
Development of Command Post (CP) relevancy.			
<b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> FY 2021 funding decreases by \$9.063 Million as a result of EWPMT Program efficiencies.			
<b><i>Title:</i></b> FY 2020 SBIR/STTR Transfer <b><i>Description:</i></b> Funding transferred in accordance with Title 15 USC ?638	-	1.067	-
<b><i>FY 2020 Plans:</i></b> Funding transferred in accordance with Title 15 USC ?638 <b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> Funding transferred in accordance with Title 15 USC ?638			
<b>Accomplishments/Planned Programs Subtotals</b>	17.714	23.514	14.437

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• K00002: <i>EW Planning &amp; Management Tools (EWPMT)</i>	4.700	7.568	7.849	-	7.849	0.792	-	-	-	0.000	20.909

**Remarks**  
EWPMT Support which includes New Equipment Training (NET); Interim Contractor Support (ICS); and Program Management Support.

**D. Acquisition Strategy**  
EWPMT is an Automated Information System (AIS) that will follow an evolutionary acquisition strategy using a Capability Drop (CD) construct for rapid development and integration of new Electronic Warfare and Spectrum Management capabilities to pace the near peer threats as well as provide for continuous product improvements in support of Multi-Domain Operations (MDO). EWPMT is modeled primarily after the Incrementally Deployed Software Intensive Program approach found in the DoDI 5000.02.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX5 / <i>Electronic Warfare And Management Tool</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PMO Staff/Travel	Various	PM Electronic Warfare & Cyber : Aberdeen Proving Ground, MD	12.735	0.098	Apr 2019	0.100	Mar 2020	0.155	Mar 2021	-		0.155	Continuing	Continuing	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		1.067		-		-		-	0.000	1.067	-
<b>Subtotal</b>			12.735	0.098		1.167		0.155		-		0.155	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EMD Contract - EWPMT CD1	C/IDIQ	Raytheon : Fort Wayne, IN	18.200	-		-		-		-		-	0.000	18.200	18.200
EMD Contract - EWPMT CD2	C/IDIQ	Raytheon : Fort Wayne, IN	24.359	-		-		-		-		-	0.000	24.359	24.359
EMD Contract - EWPMT CD3	C/IDIQ	Raytheon : Fort Wayne, IN	19.654	6.726	Nov 2018	-		-		-		-	0.000	26.380	26.373
EMD Contract - EWPMT CD4	C/IDIQ	Raytheon : Fort Wayne, IN	-	5.330	Jul 2019	15.673	Dec 2019	6.940	Dec 2020	-		6.940	0.000	27.943	30.576
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	-	0.604		-		-		-		-	0.000	0.604	-
<b>Subtotal</b>			62.213	12.660		15.673		6.940		-		6.940	0.000	97.486	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EWPMT Technical and Engineering Support	Option/CPFF	Various : Various	24.973	4.765	Dec 2018	3.517	Dec 2019	4.502	Dec 2020	-		4.502	Continuing	Continuing	-
<b>Subtotal</b>			24.973	4.765		3.517		4.502		-		4.502	Continuing	Continuing	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>			<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX5 / <i>Electronic Warfare And Management Tool</i>	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
EWPMT Contract																												
Development and Test for CD3																												
Development for CD4 and Test for EWPMT Increment 1																												
Initial Operational Test & Evaluation (IOT&E)																												
Continued EWPMT Development																												
Full Deployment Decision (FDD)																												
Full Operational Capability (FOC)																												
NET/NEF COMPO 1																												
NET/NEF COMPOs 2 & 3																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX5 / <i>Electronic Warfare And Management Tool</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
EWPMT Contract	1	2014	4	2023
Development and Test for CD1	4	2014	3	2016
Test CD1 (Government Confidence test)	2	2016	2	2016
Limited Deployment Decision for CD1	4	2016	4	2016
CD1 Fielding	4	2016	3	2018
Initial Operational Capability (IOC)	1	2017	1	2017
Development and Test for CD2	4	2016	4	2018
Development and Test for CD3	3	2018	3	2020
Development for CD4 and Test for EWPMT Increment 1	4	2019	4	2021
Initial Operational Test & Evaluation (IOT&E)	3	2021	4	2021
Continued EWPMT Development	4	2021	2	2023
Full Deployment Decision (FDD)	4	2021	4	2021
Full Operational Capability (FOC)	4	2025	4	2025
NET/NEF COMPO 1	4	2021	3	2025
NET/NEF COMPOS 2 & 3	4	2025	4	2026

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>				<b>Project (Number/Name)</b> DX6 / <i>Multi-Function Electronic Warfare (MFEW)</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
DX6: <i>Multi-Function Electronic Warfare (MFEW)</i>	-	30.113	30.574	45.791	-	45.791	9.010	4.523	5.745	6.720	0.000	132.476
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Multi-Function Electronic Warfare (MFEW) is a capability set that will provide BCT Commanders with an organic airborne offensive Electronic Warfare (EW) capability, which empowers Commanders to shape the Electromagnetic Spectrum (EMS) to their advantage. The MFEW Air Large system, when installed onto the Gray Eagle (GE) Unmanned Aerial System (UAS), will provide: 1) Offensive Electronic Attack (OEA) - Non-Kinetic Fires capability with the intent of denying, degrading, or disrupting enemy communications capability and non-communications emitters; 2) Electronic Warfare Support (ES) - Capability to search, intercept, identify, and locate or localize sources of intentional and unintentional radiated electromagnetic (EM) energy for the purpose of immediate threat recognition, targeting, planning, and execution of future operations; 3) Dissemination of Military Information Support Operations (MISO) products; and 4) Support of Offensive Cyber Operations (OCO) and Multi-Domain Operations.

Justification:  
FY 2021 Base funding in the amount of \$45.791 million will support MFEW Air Large Engineering and Manufacturing Development (EMD), contractor testing, Gray Eagle integration and air worthiness certification and Government Developmental Testing (DT).

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> Multi-Function Electronic Warfare (MFEW) Air Large	30.091	29.185	45.791
<b>Description:</b> MFEW-Air Large is an airborne Electronic Warfare payload to be integrated onto the Gray Eagle Unmanned Aerial Vehicle to provide offensive Electronic Attack (EA) and Electronic Warfare Support (ES) capability to the BCT.			
<b>FY 2020 Plans:</b> Engineering and Manufacturing Development (EMD) activities and development of EMD systems for test			
<b>FY 2021 Plans:</b> Continue Engineering and Manufacturing Development (EMD) activities, to include 4 EMD articles, platform integration, and conducts developmental testing.			
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 increase due to ramp up and completion of Engineering and Manufacturing Development.			
<b>Title:</b> FY 2018 NDAA SEC 825 MDAP Cost Overrun	0.022	-	-
<b>Title:</b> FY 2020 SBIR/STTR Transfer	-	1.389	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX6 / <i>Multi-Function Electronic Warfare (MFEW)</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021
<b>Description:</b> Funding transferred in accordance with Title 15 USC ?638			
<b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638			
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638			
<b>Accomplishments/Planned Programs Subtotals</b>	30.113	30.574	45.791

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• B05000: <i>Multi-Function Electronic Warfare (MFEW) Systems</i>	-	-	8.669	-	8.669	19.267	20.137	10.312	-	0.000	58.385

**Remarks**

**D. Acquisition Strategy**  
MFEW Air has employed a tailored acquisition approach to rapidly delivery capability to the field. The MFEW Air Large employed a competitive acquisition approach for the EMD phase of the program. The development is using a tailored acquisition approach to rapidly deliver an initial airborne EW capability to the Army using the Consortium for Command, Control, Communications, and Computer Technologies (C5) Other Transaction Agreement (OTA). Phase 1 will build two (2) MFEW-AL systems to demonstrate select OEA and ES capabilities. Phase 2 will build four (4) EMD systems for testing, evaluation, qualification and certification, verification of performance, and flight testing.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX6 / <i>Multi-Function Electronic Warfare (MFEW)</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Office Support - MFEW Air	Various	PM Electronic Warfare & Cyber (PM EW&C) : Aberdeen Proving Ground, MD	1.020	0.676	Jan 2019	0.008	Jan 2020	0.259	Jan 2021	-		0.259	0.000	1.963	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		1.389		-		-		-	0.000	1.389	-
<b>Subtotal</b>			1.020	0.676		1.397		0.259		-		0.259	0.000	3.352	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MFEW OTA Prototype Design&Development Contract	C/FFP	C5 Consortium OTA : Acquisition Contracting Center-New Jersey	18.890	14.137	Feb 2019	-		-		-		-	0.000	33.027	-
Command and Control Development Contract	C/CPFF	EWPMT / APP EW : Aberdeen Proving Ground, MD	0.240	0.217	Apr 2019	-		-		-		-	0.000	0.457	-
MFEW Techniques and risk reduction activities	C/CPFF	Various (JHU, GTRI, MITRE, etc) : Aberdeen Proving Ground, MD	0.750	1.009	Jan 2019	-		-		-		-	0.000	1.759	-
MFEW OTA EMD Contract	C/FFP	C5 Consortium OTA : Acquisition Contracting Center-New Jersey	-	-		24.439	Feb 2020	40.460	Feb 2021	-		40.460	0.000	64.899	-
Grey Eagle Integration	Option/CPFF	General Atomics : San Diego, CA	-	0.972	May 2019	1.289	Jan 2020	0.250	Jan 2021	-		0.250	0.000	2.511	-
<b>Subtotal</b>			19.880	16.335		25.728		40.710		-		40.710	0.000	102.653	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX6 / <i>Multi-Function Electronic Warfare (MFEW)</i>
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<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Contractor Engineering - MFEW Air	C/CPFF	AASKI : Aberdeen Proving Ground, MD	2.336	0.414	Dec 2018	0.639	Dec 2019	0.462	Dec 2020	-		0.462	0.000	3.851	-
Matrix Engineering - MFEW Air	Various	Various : Aberdeen Proving Ground, MD	0.588	1.270	Dec 2018	1.192	Dec 2019	0.460	Dec 2020	-		0.460	0.000	3.510	-
Engineering Support Services - MFEW Air	SS/CPFF	TBD : TBD	-	-		-		0.500	Jan 2021	-		0.500	0.000	0.500	-
<b>Subtotal</b>			2.924	1.684		1.831		1.422		-		1.422	0.000	7.861	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Developmental Test (DT) / Flight Testing (Air)	TBD	Various : Aberdeen Proving Ground, MD	-	-		-		3.400	Apr 2021	-		3.400	0.000	3.400	-
Test range and test support	Various	Various : Various	-	0.628	Mar 2019	1.618		-		-		-	0.000	2.246	-
Modeling & Simulation / Test Infrastructure	Various	Various : Aberdeen Proving Ground, MD	-	10.790	Jan 2019	-		-		-		-	0.000	10.790	-
<b>Subtotal</b>			-	11.418		1.618		3.400		-		3.400	0.000	16.436	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	23.824	30.113	30.574	45.791	-	45.791	0.000	130.302	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX6 / <i>Multi-Function Electronic Warfare (MFEW)</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
MFEW Air OTA Prototype Design&Development	█																											
MFEW Air OTA EMD - Phase 2					█																							
Developmental Test (DT)/Flight Testing/Airworthiness													█															
User Assessment									█																			
Grey Eagle Intergration and Air Worthiness					█																							
Tailored Milestone C									▲																			
IOT&E													█															
Gray Eagle A-KIT Production																	█				█							
MFEW Air Production and Fielding																					█							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> DX6 / <i>Multi-Function Electronic Warfare (MFEW)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Tailored Milestone B	3	2018	3	2018
MFEW Air OTA Award	4	2018	4	2018
MFEW Air OTA Prototype Design&Development	4	2018	2	2020
MFEW Air OTA EMD - Phase 2	2	2020	4	2022
Developmental Test (DT)/Flight Testing/Airworthiness	1	2022	2	2022
User Assessment	2	2021	2	2021
Grey Eagle Intergration and Air Worthiness	2	2020	4	2022
Tailored Milestone C	3	2021	3	2021
IOT&E	2	2022	3	2022
Gray Eagle A-KIT Production	4	2020	4	2026
MFEW Air Production and Fielding	3	2021	4	2026

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>			<b>Project (Number/Name)</b> ET7 / <i>Radio Frequency Interference Mitigation</i>				
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
<i>ET7: Radio Frequency Interference Mitigation</i>	-	0.949	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.949
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

FY19 is the last year of funding for this project.

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

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

Centralized management of RIM offers a holistic approach for identification, system of systems engineering, developmental testing, and maturing of RIM solutions to address current and evolving RF interference issues. User and acquisition communities will synchronize, integrate, and codify RIM requirements to facilitate the cross cutting approach necessary for the efficient procurement of common RIM products. This approach will eliminate the need for separate hardware and platform integration research and development efforts for SDS and platforms. An integrated approach will eliminate the need for separate hardware and platform integration research and development efforts for SDS and platform Program Managers. RIM products are intended to preserve the investment that the Army has made in current Electronic Warfare (EW) and Mission Command Transport SDS and provide a strategy for future efforts for new SDS development with integrated RIM solutions. There is no FY 2020/2021 request.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> RF Interference Mitigation	0.949	-	-
<b>Description:</b> RIM is a System of Systems Enterprise approach that will allow Spectrum Dependent Systems to co-exist with Force Protection assets.			
<b>Accomplishments/Planned Programs Subtotals</b>	0.949	-	-

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

N/A

**Remarks**

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604270A / <i>Electronic Warfare Development</i>	Project (Number/Name) ET7 / <i>Radio Frequency Interference Mitigation</i>

**D. Acquisition Strategy**

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

The RIM acquisition strategy shifted focus from tunable filter technology to IC technology. The decision to shift focus was a direct result of the S&T community accelerating the technical maturity. IC technology will enhance the warfighters ability to utilize the spectrum compared to tunable filter technology. Additionally, RIM is being leveraged through the U.S. Army Europe (USAREUR) and Cyber Electromagnetic Activities (CEMA) Operational Needs Statement (ONS) and this effort could result in future capabilities.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> ET7 / <i>Radio Frequency Interference Mitigation</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	MIPR	PM Electronic Warfare & Cyber : APG, MD	0.621	-		-		-		-		-	0.000	0.621	-
<b>Subtotal</b>			0.621	-		-		-		-		-	0.000	0.621	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 Development Models	TBD	TBD : TBD	5.133	-		-		-		-		-	0.000	5.133	-
<b>Subtotal</b>			5.133	-		-		-		-		-	0.000	5.133	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	Allot	Various : Various	2.514	0.949	Nov 2018	-		-		-		-	0.000	3.463	-
<b>Subtotal</b>			2.514	0.949		-		-		-		-	0.000	3.463	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			8.268	0.949	0.000	-	-	-	0.000	9.217	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>			<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> ET7 / <i>Radio Frequency Interference Mitigation</i>	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Development for Interference Cancellation (IC)	[Redacted]				[Redacted]																							
Developmental Testing (DT) for IC	[Redacted]																											
Development for IC Algorithm	[Redacted]																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> ET7 / <i>Radio Frequency Interference Mitigation</i>

Schedule Details

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

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>				<b>Project (Number/Name)</b> VS6 / <i>Integrated Electronic Warfare Systems</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
VS6: <i>Integrated Electronic Warfare Systems</i>	-	7.534	5.451	2.198	-	2.198	2.198	2.131	2.157	1.602	0.000	23.271
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Counter Radio Controlled Improvised Explosive Device (RCIED) Electronic Warfare (CREW), provides protection of ground forces operating in vehicle convoys, single vehicles, and fixed locations in operational theaters, which enables freedom of movement across the depth and breadth of the operational environment. It is programmable with techniques to mitigate emerging threats. In order to keep pace with the threat evolution, development efforts will provide fielded CREW systems as well as other EW systems with techniques that mitigate the range of threats as required. These development efforts may include development of new techniques, integration of existing techniques, and hardware and software development and integration in order to pace the threat.

Justification: FY 2021 Base funding in the amount of \$2.198 million supports the continued development of CREW systems as well as other EW systems with techniques that mitigate the range of threats as required. These development efforts may include development of new techniques, integration of existing techniques, and hardware and software development and integration in order to pace the threat.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> IEWS - CREW	7.528	5.204	2.198
<b>Description:</b> The Integrated Electronic Warfare System (IEWS) will provide multiple capabilities, to include Electronic Warfare Planning and Management Tool (EWPMT), Multi-Function EW (MFEW), and Defensive Electronic Attack (DEA). The Army's only current Defensive Electronic Warfare solution is Counter Radio Controlled Improvised Explosive Device (RCIED) Electronic Warfare (CREW).			
<b>FY 2020 Plans:</b> Development of new techniques, integration of existing techniques, and hardware and software development and integration in order to pace the threat.			
<b>FY 2021 Plans:</b> Continue development of new techniques, integration of existing techniques, and hardware and software development and integration in order to pace the threat.			
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Decrease due to termination of Duke Secondary Unit Upgrade.			
<b>Title:</b> FY 2018 NDAA SEC 825 MDAP Cost Overrun	0.006	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> VS6 / <i>Integrated Electronic Warfare Systems</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638</p>	-	0.247	-
<b>Accomplishments/Planned Programs Subtotals</b>	7.534	5.451	2.198

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

N/A

**Remarks**

**D. Acquisition Strategy**

Due to change in the Army priorities, previously awarded (FY2016) Indefinite Delivery Indefinite Quantity (IDIQ) contract for RCIED threat changes was stopped Sep 2019 pending Termination For Convenience.

Continued development of CREW and other EW systems through hardware and software development and integration to pace the threat will leverage Other Government Agencies' competitively awarded contracts and task orders.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> VS6 / <i>Integrated Electronic Warfare Systems</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PMO Staff/Travel for EWPMT	Allot	PM Electronic Warfare & Cyber : Aberdeen Proving Ground, MD	4.956	-		-		-		-		-	0.000	4.956	-
Program and Technical Assistance support	C/CPFF	TBD : Aberdeen Proving Ground, MD	3.789	-		-		-		-		-	0.000	3.789	-
PMO Staff/Travel for CREW	Allot	PM Electronic Warfare & Cyber : Aberdeen Proving Ground, MD	2.554	0.227	Dec 2018	0.099	Dec 2019	0.020	Dec 2020	-		0.020	0.000	2.900	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.247		-		-		-	0.000	0.247	-
<b>Subtotal</b>			11.299	0.227		0.346		0.020		-		0.020	0.000	11.892	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EMD Contract - EWPMT	C/CPIF	SOTERA Defense Solutions Herndon, VA : RAYTHEON Fort Wayne, IN	38.318	-		-		-		-		-	0.000	38.318	-
IEWS Engineering and Development	MIPR	I2WD : Aberdeen Proving Ground, MD	5.557	-		-		-		-		-	0.000	5.557	-
Risk Reduction Studies for MFEW	MIPR	Various : Various	7.969	-		-		-		-		-	0.000	7.969	-
Develop CREW H/W and S/W solutions	C/CPFF	SRC, Inc. : Syracuse, NY	20.037	7.096	Nov 2018	-		-		-		-	0.000	27.133	-
Development of H/W and S/W for CREW and other EW systems	SS/CPFF	Various : Various	-	-		4.118	Feb 2020	1.018	Dec 2020	-		1.018	0.000	5.136	-
<b>Subtotal</b>			71.881	7.096		4.118		1.018		-		1.018	0.000	84.113	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604270A / <i>Electronic Warfare Development</i>				VS6 / <i>Integrated Electronic Warfare Systems</i>							
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
MFEW Technical/ Engineering Support - Contractor	C/CPFF	GTRI : Atlanta, GA	2.046	-		-		-		-		-	0.000	2.046	-
Matrix Engineering Support	MIPR	CERDEC : Aberdeen Proving Ground, MD	7.412	0.205	Dec 2018	0.149	Dec 2019	0.215	Dec 2020	-		0.215	0.000	7.981	-
EWPMT Architecture Study	MIPR	Various : Various	1.194	-		-		-		-		-	0.000	1.194	-
Engineering support	C/CPFF	Various : Various	3.207	-		0.838	Dec 2019	0.945	Dec 2020	-		0.945	0.000	4.990	-
FY 2019 MDAP Tax	TBD	FY 2019 Pending Rescission : FY 2019 Pending Rescission	-	0.006		-		-		-		-	0.000	0.006	-
<b>Subtotal</b>			13.859	0.211		0.987		1.160		-		1.160	0.000	16.217	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
EWPMT Test support	MIPR	Various : TBD	1.096	-		-		-		-		-	0.000	1.096	-
Operational Assessment (OA) of DV4 systems	MIPR	Yuma Proving Ground : Yuma, AZ	1.950	-		-		-		-		-	0.000	1.950	-
Continuous evaluation of CREW Technologies	MIPR	Yuma Proving Ground Yuma, AZ : YPG, AZ	1.718	-		-		-		-		-	0.000	1.718	-
<b>Subtotal</b>			4.764	-		-		-		-		-	0.000	4.764	N/A
<b>Project Cost Totals</b>			101.803	7.534		5.451		2.198		-		2.198	0.000	116.986	N/A
<b>Remarks</b>															

**UNCLASSIFIED**

<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>			<b>Date: February 2020</b>		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>		<b>Project (Number/Name)</b> VS6 / <i>Integrated Electronic Warfare Systems</i>	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Develop HW and SW solutions for CREW	████████████████				████████████████																							
Secondary Unit Development	████████████████				████████████████																							
Develop HW and SW solutions for CREW and other EW systems	████████████████				████████████████				████████████████				████████████████				████████████████				████████████████							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604270A / <i>Electronic Warfare Development</i>	<b>Project (Number/Name)</b> VS6 / <i>Integrated Electronic Warfare Systems</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
EWPMT Milestone B Decision	3	2013	3	2013
EWPMT Contract	3	2013	4	2014
MFEW Risk Reduction Studies	3	2013	4	2014
Delivery of CREW-2 Duke (DV4) Systems for Development	1	2014	1	2014
Operational Assessment and Engineering test of Duke (DV4) systems	2	2014	4	2014
CREW Relevancy Development Contract Award	2	2016	2	2016
Develop H/W and S/W solutions for CREW	2	2016	2	2020
Force Protection, Technique Development, and SAASM	2	2016	2	2018
Secondary Unit Development	3	2018	4	2019
Develop H/W and S/W solutions for CREW and other EW systems	2	2020	2	2026
Force Protection Assessment	3	2017	3	2017
Implemented Technique Assessment	3	2018	3	2018

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604328A / <i>TRACTOR CAGE</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	27.050	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	27.050
C71: <i>Tractor Cage</i>	-	27.050	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	27.050

**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>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	29.050	0.000	0.000	-	0.000
Current President's Budget	27.050	0.000	0.000	-	0.000
Total Adjustments	-2.000	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-2.000	-			
• SBIR/STTR Transfer	-	-			

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	74.629	87.179	91.574	-	91.574	61.328	56.704	56.848	55.308	Continuing	Continuing
CF3: <i>Integrated Soldier Systems (SL CFT)</i>	-	0.000	4.504	4.597	-	4.597	4.425	4.498	4.580	4.626	0.000	27.230
ES9: <i>Advanced Tactical Parachute System</i>	-	6.457	6.617	1.827	-	1.827	2.962	2.961	2.997	3.996	0.000	27.817
EW4: <i>Crew Served Weapons Engineering Development</i>	-	25.058	4.089	4.263	-	4.263	4.285	4.423	4.525	4.498	0.000	51.141
FF2: <i>Small Arms Fire Control</i>	-	4.094	14.700	10.153	-	10.153	11.244	7.993	9.991	9.992	0.000	68.167
FI2: <i>Lightweight 30mm Cannon</i>	-	0.000	1.384	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.384
FL8: <i>84mm MAAWS Ammunition</i>	-	0.000	4.040	3.131	-	3.131	2.997	0.000	0.000	0.000	0.000	10.168
FM4: <i>Next Generation Squad Weapons</i>	-	0.000	33.080	44.837	-	44.837	13.767	15.456	16.045	10.991	0.000	134.176
S58: <i>Soldier Enhancement Program</i>	-	8.989	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.989
S60: <i>Clothing &amp; Equipment</i>	-	8.152	6.453	6.717	-	6.717	5.010	4.846	3.697	6.814	0.000	41.689
S61: <i>Acis Engineering Development</i>	-	3.492	2.988	1.857	-	1.857	2.768	2.372	1.449	0.463	Continuing	Continuing
S62: <i>Counter-Defilade Target Engagement - SDD</i>	-	0.330	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.330
S63: <i>Individual Weapons Engineering Development</i>	-	12.454	2.697	4.374	-	4.374	4.214	4.280	4.270	4.216	0.000	36.505
S64: <i>Common Remotely Operated Wpn Sys (CROWS)</i>	-	0.000	0.000	1.499	-	1.499	0.000	0.000	0.000	0.000	0.000	1.499
S70: <i>Personnel Recovery Support System (PRSS)</i>	-	0.936	0.000	0.000	-	0.000	0.000	0.395	0.796	0.649	Continuing	Continuing
VS5: <i>Soldier Protective Equipment</i>	-	4.667	6.627	8.319	-	8.319	9.656	9.480	8.498	9.063	0.000	56.310

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	
<b>Note</b> Project FI2 Lightweight 30mm Cannon has no funding request for Fiscal Year (FY) 2021. This program supports the Army Modernization priorities (Build a More Lethal Force) through enhancement of Joint Lethality in contested environments by minimizing and eliminating erosion of close combat capability relative to peer competitors in complex terrain as outlined in the National Defense Strategy (NDS).  Project S64 Common Remotely Operated Wpn Sys (CROWS) had a skip year of funding in FY 2019 and was last funded in FY 2018. This program supports the Army Modernization priorities (Build a More Lethal Force) through enhancement of Joint Lethality in contested environments by minimizing and eliminating erosion of close combat capability relative to peer competitors in complex terrain as outlined in the NDS.		
<b>A. Mission Description and Budget Item Justification</b> This Program Element (PE) Engineering and Manufacturing Development (EMD) manages the Soldier as a system, with the goal of increasing Soldiers' combat effectiveness, increasing survivability, and improving the Soldiers' quality of life. It develops and tests prototypes of weapons, clothing, equipment, and other items useful to support the Soldier.  Project CF3 (Integrated Soldier Systems (SL CFT)) supports the Adaptive Soldier Architecture (ASA) effort that will develop a full system architecture for the Soldier and the Squad. The focus will be full integration of all mission-specific equipment into the ASA as well as full configuration management of the Configuration Database, Architecture Assessment Tool and Squad Performance Model.  Project ES9 (Advanced Tactical Parachute System) supports efforts to improve personnel parachute systems and associated equipment for low and high altitude operations to include canopy improvements based on integration of new technology with the goal of enhancing the insertion capability and safety of the airborne Soldier and increasing the performance, reliability, and durability of personnel airdrop equipment.  Project EW4 (Crew Served Weapons Engineering Development) supports efforts to transition components or prototypes from Small Arms Improvement, Project S54, Program Element 0603827A, (Budget Activity 4) and other domestic and foreign sources of small arms weapons to demonstrate, test and evaluate capability near or at planned operational requirements.  Project FF2 (Small Arms Fire Control) supports the development of an advanced fire control for the Next Generation Automatic Rifle (NGSW-AR) and Rifle (NGSW-R). The Next Generation Fire Control will increase the probability of hit and decrease the time to engage through a variable powered direct view optic with integrated range finder, ballistic calculator, and digital display capable of providing an adjusted aim point.  Project FI2 (Lightweight 30mm Cannon) provides increased lethality modification to Product Directorate Counter-Rocket Artillery Mortars (PD C-RAM) under a JUONS. An upgraded medium caliber weapon will be developed, tested and evaluated for integration into a modified remote weapon station under an Urgent Materiel Release (UMR).		

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	
<p>Project FL8 (84mm MAAWS Ammunition) supports test, evaluation and quality up to seven types of 84 millimeter (mm) munitions for the U.S. Army use with the M3/M3A1 Multi-Role Anti-Personnel Weapon Systems (MAAWS).</p> <p>Project FM4 (Next Generation Squad Weapons) supports the rapid prototyping and development of a NGSW-AR, NGSW-R and common cartridge to provide capability improvements in accuracy, range and lethality, in order to maintain overmatch and meet future warfighter requirements.</p> <p>Project S58 (Soldier Enhancement Program) supports accelerated integration, modernization, and enhancement efforts of lighter, more lethal weapons, and improved Soldier items including lighter, more comfortable load-bearing equipment, field gear, survivability items, communications equipment, and navigational aids.</p> <p>Project S60 (Clothing &amp; Equipment) supports pre-production development of state-of-the-art individual clothing and equipment to improve the survivability, mobility and sustainment affecting the quality of life of the individual Soldier.</p> <p>Project S61 (Acis Engineering Development) provides System Development programs with improved aviator safety, survivability, and human performance that amplify the warfighting effectiveness and facilitates full-spectrum dominance of the Army aircraft including the AH-64 Apache/Longbow, CH-47 Chinook, UH/HH-60 Blackhawk, Light Utility Helicopter, and Armed Reconnaissance Helicopter.</p> <p>Project S62 (Counter-Defilade Target Engagement - SDD) the XM25, Individual Airburst Weapon System (IAWS) delivers a 25mm programmable high explosive airburst (HEAB) round to defeat defilade and point area targets out to approximately 600 meters. Accurate and lethal engagement of defilade targets at the squad level is the number one capability gap identified by the United States Army Infantry Center (USAIC).</p> <p>Project S63 (Individual Weapons Engineering Development) demonstrates engineering development models or integrated commercial items designed to enhance lethality, target acquisition, fire control, training effectiveness, and reliability for small arms weapon systems and ammunition. Programs include Improved Weapons Coatings, Personal Defense Weapon, 30 Round 5.56mm Magazine, Modular Handgun System (MHS), Precision Sniper Rifle (PSR), Sub Compact, and Interim Combat Service Rifle (ICR).</p> <p>Project S64 (Common Remotely Operated Wpn Sys (CROWS)) continues enhancing CROWS capability and reliability to increase its application across combat and tactical platforms. This capability enhances the Soldier's survivability, lethality and situational awareness.</p> <p>Project S70 (Personnel Recovery Support System (PRSS)) provides system research, development and testing of the Personal Recovery Support System/Personnel Recovery Support Equipment supporting operations to report and locate isolated, missing, detained or captured Soldiers.</p> <p>Project VS5 (Soldier Protective Equipment) supports engineering and manufacturing development of Individual Soldier Ballistic Protection equipment. It will leverage advancements in technology to continue incremental improvements to body armor (to include improved outer tactical vests, plate carriers, and helmets) and other personal protective equipment.</p>		

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	63.793	106.121	107.166	-	107.166
Current President's Budget	74.629	87.179	91.574	-	91.574
Total Adjustments	10.836	-18.942	-15.592	-	-15.592
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-20.442			
• Congressional Rescissions	-	-			
• Congressional Adds	-	1.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	10.836	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-15.592	-	-15.592

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

**Project:** EW4: *Crew Served Weapons Engineering Development*

Congressional Add: *FY 2019 Congressional Add: Cannon Life Extension-\$1.5 million & FY2019 ATR Next Generation Squad Weapons (NGSW-AR)- \$14.490 million*

Congressional Add Subtotals for Project: EW4

Congressional Add Totals for all Projects

	<b>FY 2019</b>	<b>FY 2020</b>
	14.490	1.500
	14.490	1.500
	14.490	1.500

**Change Summary Explanation**

FY 2021 decrease in funding due to reduced Ammo requirements and protective coatings testing.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>				<b>Project (Number/Name)</b> CF3 / <i>Integrated Soldier Systems (SL CFT)</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
CF3: <i>Integrated Soldier Systems (SL CFT)</i>	-	0.000	4.504	4.597	-	4.597	4.425	4.498	4.580	4.626	0.000	27.230
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Adaptive Squad Architecture (ASA) and Squad Performance Model (SPM) are Program Executive Office Soldier (PEO S) led efforts which will allow optimization of the Soldier and the Squad. The focus of CF3 will be the full integration of all mission-specific equipment (CF2 incorporates Soldier base/common kit) into the ASA and SPM as well as full configuration management of the Configuration Database (CD), Architecture Assessment Tool (AAT) and SPM. This will be accomplished by continued development of Interface Control Documents (ICDs) in order to provide common established interfaces for external stakeholders who will interface on or with the Soldier platform. The ASA and SPM will continue to refine a metrics-based approach that will include live, virtual, and constructive tools across the DoD, academia, and industry which will be used for senior leaders to make deliberate decisions based on the analysis of Soldier/Squad Performance. Funding for this project aligns with the Army's priorities in support of the National Defense Strategy and is a priority of the Soldier Lethality Cross Functional Team.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Integrated Soldier Systems	-	4.299	4.597	-	4.597
<b>Description:</b> Test, maintain and evolve a Soldier/squad equipment configuration baseline and conduct configuration management at the system level. Physically integrate components, improve compatibility and interoperability across programs. Establish and maintain tools that provide Systems Engineering, Configuration Management and Evaluation in a virtual and physical environment. Conduct Squad Performance Model (SPM) evaluations and integrate mission-specific equipment into the Adaptive Squad Architecture (ASA) with continued emphasis on development of ICDs, evaluations, and improved fidelity of the SPM.					
<b>FY 2020 Plans:</b> Integrated mission-specific equipment with other combat platforms into initial version of ASA. Conducted evaluations in support of the SPM.					
<b>FY 2021 Base Plans:</b> Continue the integration of mission-specific equipment with other combat platforms into initial version of ASA. Continue evaluations in support of the SPM.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b>					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> CF3 / <i>Integrated Soldier Systems (SL CFT)</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
FY 2020 to FY 2021 increase in required funding is due to the analysis of other mission specific equipment that seeks to reduce physical weight, cognitive burden, and sustainment needs of the Squad as an Integrated Combat Platform.					
<b>Title:</b> FY 2020 SBIR/STTR Transfer	-	0.205	-	-	-
<b>Description:</b> Funding transferred in accordance with Title 15 USC ?638					
<b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638					
<b>Accomplishments/Planned Programs Subtotals</b>	-	4.504	4.597	-	4.597

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• CF2: <i>Integrated Soldier Systems Prototyping (SL CFT)</i>	-	1.959	2.541	-	2.541	3.149	3.771	3.843	3.881	0.000	19.144

**Remarks**

**D. Acquisition Strategy**  
PEO Soldier will utilize available Adaptive Squad Architecture (ASA) and Squad Performance Model (SPM) tools, current Systems Engineering and Technical Assistance (SETA) contracts as well as tools/deliverables built under project CF2 to validate, verify and operationally test the ASA and SPM, in both physical and virtual environments. The PEO will utilize project CF3 to leverage any data, architectural products or designs from the Army's Heads-up Display (HUD) v3.0 (a separate project).

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> CF3 / <i>Integrated Soldier Systems (SL CFT)</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.205		-		-		-	0.000	0.205	-
<b>Subtotal</b>			-	-		0.205		-		-		-	0.000	0.205	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
ASA and SPM Engineering, Manufacturing, Development	MIPR	TBD : Various	-	-		2.402	Jan 2020	2.597	Jan 2021	-		2.597	0.000	4.999	-
<b>Subtotal</b>			-	-		2.402		2.597		-		2.597	0.000	4.999	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Physical evaluations to support ASA and SPM	MIPR	Various : To Be Determined	-	-		1.897	Jan 2020	2.000	Jan 2021	-		2.000	0.000	3.897	-
<b>Subtotal</b>			-	-		1.897		2.000		-		2.000	0.000	3.897	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	-	4.504	4.597	-	4.597	0.000	9.101	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>			<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> CF3 / <i>Integrated Soldier Systems (SL CFT)</i>	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
ASA Integration																												
SPM Evaluations																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> CF3 / <i>Integrated Soldier Systems (SL CFT)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
ASA Integration	2	2020	4	2025
SPM Evaluations	2	2020	4	2025

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>				<b>Project (Number/Name)</b> ES9 / <i>Advanced Tactical Parachute System</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
ES9: <i>Advanced Tactical Parachute System</i>	-	6.457	6.617	1.827	-	1.827	2.962	2.961	2.997	3.996	0.000	27.817
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Funding in this project supports the Army's Cross Functional Teams (CFT) initiatives. Advanced Tactical Parachute System funding supports efforts to improve Low Altitude and High Altitude personnel parachutes and associated equipment to include test and evaluation of items transitioning from Advanced Component Development and prototype (6.4) efforts, with the goal of enhancing the insertion capability and safety of the airborne Soldier and increasing the performance, reliability, and durability of personnel airdrop equipment. Funds improvements and testing/evaluation of personnel parachute systems includes integration and interface on the Soldier system. This project will continue to support cross-service initiatives to improve commonality.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Advanced Tactical Parachute System	6.074	6.316	1.827	-	1.827
<b>Description:</b> Advanced Tactical Parachute System fund improvements and testing/evaluation of personnel parachute systems. Project supports effort to improve Low Altitude and High Altitude personnel parachute systems and associated equipment to include test and evaluation of items transitioning from Advance Component Development and prototype (6.4) efforts, with the goal of enhancing the insertion capability and safety of the airborne Soldier and increasing the performance, reliability, and durability of personnel airdrop equipment.					
<b>FY 2020 Plans:</b> Complete OT for Enhanced Electronic Automatic Activation Device (EEAAD) in support of MS C decision and full materiel release. Complete Parachutist Oxygen Delivery System (PODS) DT and prepare to enter OT. Conduct DT for Military Altimeters. Continue to conduct testing for service life extension for RA-1, T-11, and MC-6 parachutes; glide modulation capability of the RA-1 parachute system; and automated parachute management tracking system development and integration for RA-1, T-11, and MC-6 parachute systems; and support modernization initiatives to parachute systems.					
<b>FY 2021 Base Plans:</b> Complete the rescheduled (from FY 2020) Operational Testing (OT) for the Enhanced Electronic Automatic Activation Device (EEAAD) in support of MS C decision and Full Material Release (FMR). Conduct Parachutist Emergency Release System (PERS) (formally called Towed Jumper Release Systems (TJRS)) Developmental Testing (DT). Continue to conduct testing for service life extension for T-11, and MC-6 parachutes, automated					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> ES9 / <i>Advanced Tactical Parachute System</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
parachute management tracking system integration for personnel parachute systems, Parachutist Navigation System software improvements, T-11 and RA-1 upgrades and support enhanced standoff parachute insertion capabilities.  <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decrease in Advanced Tactical Parachute portfolio is due to anticipated requirements changes in FY 2021.					
<b>Title:</b> FY 2019 Rescission <b>Description:</b> Rescission Infantry support weapons - S62 counter-defilade target engagement	0.383	-	-	-	-
<b>Title:</b> FY 2020 SBIR/STTR Transfer <b>Description:</b> Funding transferred in accordance with Title 15 USC ?638  <b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638 <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638	-	0.301	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	6.457	6.617	1.827	-	1.827

<b>C. Other Program Funding Summary (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• MA7801: <i>Advanced Tactical Parachute System</i>	41.104	42.622	53.021	-	53.021	47.755	39.808	38.978	25.110	0.000	288.398
• ET8: <i>Personnel Airdrop System Development</i>	0.396	0.297	1.266	-	1.266	1.264	1.811	0.999	0.999	Continuing	Continuing

**Remarks**

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

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> ES9 / <i>Advanced Tactical Parachute System</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FY 2019 Rescission	TBD	Various : Various	-	0.383		-		-		-		-	0.000	0.383	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.301		-		-		-	0.000	0.301	-
<b>Subtotal</b>			-	0.383		0.301		-		-		-	0.000	0.684	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Dev Contracts	C/FFP	Various : Various	5.574	2.997		3.242		0.559		-		0.559	6.335	18.707	Continuing
Dev Sys Engineering Spt	MIPR	Various : Various	0.400	0.200		0.125		0.212		-		0.212	1.190	2.127	Continuing
FY 2019 SBIR / STTR/ FFRDC Transfer	TBD	TBD : TBD	-	0.253		-		-		-		-	0.000	0.253	-
<b>Subtotal</b>			5.974	3.450		3.367		0.771		-		0.771	7.525	21.087	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 Office Support Costs	MIPR	NSRDEC : Natick, MA	0.531	0.435		0.324		0.283		-		0.283	0.491	2.064	Continuing
<b>Subtotal</b>			0.531	0.435		0.324		0.283		-		0.283	0.491	2.064	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
DT/OT	MIPR	various : various	1.960	2.189		2.625		0.773		-		0.773	4.913	12.460	Continuing
<b>Subtotal</b>			1.960	2.189		2.625		0.773		-		0.773	4.913	12.460	N/A







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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> ES9 / <i>Advanced Tactical Parachute System</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Enhanced Electronic Auto Activation Device (EEAAD) Dev	1	2019	4	2021
EEAAD Milestone C	1	2022	1	2022
RA-1 Improvements	1	2019	4	2022
T-11/MC-6 Service Life Enhancements	1	2019	4	2022
Parachutist Flotation Device (PFD) MDD	3	2019	3	2019
PFD Development	3	2019	3	2020
PFD Milestone C	3	2021	3	2021
Evaluate T-11 Pack Tray Modifications	1	2020	4	2020
Low Observable (Signature Reduction) Testing	1	2020	4	2022
PNS Software Improvements	1	2020	4	2025
Support Enhanced Standoff Parachute Insertion	3	2020	4	2024
Parachutist Emergency Release System (PERS) MDD	1	2021	1	2021
PERS Development	2	2021	4	2022
PERS Milestone C	1	2023	1	2023
Military Altimeters MDD	1	2021	1	2021
Military Altimeters Development	2	2021	4	2022
Military Altimeters Milestone C	1	2023	1	2023
Develop Static Line T-11 Reserve Automatic Activation Device (RAAD)	1	2022	2	2025
Static Line T-11RAAD Milestone C	3	2025	3	2025
High Altitude Insertion Enhancements	1	2023	4	2025
Develop and Test Smart Universal Static line Hook (SUSH)	1	2023	4	2023
Develop and Test T-11 Light Weight Canopy	1	2024	4	2025

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b>	<b>R-1 Program Element (Number/Name)</b>	<b>Project (Number/Name)</b>
2040 / 5	PE 0604601A / <i>Infantry Support Weapons</i>	ES9 / <i>Advanced Tactical Parachute System</i>

**Note**

Note: Towed Jumper Retrieval System (TJRS) is now Parachutist Emergency Release System (PERS).

High Altitude Insertion Enhancements includes the following programs: Glide Augmentation, Situational Awareness Aids, High Altitude Combo Drops and GPS Denied Navaid.

RA-1 Improvements included the following programs: Glide Modulation, C-17 Over the Ramp (OTR), Riser Improvement, Above 25K Operations and Reserve Deployment Bag.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>				<b>Project (Number/Name)</b> EW4 / <i>Crew Served Weapons Engineering Development</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EW4: <i>Crew Served Weapons Engineering Development</i>	-	25.058	4.089	4.263	-	4.263	4.285	4.423	4.525	4.498	0.000	51.141
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

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

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> New Weapon Systems	6.335	1.191	1.321	-	1.321
<b>Description:</b> Development of new crew served weapons					
<b>FY 2020 Plans:</b> Precision Sniper Rifle (PSR): Supported ammunition specific testing, development of a spare parts contract, Life Cycle sustainment planning efforts, and activities to support a Milestone C / Type Classification-Standard decision for PSR weapon system and two ammunition cartridges.					
New Weapon Systems Evaluations and Assessments: Continued to perform initial evaluation and assessment of new weapon systems.					
<b>FY 2021 Base Plans:</b> M3/M3E1 Multi-Role Anti-Armor Anti-Personnel Weapon System (MAAWS): Plan to complete all operational and qualification test efforts required to obtain Type Classification and Full Materiel Release of the M3E1 w/Fire Control.					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> EW4 / <i>Crew Served Weapons Engineering Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<p>New Weapon Systems Evaluations and Assessments: Will continue to explore new weapon system technologies and perform initial evaluations and assessments required to facilitate rapid acquisition of increased capabilities where applicable.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Fiscal Year (FY) 2021 increase in funds to complete production qualification testing for the M3E1.</p>					
<p><b>Title:</b> Crew Served Weapons Enhancements</p> <p><b>Description:</b> Enhancements and developments of Crew Served weapons</p> <p><b>FY 2020 Plans:</b> FY 2020 New Start Efforts: Individual Non-Lethal System: Worked to address technical issues identified during prove out test, refined user requirements and initiated hardware contract for verification test in support of Type classification.</p> <p>Also, Current and Legacy Weapon Improvements: Assessed and evaluated selected capabilities and improvements for all current and legacy weapon systems.</p> <p>Small Business Innovation Research (SBIR) Enhancements: Continued to support Phase II Enhancement and/or initialization of Phase III SBIR activities.</p> <p><b>FY 2021 Base Plans:</b> Gunner Integrated Protection and Restraint System, Objective Gunner Protection Kit (GIPRS/OGPK): Complete developmental verification testing and begin operational testing for the TOW Missile Objective Gunner Protection Kit (TOGPK) 2.0. Will begin work on technical publications and prepare for TOGPK 2.0 type classification. Will prepare for ruggedization and qualification testing for the improved GIPRS Slip Ring.</p> <p>Current and Legacy Weapon Improvements: Will continue to assess and evaluate selected capabilities and improvements for all current and legacy weapon systems.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 funding decrease as less support is now required for CSASS.</p>	2.628	0.810	0.420	-	0.420
<p><b>Title:</b> Ammunition</p> <p><b>Description:</b> Improvement of Crew Served Weapons Ammunition</p>	0.975	0.025	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> EW4 / <i>Crew Served Weapons Engineering Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<p><b><i>FY 2020 Plans:</i></b> Ammunition Upgrades: Tested, evaluated and analyzed the effect of current and new ammunition on Crew Served Weapons.</p> <p><b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> Decrease in funds requested due to lack of requirement for Ammo.</p>					
<p><b><i>Title:</i></b> Combat Optics</p> <p><b><i>Description:</i></b> Improvement of Combat Optics</p> <p><b><i>FY 2020 Plans:</i></b> FY 2020 New Start: Next Generation Optics: Integrated current and emerging target acquisition component technologies into a variable magnification spotting scope and into binoculars.</p> <p>Mounted Machinegun Optic: Continued integration efforts with airburst ammo through engineering studies and evaluation of emerging technologies for Mk19 MMO PPPI.</p> <p><b><i>FY 2021 Base Plans:</i></b> Mounted Machinegun Optic (MMO): Continue MMO pre-planned product improvement (PPPI) R&amp;D efforts for integration with HEDP airburst programmer ammo.</p> <p>Digital Spotting Scope (DSS): Will pursue transition of spotting scope technology investments towards development of next generation spotting scope system. DSS will include embedded digital overlays, fire control solutions with down range wind sensing, digital image enhancements to improve target discrimination and positive ID, networking capabilities, and covert target isolation and hand-off.</p> <p>Next Generation Optics: Continue engineering evaluations, verification and validation of weapon optics performance requirements, covert target isolation and hand-off.</p> <p><b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> FY 2021 funding increase in funds due to launch of the new Digital Spotting Scope effort.</p>	0.530	0.421	2.497	-	2.497
<p><b><i>Title:</i></b> Research and Analysis</p> <p><b><i>Description:</i></b> Market Research and Cost Benefit Analysis</p>	0.100	0.025	0.025	-	0.025

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> EW4 / <i>Crew Served Weapons Engineering Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>FY 2020 Plans:</b> Continued Market Research and Cost Benefit Analysis of new small arms weapon systems and/or enhancements for engineering and manufacturing development.					
<b>FY 2021 Base Plans:</b> Will continue Market Research and Cost Benefit Analysis of new small arms weapons and/or enhancements. Continued research & analysis of mature technologies will inform engineering and manufacturing development required to facilitate rapid acquisition of increased capabilities where applicable.					
<b>Title:</b> FY 2020 SBIR/STTR Transfer <b>Description:</b> Funding transferred in accordance with Title 15 USC ?638	-	0.117	-	-	-
<b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638 <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638					
<b>Accomplishments/Planned Programs Subtotals</b>	10.568	2.589	4.263	-	4.263

	<b>FY 2019</b>	<b>FY 2020</b>
<b>Congressional Add:</b> FY 2019 Congressional Add: Cannon Life Extension-\$1.5 million & FY2019 ATR Next Generation Squad Weapons (NGSW-AR)- \$14.490 million	14.490	1.500
<b>FY 2019 Accomplishments:</b> FY 2019 Congressional Add: Cannon Life Extension-\$1.5 million & FY2019 ATR Next Generation Squad Weapons (NGSW-AR)- \$14.490 million		
<b>FY 2020 Plans:</b> FY 2019 Congressional Add: Cannon Life Extension-\$1.5 million & FY2019 ATR Next Generation Squad Weapons (NGSW-AR)- \$14.490 million		
<b>Congressional Adds Subtotals</b>	14.490	1.500

<b>C. Other Program Funding Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• S54: <i>Small Arms Improvement</i>	7.395	14.555	16.082	-	16.082	19.213	17.423	10.477	10.583	0.000	95.728

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> EW4 / <i>Crew Served Weapons Engineering Development</i>

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

Line Item	FY 2019	FY 2020	FY 2021	FY 2021	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Cost To	
			Base	OCO	Total					Complete	Total Cost
• FL8: <i>84mm MAAWS Ammunition</i>	-	4.040	3.131	-	3.131	2.997	-	-	-	0.000	10.168
• FM4: <i>Next Generation Squad Weapons</i>	-	33.080	44.837	-	44.837	13.767	15.456	16.045	10.991	0.000	134.176
• GZ1500: <i>Sniper Rifles Modifications</i>	2.747	2.426	1.898	-	1.898	1.855	1.890	1.792	2.111	Continuing	Continuing
• GZ1290: <i>M249 SAW Machine Gun MODS</i>	3.139	-	0.000	-	0.000	-	-	-	-	Continuing	Continuing
• GZ1300: <i>M240 Medium Machine Gun MODS</i>	6.947	8.000	6.385	-	6.385	7.992	7.992	7.992	-	Continuing	Continuing
• GB3000: <i>MK-19 Grenade Machine Gun MODS</i>	1.684	3.737	6.444	-	6.444	11.666	14.369	-	-	Continuing	Continuing
• GB4000: <i>M2 50 Cal Machine Gun MODS</i>	19.098	6.090	0.000	-	0.000	-	-	-	-	0.000	25.188
• GC0925: <i>Modifications Less Than \$5.0m (WOCV-WTCV)</i>	6.362	4.327	2.604	-	2.604	2.360	2.336	2.713	3.608	Continuing	Continuing
• GL3200: <i>Items Less Than \$5.0m (WOCV-WTCV)</i>	4.571	3.066	2.763	-	2.763	2.866	2.974	3.171	3.196	Continuing	Continuing
• G13000: <i>M240 Medium Machine Gun (7.62mm)</i>	14.581	12.500	0.000	-	0.000	-	-	-	-	Continuing	Continuing
• G01506: <i>Precision Sniper Rifle</i>	-	5.747	10.137	-	10.137	12.100	6.285	5.213	5.994	Continuing	Continuing
• G13101: <i>MULTI-ROLE ANTI-ARMOR ANTI-PERSONNEL WEAPON SYSTEM</i>	19.880	19.264	17.864	4.765	22.629	26.690	26.009	-	-	Continuing	Continuing

**Remarks**

In support of Small Arms Requirements, components or prototypes developed in BA 4 PE 0603827A Soldier Systems - Advanced Development Project S54 Small Arms Improvement transition to BA 5 PE 0604601A Infantry Support Weapons Project EW4 Crew Served Weapons Engineering Development to conduct engineering and manufacturing development. Once the component, prototype or operational prototype achieves Milestone C and type classification the item transitions to small arms weapon systems production or modification programs.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604601A / <i>Infantry Support Weapons</i>	Project (Number/Name) EW4 / <i>Crew Served Weapons Engineering Development</i>

**D. Acquisition Strategy**

Primary strategy is to mature and finalize design efforts, award Research, Development, Test and Evaluation (RDT&E) Department of Defense Ordnance Technology Consortium (DOTC) and other OTA type hardware contracts. Test and evaluate systems that result in type classification, material release, and follow-on production contract awards.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604601A / Infantry Support Weapons				EW4 / Crew Served Weapons Engineering Development							
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Allot	PM Soldier Weapons, : Picatinny Arsenal	1.051	0.715	Mar 2019	-		-		-		-	Continuing	Continuing	Continuing
Travel	MIPR	PM Soldier Weapons, : Picatinny Arsenal	0.220	0.135	Mar 2019	0.010	Mar 2020	0.013	Mar 2021	-		0.013	Continuing	Continuing	Continuing
FY2019 SBIR / STTR Transfer	FFRDC	Army Budget Office : Pentagon, Washington DC	-	0.984	Nov 2018	-		-		-		-	Continuing	Continuing	Continuing
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.117		-		-		-	0.000	0.117	-
<b>Subtotal</b>			1.271	1.834		0.127		0.013		-		0.013	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Fabrication	Various	Various : Multiple Contractors	0.550	4.384	Mar 2019	0.285	Mar 2020	0.300	Mar 2021	-		0.300	Continuing	Continuing	Continuing
Hardware Development	MIPR	Army Research Development Engineers Centers : Multiple	4.274	15.581	Mar 2019	0.035	Mar 2020	1.200	Mar 2021	-		1.200	Continuing	Continuing	Continuing
<b>Subtotal</b>			4.824	19.965		0.320		1.500		-		1.500	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering	MIPR	Army Research Development	6.849	1.169	Mar 2019	0.986	Mar 2020	0.200	Mar 2021	-		0.200	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604601A / Infantry Support Weapons				EW4 / Crew Served Weapons Engineering Development							
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
		Engineering Centers : Multiple													
Logistics	MIPR	Tank & Automotive Command (TACOM), : Warren	0.499	0.195	Mar 2019	0.036	Mar 2020	0.050	Mar 2021	-		0.050	Continuing	Continuing	Continuing
Human Research and Engineering	MIPR	Army Research Laboratory, : Aberdeen Proving Ground	0.437	0.297	Mar 2019	0.036	Mar 2020	0.050	Mar 2021	-		0.050	Continuing	Continuing	Continuing
<b>Subtotal</b>			7.785	1.661		1.058		0.300		-		0.300	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Testing	MIPR	Army Developmental Test Command, : Aberdeen Proving Ground	3.215	0.868	Mar 2019	2.485	Mar 2020	1.200	Mar 2021	-		1.200	Continuing	Continuing	Continuing
Operational Testing	MIPR	Army Test and Evaluation Command, : Aberdeen Proving Ground	3.068	0.500	Mar 2019	0.065	Mar 2020	1.200	Mar 2021	-		1.200	Continuing	Continuing	Continuing
Validation Testing	MIPR	Army Test and Evaluation Centers, : Multiple	0.544	0.230	Mar 2019	0.034	Mar 2020	0.050	Mar 2021	-		0.050	Continuing	Continuing	Continuing
<b>Subtotal</b>			6.827	1.598		2.584		2.450		-		2.450	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			20.707	25.058		4.089		4.263		-		4.263	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2021 Army							<b>Date:</b> February 2020			
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>			<b>Project (Number/Name)</b> EW4 / <i>Crew Served Weapons Engineering Development</i>				

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
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<b>Remarks</b>									

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> EW4 / <i>Crew Served Weapons Engineering Development</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>NEW WEAPON SYSTEMS</b>																												
Next Generation Squad Weapon-Automatic Rifle	█				█																							
M3/M3E1 Multi-Role Anti-Armor Anti-Personnel Weapon System	█				█				█																			
Precision Sniper Rifle (PSR)	█				█																							
New Weapon Systems Evaluations and Assessments	█																											
<b>CREW SERVED WEAPON ENHANCEMENTS</b>																												
Compact Semi-Automatic Sniper System (CSASS)	█				█																							
Increased Barrel Life/Replace Chrome	█				█																							
M2 Lightweight Program	█				█																							
Weapons Upgrades and Accessories	█				█																							
Current and Legacy Weapon Improvements	█				█				█				█				█				█							
					Formerly Weapons Upgrades and Accessories																							
Gunner Integrated Protection and Restraint Systems (GIPRS)	█				█				█				█															
Individual Non-Lethal System	█				█				█				█				█				█							

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> EW4 / <i>Crew Served Weapons Engineering Development</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Small Business Innovation Research (SBIR) Enhancements	[Redacted]																											
<b>AMMUNITION</b>	[Redacted]																											
XM1112 Airburst Non-Lethal Munition (ANLM)	[Redacted]																											
Ammunition Upgrades	[Redacted]																											
<b>COMBAT OPTICS</b>	[Redacted]																											
Eagle Eye Digital Spotting Scope	[Redacted]																											
Optic Upgrades	[Redacted]																											
Next Generation Optics	[Redacted]																											
	Formerly Optic Upgrades																											
<b>RESEARCH AND ANALYSIS</b>	[Redacted]																											
Research and Analysis	[Redacted]																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> EW4 / <i>Crew Served Weapons Engineering Development</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
NEW WEAPON SYSTEMS	1	2017	4	2025
Next Generation Squad Weapon-Automatic Rifle	1	2019	4	2019
M3/M3E1 Multi-Role Anti-Armor Anti-Personnel Weapon System (MAAWS)	1	2017	4	2021
Precision Sniper Rifle (PSR)	1	2017	4	2020
New Weapon Systems Evaluations and Assessments	1	2018	4	2025
CREW SERVED WEAPON ENHANCEMENTS	1	2017	4	2025
Compact Semi-Automatic Sniper System (CSASS)	1	2017	4	2019
Increased Barrel Life/Replace Chrome	1	2019	4	2020
M2 Lightweight Program	1	2018	4	2020
Weapons Upgrades and Accessories	1	2017	4	2019
Current and Legacy Weapon Improvements	1	2020	4	2025
Gunner Integrated Protection and Restraint Systems (GIPRS/OGPK)	1	2017	4	2023
Individual Non-Lethal System	1	2021	4	2025
Small Business Innovation Research (SBIR) Enhancements	1	2017	4	2025
AMMUNITION	1	2017	4	2020
XM1112 Airburst Non-Lethal Munition (ANLM)	1	2017	4	2020
Ammunition Upgrades	1	2017	4	2020
COMBAT OPTICS	1	2017	4	2025
Eagle Eye Digital Spotting Scope	1	2021	4	2022
Optic Upgrades	1	2017	4	2019
Next Generation Optics	1	2020	4	2025
FIRE CONTROL	1	2017	4	2017

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**Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> EW4 / <i>Crew Served Weapons Engineering Development</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
Advanced Fire Control with Hyperspectral Target	1	2017	4	2017
Advanced Fire Control with Precision Projectile/Dynamic	1	2017	4	2017
Fire Control Upgrades	1	2017	4	2017
RESEARCH AND ANALYSIS	1	2017	4	2025
Research and Analysis	1	2017	4	2025

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>				<b>Project (Number/Name)</b> FF2 / <i>Small Arms Fire Control</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
FF2: <i>Small Arms Fire Control</i>	-	4.094	14.700	10.153	-	10.153	11.244	7.993	9.991	9.992	0.000	68.167
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Next Generation Squad Weapon - Fire Control (NGSW-FC) is an advanced fire control device to support the Next Generation Squad Weapons. NGSW-FC increases the probability of hit and decreases the time to engage through a variable powered direct view optic with integrated range finder, ballistic calculator, and digital display capable of providing an adjusted aim point. The NGSW-FC will utilize open architecture to deliver the initial increased core capability followed by increasing increments of capability/enhancements over time as technology matures and evolves. Capability enhancements will be developed through iterative prototyping that may include technology such as advanced camera based capabilities; optical augmentation; aim augmentation; weapon stabilization; wind sensing; optimization of size, weight, and power; advanced network lethality; advanced ruggedization; and augmented reality.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Design, Develop and Fabricate	3.257	11.778	5.826	-	5.826
<b>Description:</b> Includes contract awards for the Engineering and Manufacturing Development (EMD) of all Fire Control configurations, enhancements, and hand held devices.					
<b>FY 2020 Plans:</b> Awarded two independent fixed amount Other Transaction Agreements (OTAs) with two separate vendors for the rapid prototyping, design and development of the Next Generation Squad Weapon - Fire Control (NGSW-FC). Each vendor delivered one hundred and fifteen NGSW-FC prototype systems for government testing and Soldier evaluation.					
<b>FY 2021 Base Plans:</b> Will continue to conduct iterative prototype efforts to design, develop, and fabricate enhancements to the NGSW-FC, conduct technical system engineering reviews, and implementation plans for iterative prototype components. Will award agreements or contracts to conduct iterative prototype efforts.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Decrease in Fiscal Year (FY) 2021 funding is due to Rapid Prototyping phase of the NGSW-FC initial prototype being mostly conducted in FY 2020. FY 2021 developmental and fabrication will focus on iterative prototyping efforts.					
<b>Title:</b> Engineering Support	0.570	1.485	2.015	-	2.015

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FF2 / <i>Small Arms Fire Control</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<p><b>Description:</b> Government engineering support, providing oversight of design development and contractor performance.</p> <p><b>FY 2020 Plans:</b> Provided engineering support and oversight of design improvements and contractor performance. Provided oversight of developmental and operational test activities, preliminary and critical design reviews. Participated in source selection activities and technical reviews.</p> <p><b>FY 2021 Base Plans:</b> Will continue to provide government engineering support at laboratories and engineering centers, providing design, limited testing and oversight of development and contractor performance. Will begin planning and documentation that will be required for iterative prototyping for system enhancements.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 funding will increase due to larger engineering support requirement for the NGSW-FC, significant NGSW-FC prototype testing events, down-selection, and associated iterative prototype efforts.</p>					
<p><b>Title:</b> Test and Evaluation</p> <p><b>Description:</b> Government testing and evaluation of prototypes, articles and improvements. Includes Soldier Touch Point evaluations.</p> <p><b>FY 2020 Plans:</b> Prototype systems was tested both for technical capability as well as user evaluation. Developed test and evaluation criteria, test and evaluate improvements of prototypes and documented all results.</p> <p><b>FY 2021 Base Plans:</b> NGSW-FC prototype systems will continue to undergo technical optical lab testing, environmental testing, electromagnetic environment effects (E3) testing, and soldier touch point user evaluations. Will continue to conduct all required testing and analysis to support source selection along with production and fielding decision.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 funding increase due to delivery of prototypes being tested in FY 2021 for NGSW-FC.</p>	0.131	0.687	2.228	-	2.228
<p><b>Title:</b> Program Management</p> <p><b>Description:</b> Program management office non-labor activities, to include travel and other indirect costs.</p> <p><b>FY 2020 Plans:</b></p>	0.032	0.082	0.084	-	0.084

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FF2 / <i>Small Arms Fire Control</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Provided for administrative costs incurred by the Program Management office, to include travel, contractor service support, and other requirements to support the program.  <b><i>FY 2021 Base Plans:</i></b> Will continue to provide for administrative costs incurred by the Program Management office, to include travel, contractor service support, and other requirements to support the program.  <b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> Slight increase in cost for equivalent level of effort in FY 2021.					
<b><i>Title:</i></b> FY 2019 Rescission (0604601A/S62)	0.104	-	-	-	-
<b><i>Title:</i></b> FY 2020 SBIR/STTR Transfer  <b><i>Description:</i></b> Funding transferred in accordance with Title 15 USC ?638  <b><i>FY 2020 Plans:</i></b> Funding transferred in accordance with Title 15 USC ?638  <b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> Funding transferred in accordance with Title 15 USC ?638	-	0.668	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	4.094	14.700	10.153	-	10.153

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• S54: <i>Small Arms Improvement</i>	7.395	14.555	16.082	-	16.082	19.213	17.423	10.477	10.583	0.000	95.728
• G14513: <i>Next Generation Squad Weapon - Fire Control</i>	-	-	35.822	-	35.822	86.560	178.950	250.932	266.934	0.000	819.198

**Remarks**

**D. Acquisition Strategy**  
 The NGSW-FC program is a Middle Tier Acquisition (MTA) program utilizing Rapid Prototyping authority under Section 804 of the FY 2016 National Defense Authorization Act (NDAA). A full and open competition will select two vendors for fixed amount Other Transaction Authority (OTA) awards to mature and finalize system designs and conduct test and evaluation. Upon successful completion of the prototyping effort, the Government will award follow on production contract(s) for the NGSW-FC without further competition.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FF2 / <i>Small Arms Fire Control</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FY 2019 Rescission (0604601A/S62)	Allot	Army Budget Office : Pentagon	-	0.104	Sep 2019	-		-		-		-	0.000	0.104	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.668		-		-		-	0.000	0.668	-
<b>Subtotal</b>			-	0.104		0.668		-		-		-	0.000	0.772	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Next Generation Fire Control - Rapid Prototyping OTA	C/TBD	VENDOR 1: Army Contracting Command - New Jersey (ACC-NJ) : Picatinny Arsenal, NJ	-	-		5.833	Apr 2020	2.913	Jan 2021	-		2.913	Continuing	Continuing	-
Next Generation Fire Control - Rapid Prototyping OTA	C/TBD	VENDOR 2: Army Contracting Command - New Jersey (ACC-NJ) : Picatinny Arsenal, NJ	-	-		5.833	Apr 2020	2.913	Jan 2021	-		2.913	Continuing	Continuing	-
Engineering & Manufacturing Development Contract #3 - Other	C/FFP	TBD : TBD	-	1.051	Feb 2019	-		-		-		-	0.000	1.051	-
Engineering & Manufacturing Development Contract #4- Squad Fire Control	C/FFP	TBD : TBD	-	2.206	Aug 2019	-		-		-		-	0.000	2.206	-
<b>Subtotal</b>			-	3.257		11.666		5.826		-		5.826	Continuing	Continuing	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FF2 / <i>Small Arms Fire Control</i>
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<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering Support	MIPR	Combat Capability Development Command - Armaments Center (CCDC-AC) : Picatinny Arsenal, NJ	-	0.570	Oct 2018	1.541	Nov 2019	2.015	Nov 2020	-		2.015	Continuing	Continuing	-
Program Management (Non-Labor)	Allot	Project Manager Soldier Weapons (PMSW) /Non-Labor : Picatinny Arsenal, NJ	-	0.032	Oct 2018	0.082	Nov 2019	0.084	Nov 2020	-		0.084	Continuing	Continuing	-
<b>Subtotal</b>			-	0.602		1.623		2.099		-		2.099	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	MIPR	US Army Test and Evaluation Command (ATEC) : Aberdeen Proving Ground, MD	-	0.131	Nov 2018	0.743	Mar 2020	2.228	Mar 2021	-		2.228	Continuing	Continuing	-
<b>Subtotal</b>			-	0.131		0.743		2.228		-		2.228	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
	<b>Project Cost Totals</b>		-	4.094	14.700	10.153	-	10.153	Continuing	Continuing

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FF2 / <i>Small Arms Fire Control</i>
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Rapid Prototyping - Fire Control</b>	<div style="display: flex; justify-content: space-between; padding: 5px;"> <span>1</span> <span>2</span> <span>3</span> <span>4</span> </div>																											
Prototype Opportunity Notice																												
Other Transaction Agreement (OTA) Award - Rapid Prototyping																												
VENDOR 1 - Contractor Design and Prototype Fabrication																												
VENDOR 2 - Contractor Design and Prototype Fabrication																												
Engineering Support - Rapid Prototyping																												
Prototype Testing and Evaluation																												
Production Decision - NGFC																												
Iterative Prototyping - Fire Control Enhancements																												
OTA Awards - Iterative Prototyping																												
Contractor Design and Prototype Fabrication																												
Engineering Support - Iterative Prototyping																												
Test and Evaluation - Iterative Prototyping Testing 1																												

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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FF2 / <i>Small Arms Fire Control</i>
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Test and Evaluation - Iterative Prototyping Testing 2																												
Engineering Change Proposal (ECP) 1																					5							

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FF2 / <i>Small Arms Fire Control</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Rapid Prototyping - Fire Control	1	2019	4	2021
Prototype Opportunity Notice	3	2019	3	2019
Other Transaction Agreement (OTA) Award - Rapid Prototyping	3	2020	3	2020
VENDOR 1 - Contractor Design and Prototype Fabrication	3	2020	4	2021
VENDOR 2 - Contractor Design and Prototype Fabrication	3	2020	4	2021
Engineering Support - Rapid Prototyping	1	2019	4	2021
Prototype Testing and Evaluation	1	2021	1	2021
Production Decision - NGFC	4	2021	4	2021
Iterative Prototyping - Fire Control Enhancements	1	2021	4	2025
OTA Awards - Iterative Prototyping	1	2022	1	2022
Contractor Design and Prototype Fabrication	1	2022	4	2025
Engineering Support - Iterative Prototyping	1	2022	4	2025
Test and Evaluation - Iterative Prototyping Testing 1	2	2023	4	2023
Test and Evaluation - Iterative Prototyping Testing 2	4	2024	1	2025
Engineering Change Proposal (ECP) 1	4	2025	4	2025

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>				<b>Project (Number/Name)</b> F12 / <i>Lightweight 30mm Cannon</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
F12: <i>Lightweight 30mm Cannon</i>	-	0.000	1.384	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.384
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

This program supported the Army's Modernization priorities (Build a More Lethal Force) through enhancement of Joint Lethality in contested environments by minimizing and eliminating erosion of close combat capability relative to peer competitors in complex terrain as outlined in the National Defense Strategy (NDS). There is no funding request for Fiscal Year (FY) 2021.

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

Project F12 Lightweight 30 millimeter (mm) Cannon provides increased lethality modifications to Product Directorate Counter-Rockets, Artillery and Mortar (PD C-RAM) on their mine-resistant ambush-protected (MRAP) All-Terrain Vehicle, Mine Counter Measure- Low-slow-small Integrated Defense System (MCM-LIDS) Platforms, and United States Marine Corps (USMC). Funds will provide safety qualification testing of the weapon and include weapon modifications such as percussion primed weapons for future procurements and integration testing on various remote weapon stations.

In support of an USMC Joint Urgent Operational Need Statement (JUONS) CC-0558 to provide an increased lethality modification for Product Directorate Counter Rocket Artillery Mortars (PD C-RAM) and any future requirement that requires 30mm increased lethality.

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

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Contractor Design and Prototype Fabrication	-	0.844	-	-	-
<b>Description:</b> Includes contractor design, development and prototype fabrication for engineering and manufacturing development of the XM914 30 millimeter (mm) autocannon.					
<b>FY 2020 Plans:</b> Contractor continued to develop and fabricate modifications and prototypes for engineering and manufacturing development of the XM914 30mm autocannon.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b>					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> F12 / <i>Lightweight 30mm Cannon</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
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This program supports the Army's Modernization priorities (Build a More Lethal Force) through enhancement of Joint Lethality in contested environments by minimizing and eliminating erosion of close combat capability relative to peer competitors in complex terrain as outlined in the National Security Strategy (NDS). There is no funding request for FY 2021.

<p><b>Title:</b> Engineering Support</p> <p><b>Description:</b> Government engineering support at lab/center, providing design, limited testing and oversight of development and contractor performance.</p> <p><b>FY 2020 Plans:</b> Government engineering support continued to provide oversight of modifications, development and contractor performance.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> This program supported the Army's Modernization priorities (Build a More Lethal Force) through enhancement of Joint Lethality in contested environments by minimizing and eliminating erosion of close combat capability relative to peer competitors in complex terrain as outlined in the National Defense Strategy (NDS). There is no funding request for Fiscal Year (FY) 2021.</p>	-	0.384	-	-	-
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<p><b>Title:</b> Test and Evaluation</p> <p><b>Description:</b> Government testing and evaluation of weapon prototype, articles and system improvements.</p> <p><b>FY 2020 Plans:</b> Government continued to test and evaluation modifications, prototypes, test articles and system improvements.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> This program supported the Army's Modernization priorities (Build a More Lethal Force) through enhancement of Joint Lethality in contested environments by minimizing and eliminating erosion of close combat capability relative to peer competitors in complex terrain as outlined in the NDS. There is no funding request for FY 2021.</p>	-	0.084	-	-	-
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<p><b>Title:</b> Program Management</p> <p><b>Description:</b> Program management office provides oversight of contract actions, engineering support and test activities.</p> <p><b>FY 2020 Plans:</b></p>	-	0.009	-	-	-
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> F12 / <i>Lightweight 30mm Cannon</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<p>Program management office continued to provide oversight of contractor development and fabrication, engineering support at government facilities, and test and evaluation of system modifications and improvements.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> This program supported the Army's Modernization priorities (Build a More Lethal Force) through enhancement of Joint Lethality in contested environments by minimizing and eliminating erosion of close combat capability relative to peer competitors in complex terrain as outlined in the NDS. There is no funding request for Fiscal Year FY 2021.</p>					
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638</p>	-	0.063	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	-	1.384	-	-	-

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• G13800: GUN AUTOMATIC 30MM M230	-	20.000	0.000	-	0.000	-	-	-	-	0.000	20.000

**Remarks**  
This program supported the Army's Modernization priorities (Build a More Lethal Force) through enhancement of Joint Lethality in contested environments by minimizing and eliminating erosion of close combat capability relative to peer competitors in complex terrain as outlined in the NDS. There is no funding request for FY 2021.

**D. Acquisition Strategy**  
The XM914 is currently considered a non-standard weapon that is being sold commercially to foreign customers by the vendor. As a modified version of the M230 30mm chain gun for the AH-64 Apache advanced attack helicopter, the XM914 requires safety confirmation/safety release and weapon qualification for vehicle mounted platforms. A long term, Indefinite Delivery/Indefinite Quantity (ID/IQ) Requirements type contract will be pursued once a production requirement is finalized. The contract may also include contract options for remote weapon station procurements to allow vehicle/platform PMs to procure the total weapon system. A sole source contract is currently being developed for a USMC procurement requirement for 30 mm weapons under JUONS CC-0558.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b>	<b>R-1 Program Element (Number/Name)</b>	<b>Project (Number/Name)</b>
2040 / 5	PE 0604601A / <i>Infantry Support Weapons</i>	F12 / <i>Lightweight 30mm Cannon</i>

The program supports new and emerging urgent requirements and will support integration with ground vehicle platforms.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> F12 / <i>Lightweight 30mm Cannon</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	MIPR	PM Soldier Weapons : Picatinny Arsenal, NJ	0.080	-		0.009	Oct 2019	-		-		-	0.000	0.089	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.063		-		-		-	0.000	0.063	-
<b>Subtotal</b>			0.080	-		0.072		-		-		-	0.000	0.152	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 Design and Prototype Fabrication	SS/FFP	Northrop Grumman : Mesa, AZ	5.200	-		0.844	Nov 2019	-		-		-	0.000	6.044	-
<b>Subtotal</b>			5.200	-		0.844		-		-		-	0.000	6.044	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering Support	MIPR	Multiple Other Government Agencies : Multiple	1.350	-		0.384	Oct 2019	-		-		-	0.000	1.734	-
<b>Subtotal</b>			1.350	-		0.384		-		-		-	0.000	1.734	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	MIPR	Army Test and Evaluation Command (ATEC) : Aberdeen Proving Ground, MD	1.650	-		0.084	Dec 2019	-		-		-	0.000	1.734	-



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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> F12 / <i>Lightweight 30mm Cannon</i>
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Contractor Design and Prototype Fabrication (Phase II)																												
Engineering Support (Phase II)																												
Test and Evaluation (Phase II)																												
Program Management (Phase II)																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> F12 / <i>Lightweight 30mm Cannon</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Contractor Design and Prototype Fabrication (Phase I)	1	2018	4	2018
Engineering Support (Phase I)	1	2018	4	2018
Test and Evaluation (Phase I)	1	2018	4	2018
Program Management (Phase I)	1	2018	4	2018
Contractor Design and Prototype Fabrication (Phase II)	1	2020	4	2020
Engineering Support (Phase II)	1	2020	4	2020
Test and Evaluation (Phase II)	1	2020	4	2020
Program Management (Phase II)	1	2020	4	2020

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>				<b>Project (Number/Name)</b> FL8 / <i>84mm MAAWS Ammunition</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
FL8: <i>84mm MAAWS Ammunition</i>	-	0.000	4.040	3.131	-	3.131	2.997	0.000	0.000	0.000	0.000	10.168
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project FL8 84mm MAAWS Ammunition will test, evaluate and qualify up to seven types of 84 millimeters (mm) munitions for United States (U.S.) Army use with the M3/M3A1 Multi-Role Anti-Armor Anti-Personnel Weapon Systems (MAAWS). In addition to type classifying existing rounds, funds will also provide for the evaluation and qualification of the new High Explosive Programmable Airbursting Round. These rounds will provide improved lethality and a higher probability of hit in defilade positions for close combat forces against varying target sets and increased ranges in support of Infantry Squad formations. The M3/M3A1 is a HQDA G8 directed requirement scheduled for Full Material Release 4th Quarter (Q) Fiscal Year (FY) 2022.

FY 2021 funding in the amount of \$3.131 million will be used to acquire prototypes and support test and evaluation efforts for the new programmable round.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Munition Prototype Development & Demonstration	-	2.995	2.550	-	2.550
<b>Description:</b> Includes ammunition engineering and manufacturing, contract awards for prototypes, development and demonstration.					
<b>FY 2020 Plans:</b> Contract award begun the development of the programmable round. Initial prototypes were delivered, functional and critical design reviews were conducted.					
<b>FY 2021 Base Plans:</b> Plan to complete development and design reviews of the High Explosive (HE) programmable round for Type Classification and Full Material Release (TC-FMR), currently scheduled for FY 2022- 2023.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 funding decrease as only one round type will be procured.					
<b>Title:</b> Engineering Support	-	0.274	0.130	-	0.130
<b>Description:</b> Government engineering support, providing oversight of design development and contractor performance.					
<b>FY 2020 Plans:</b>					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FL8 / <i>84mm MAAWS Ammunition</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Provided engineering support and oversight of ammunition design and function. Participated in Integrated Product Team (IPT) and technical reviews.</p> <p><b>FY 2021 Base Plans:</b> Continue to provide engineering support and oversight of ammunition design and function. Continue to participate in IPT, technical reviews and T&amp;E efforts.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 funding decrease due to less engineering support being required after completion of design.</p>					
<p><b>Title:</b> Test and Evaluation</p> <p><b>Description:</b> Funds will support the following efforts:</p> <p><b>FY 2020 Plans:</b> Developed test and evaluation master plan to evaluate and analyze the effect of Commercial Off The Shelf (COTS) 84mm programmable round for type classification.</p> <p><b>FY 2021 Base Plans:</b> Continue to complete developmental test and evaluation efforts of the programmable round and begin production qualification testing.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 funding increase for production qualification test efforts.</p>	-	0.064	0.250	-	0.250
<p><b>Title:</b> Program Management</p> <p><b>Description:</b> Funds will support the following efforts:</p> <p><b>FY 2020 Plans:</b> Provided project oversight, program management, non-labor operations, and contractor support.</p> <p><b>FY 2021 Base Plans:</b> Continue to provide project oversight, program management, non-labor operations, and contractor support.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 funding decrease as less project oversight is required.</p>	-	0.524	0.201	-	0.201
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p>	-	0.183	-	-	-

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FL8 / <i>84mm MAAWS Ammunition</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<b><i>FY 2020 Plans:</i></b> Funding transferred in accordance with Title 15 USC 7638					
<b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> Funding transferred in accordance with Title 15 USC 7638					
<b>Accomplishments/Planned Programs Subtotals</b>	-	4.040	3.131	-	3.131

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• EW4: <i>Crew Served Weapons Engineering Development</i>	25.058	4.089	4.263	-	4.263	4.285	4.423	4.525	4.498	0.000	51.141
• G13101: <i>MULTI-ROLE ANTI-ARMOR ANTI-PERSONNEL WEAPON SYSTEM</i>	19.880	19.264	17.864	4.765	22.629	26.690	26.009	-	-	Continuing	Continuing
• OMA - 137010000: <i>RESET</i>	-	-	-	-	-	-	-	-	-		

**Remarks**

**D. Acquisition Strategy**  
Will use Other Transaction Authority (OTA) via the DoD Ordnance Technology Consortium (DOTC) to obtain commercially available 84mm ammunition for test and evaluation purposes. A long term Indefinite Delivery/Indefinite Quantity (IDIQ) type contract will be pursued for follow on orders.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FL8 / <i>84mm MAAWS Ammunition</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	MIPR	PMSW : Picatinny Arsenal, NJ	-	-		0.524	Oct 2019	0.201	Oct 2020	-		0.201	0.000	0.725	Continuing
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.183		-		-		-	0.000	0.183	-
<b>Subtotal</b>			-	-		0.707		0.201		-		0.201	0.000	0.908	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Munitions Prototype	SS/CPFF	SAAB : Sweden	-	-		2.995	Nov 2019	2.550	Nov 2020	-		2.550	0.000	5.545	Continuing
<b>Subtotal</b>			-	-		2.995		2.550		-		2.550	0.000	5.545	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering Support	MIPR	ARDEC : Picatinny Arsenal, NJ	-	-		0.274	Nov 2019	0.130	Oct 2020	-		0.130	0.000	0.404	Continuing
<b>Subtotal</b>			-	-		0.274		0.130		-		0.130	0.000	0.404	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 & Evaluation	MIPR	A TEC : Aberdeen, MD	-	-		0.064	Aug 2020	0.250	Oct 2020	-		0.250	0.000	0.314	Continuing
<b>Subtotal</b>			-	-		0.064		0.250		-		0.250	0.000	0.314	N/A



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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FL8 / <i>84mm MAAWS Ammunition</i>
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Materiel Development Decision					▲ 1																							
DOTC Contract Award					▲ 2																							
Critical Design Review								▲ 3																				
Prototype Delivery										▲ 4																		
Developmental Testing																												
MS-C & TC-STD															▲ 5													
Full Material Release (FMR)														▲ 6														

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FL8 / <i>84mm MAAWS Ammunition</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Matériel Development Decision	4	2019	4	2019
DOTC Contract Award	1	2020	1	2020
Critical Design Review	2	2020	2	2020
Prototype Delivery	1	2021	1	2021
Developmental Testing	4	2020	3	2022
MS-C & TC-STD	3	2022	3	2022
Full Material Release (FMR)	2	2023	2	2023

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>				<b>Project (Number/Name)</b> FM4 / <i>Next Generation Squad Weapons</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
FM4: <i>Next Generation Squad Weapons</i>	-	0.000	33.080	44.837	-	44.837	13.767	15.456	16.045	10.991	0.000	134.176
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Next Generation Squad Weapons (NGSW) program will develop weapon systems and common 6.8mm cartridge to maintain overmatch and meet future force warfighter needs.

The Next Generation Squad Weapon-Rifle (NGSW-R) is the planned replacement for the M4A1 Carbine in the close combat force and select support units. The NGSW-R will provide capability improvements in accuracy, range, and lethality.

The Next Generation Squad Weapon-Automatic Rifle (NGSW-AR) is the planned replacement for the M249 Squad Automatic Weapon (SAW) in the close combat force and select support units. The NGSW-AR combines the firepower and range of a machine gun with the precision and ergonomics of a carbine, yielding capability improvements in accuracy, range, and lethality.

The NGSW-R and NGSW-AR will use a common 6.8mm cartridge in a variety of ammunition types: general purpose (GP), special purpose (SP), reduced range, and blank.

Development efforts for additional NGSW variants may follow to replace other legacy systems or provide additional enhanced capabilities.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Contractor Design and Prototype Fabrication	-	25.848	12.886	-	12.886
<b>Description:</b> Contractor design, development and fabrication of prototypes.					
<b>FY 2020 Plans:</b>					
Included contractor design, development and prototype fabrication for engineering and manufacturing development of the NGSW. NGSW interfaced with Squad Fire Control, Family of Weapon Sights - Individual, and other enablers. Up to three contractors delivered approximately 45 automatic prototype rifles, 24 prototype rifles and associated ammunition for Government testing.					
<b>FY 2021 Base Plans:</b>					
Includes the second iteration of contractor design, development and prototype fabrication evaluated in Prototype Test II for rapid prototyping of the Next Generation Squad Weapon - Rifle and Automatic Rifle. Each of the three					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FM4 / <i>Next Generation Squad Weapons</i>
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**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>contractors will each deliver thirty-eight (38) prototype rifles, twenty-eight (28) prototype automatic rifles and six hundred sixty thousand (660,000) surrogate and general purpose rounds of ammunition for government testing and soldier touch point evaluations. Contractors will also develop and deliver the Technical Data Packages (TDP) to support final design configuration of the rifle, automatic rifle, and ammunition.</p> <p><b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> Additional Fiscal Year (FY) 2021 funding is required to fabricate a larger quantity of prototypes to support the Prototype Test II, which will have a more robust scope than the first phase of prototype testing conducted in FY 2020.</p>					
<p><b><i>Title:</i></b> Engineering Support</p> <p><b><i>Description:</i></b> Government engineering support, providing oversight of design, development and contractor performance.</p> <p><b><i>FY 2020 Plans:</i></b> Provided government engineering support at lab/center, providing design, limited testing and oversight of development and contractor performance.</p> <p><b><i>FY 2021 Base Plans:</i></b> Will continue to provide government engineering support at laboratories and engineering centers, providing design, limited testing and oversight of development and contractor performance. Will support the second phase of prototype testing (PT2) and several Soldier Touch Point events. Will begin planning and documentation in support of down-selection and production scope.</p> <p><b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> Increase to FY 2021 funding is planned for government engineering support required for the second prototype test (PT2) and multiple Soldier Touch Point events, as well as for the planning required to begin production.</p>	-	3.151	4.470	-	4.470
<p><b><i>Title:</i></b> Test and Evaluation</p> <p><b><i>Description:</i></b> Testing and evaluation at government ranges and facilities.</p> <p><b><i>FY 2020 Plans:</i></b> Provided government testing and evaluation of weapon prototype, articles and system improvements.</p> <p><b><i>FY 2021 Base Plans:</i></b></p>	-	2.329	6.590	-	6.590

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army			<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FM4 / <i>Next Generation Squad Weapons</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Government testing and evaluation of the second design iteration of prototype rifle, automatic rifle and associated ammunition. Prototype Test II will assess the final prototype configuration and support the production award decision in the first quarter (1Q) of FY 2022.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> The duration and scope of Prototype Test II will be approximately double that of the first phase of prototype testing in FY 2020, in order to fully assess final prototype performance and down-selection.					
<b>Title:</b> Program Management					
<b>Description:</b> Program office management and oversight of government and contractor efforts.					
<b>FY 2020 Plans:</b> Program management office provided oversight of contract actions, engineering support and test activities.					
<b>FY 2021 Base Plans:</b> Program management office will continue to provide oversight of contract actions, engineering support and test activities.					
	-	0.250	0.250	-	0.250
<b>Title:</b> Blank Cartridge and Blank Firing Weapon Adaption Kit Development					
<b>FY 2021 Base Plans:</b> Will begin development and rapid prototyping of a blank cartridge and weapon adaption kit (that will ensure lethal rounds cannot be fired when Soldiers are training with blanks). Will begin work with the selected vendor to integrate blanks and blank firing adapters to the Next Generation Squad Weapon (NGSW) Rifle and Automatic Rifle.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Following vendor down-selection, work will begin with the selected vendor on the blank cartridge and the blank firing weapon adaptation kit.					
	-	-	4.038	-	4.038
<b>Title:</b> Reduced Range Cartridge Development and Integration					
<b>FY 2021 Base Plans:</b> Will begin work with the selected vendor to finalize design and manufacturing development of a reduced range cartridge and integration with the Next Generation Squad Weapon (NGSW) Rifle and Automatic Rifle.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b>					
	-	-	7.799	-	7.799

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FM4 / <i>Next Generation Squad Weapons</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Following vendor down-selection, work will begin with the selected vendor on the integration of the reduced range cartridge.					
<b>Title:</b> Special Purpose Cartridge Development and Integration <b>FY 2021 Base Plans:</b> Will begin work with the vendor to finalize design and manufacturing development of the SP cartridge and integration with the NGSW Rifle and Automatic Rifle. <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Following vendor down-selection, work will begin with the selected vendor on the integration of the SP cartridge.	-	-	8.804	-	8.804
<b>Title:</b> FY 2020 SBIR/STTR Transfer <b>Description:</b> Funding transferred in accordance with Title 15 USC ?638 <b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638 <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638	-	1.502	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	-	33.080	44.837	-	44.837

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• S54: <i>Small Arms Improvement</i>	7.395	14.555	16.082	-	16.082	19.213	17.423	10.477	10.583	0.000	95.728
• EW4: <i>Crew Served Weapons Engineering Development</i>	25.058	4.089	4.263	-	4.263	4.285	4.423	4.525	4.498	0.000	51.141
• S63: <i>Individual Weapons Engineering Development</i>	12.454	2.697	4.374	-	4.374	4.214	4.280	4.270	4.216	0.000	36.505
• FL4: <i>Small Caliber Ammo for Next Gen Squad Weapons</i>	-	18.180	30.600	-	30.600	28.723	24.976	11.739	11.858	0.000	126.076
• EP5: <i>Adv Armor-Piercing (ADVAP) for Small Caliber Ammo</i>	20.247	-	0.000	-	0.000	-	-	-	-	0.000	20.247
• G14511: <i>Next Generation Squad Weapon-Automatic Rifle</i>	-	-	0.000	-	0.000	6.066	12.447	35.165	42.009	0.000	95.687

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FM4 / <i>Next Generation Squad Weapons</i>
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**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2019	FY 2020	FY 2021			FY 2022	FY 2023	FY 2024	FY 2025	Cost To	
			Base	OCO	Total					Complete	Total Cost
• G14512: <i>Next Generation Squad Weapon-Carbine</i>	-	-	0.000	-	0.000	5.994	24.975	49.950	74.925	0.000	155.844
• E06001: <i>NEXT GENERATION SQUAD WEAPON AMMUNITION</i>	-	-	11.988	-	11.988	20.519	60.880	187.813	189.692	0.000	470.892

**Remarks**

**D. Acquisition Strategy**

The NGSW program is a Middle Tier Acquisition (MTA) program utilizing Rapid Prototyping authority under Section 804 of the FY 2016 National Defense Authorization Act (NDAA). A full and open competition selected three vendors for fixed amount Other Transaction Authority (OTA) awards to mature and finalize system designs and conduct test and evaluation. Upon successful completion of the prototyping effort, the Government will award follow on production contract(s) for the NGSW-R, the NGSW-AR, and 6.8mm common ammunition, without further competition.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FM4 / <i>Next Generation Squad Weapons</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	Allot	PM Soldier Weapons : Picatinny Arsenal, NJ	-	-		-		0.250	Oct 2020	-		0.250	0.000	0.250	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		1.502		-		-		-	0.000	1.502	-
<b>Subtotal</b>			-	-		1.502		0.250		-		0.250	0.000	1.752	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Prototype Opportunity Notice	C/TBD	VENDOR 1 : ACC-NJ, Picatinny Arsenal, NJ	-	-		8.532	Jan 2020	2.271	Nov 2020	-		2.271	0.000	10.803	-
Prototype Opportunity Notice	C/TBD	VENDOR 2 : ACC-NJ, Picatinny Arsenal, NJ	-	-		8.532	Jan 2020	3.967	Nov 2020	-		3.967	0.000	12.499	-
Prototype Opportunity Notice	C/TBD	VENDOR 3 : ACC-NJ, Picatinny Arsenal, NJ	-	-		8.532	Jan 2020	6.648	Nov 2020	-		6.648	0.000	15.180	-
Blank Cartridge and Blank Firing Weapon Adaptation Kit Development	C/TBD	VENDOR TBD : ACC-NJ, Picatinny Arsenal, NJ	-	-		-		4.038	Sep 2021	-		4.038	0.000	4.038	-
Reduced Range Cartridge Development and Integration	C/TBD	VENDOR TBD : ACC-NJ, Picatinny Arsenal, NJ	-	-		-		7.799	Sep 2021	-		7.799	0.000	7.799	-
Special Purpose Cartridge Development and Integration	C/TBD	VENDOR TBD : ACC-NJ, Picatinny Arsenal, NJ	-	-		-		8.804	Sep 2021	-		8.804	0.000	8.804	-
<b>Subtotal</b>			-	-		25.596		33.527		-		33.527	0.000	59.123	N/A

**Remarks**

Blank Cartridge and Blank Firing Weapon Adaptation Kit Development, Reduced Range Cartridge Development and Integration, and Special Purpose Cartridge Development and Integration will be vendor efforts awarded to the company selected for production of the NGSW Rifle and Automatic Rifle.



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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FM4 / <i>Next Generation Squad Weapons</i>
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Rapid Prototyping - Rifle / AR / Common Cartridge</b>																												
Prototype Opportunity Notice	▲ 1																											
Other Transaction Agreements (OTA) Award - Rapid Prototyping			▲ 2																									
VENDOR 1 - Contractor Design and Prototype Fabrication																												
VENDOR 2 - Contractor Design and Prototype Fabrication																												
VENDOR 3 - Contractor Design and Prototype Fabrication																												
VENDOR TBD - Production Down-Selection															▲ 3													
Blank Cartridge & Firing Weapon Adaptation Kit Development																												
Reduced Range Cartridge Development and Integration																												
Special Purpose Cartridge Development and Integration																												
Engineering Support																												
Prototype Testing (Phase I) - Test and Evaluation																												
Prototype Testing (Phase II) - Test and Evaluation																												

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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FM4 / <i>Next Generation Squad Weapons</i>
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Iterative Prototyping - Improvements</b>																												
OTA Awards - Iterative Prototyping																												
Contractor Design and Prototype Fabrication																												
Engineering Support - Iterative Prototyping																												
Test and Evaluation																												
Engineering Change Proposal (ECP) #1																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> FM4 / <i>Next Generation Squad Weapons</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Rapid Prototyping - Rifle / AR / Common Cartridge	4	2019	4	2021
Prototype Opportunity Notice	2	2019	2	2019
Other Transaction Agreements (OTA) Award - Rapid Prototyping	4	2019	4	2019
VENDOR 1 - Contractor Design and Prototype Fabrication	4	2019	4	2021
VENDOR 2 - Contractor Design and Prototype Fabrication	4	2019	4	2021
VENDOR 3 - Contractor Design and Prototype Fabrication	4	2019	4	2021
VENDOR TBD - Production Down-Selection	1	2022	1	2022
Blank Cartridge & Firing Weapon Adaptation Kit Development	4	2021	1	2023
Reduced Range Cartridge Development and Integration	4	2021	4	2023
Special Purpose Cartridge Development and Integration	4	2021	2	2023
Engineering Support	1	2019	1	2023
Prototype Testing (Phase I) - Test and Evaluation	3	2020	4	2020
Prototype Testing (Phase II) - Test and Evaluation	2	2021	4	2021
Iterative Prototyping - Improvements	1	2022	4	2025
OTA Awards - Iterative Prototyping	1	2023	1	2023
Contractor Design and Prototype Fabrication	1	2023	4	2025
Engineering Support - Iterative Prototyping	4	2022	4	2025
Test and Evaluation	4	2024	2	2025
Engineering Change Proposal (ECP) #1	4	2025	4	2025

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604601A / Infantry Support Weapons				Project (Number/Name) S58 / Soldier Enhancement Program			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
S58: Soldier Enhancement Program	-	8.989	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.989
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

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

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<b>Title:</b> SEP Evaluations	8.473	-	-	-	-
<b>Description:</b> Procure and evaluate COTS/GOTS/NDI items that have the potential to enhance Soldier combat effectiveness.					
<b>Title:</b> System Engineering/Program Management	0.516	-	-	-	-
<b>Description:</b> Systems Engineering and Program Management.					
<b>Accomplishments/Planned Programs Subtotals</b>	8.989	-	-	-	-

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

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• MA6800: Soldier Enhancement	1.103	-	0.000	-	0.000	-	-	-	-	0.000	1.103
• E99105: Soldier Enhancement Program Ammo	0.253	-	0.000	-	0.000	-	-	-	-	0.000	0.253

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S58 / <i>Soldier Enhancement Program</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• GC0076: <i>Small Arms Equipment (Soldier Enh Prog)</i>	1.640	-	0.000	-	0.000	-	-	-	-	-	Continuing Continuing

**Remarks**

**D. Acquisition Strategy**

SEP focuses on COTS/GOTS/NDI initiatives submitted by Soldiers and industry. SEP proposals are reviewed and approved semiannually. Procurement funds SEP COTS/GOTS/NDI items in quantities sufficient for Soldier evaluation. Research, Development, Test and Evaluation is used to conduct product evaluations which includes safety testing, data collection, analysis of Soldier feedback/results and documentation of results. Product Managers responsible for portfolio in which the SEP initiative falls develops the procurement and evaluation strategy and procures the items using a variety of means from Government purchase card to full contracts. Soldiers evaluations are performed by various means from Battle Lab surveys to full scale Army Test and Evaluation testing depending on the item.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S58 / <i>Soldier Enhancement Program</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Various	MIPR	PEO Soldier : Ft. Belvoir, VA	14.309	0.516	Dec 2018	-		-		-		-	0.000	14.825	-
<b>Subtotal</b>			14.309	0.516		-		-		-		-	0.000	14.825	N/A

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

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Various	MIPR	Various : Various	39.573	-		-		-		-		-	0.000	39.573	-
<b>Subtotal</b>			39.573	-		-		-		-		-	0.000	39.573	N/A

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

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Various	MIPR	PEO Soldier : Ft. Belvoir, VA	6.424	-		-		-		-		-	0.000	6.424	-
<b>Subtotal</b>			6.424	-		-		-		-		-	0.000	6.424	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Various	MIPR	Various : Various	49.060	8.473	Jan 2019	-		-		-		-	0.000	57.533	-
<b>Subtotal</b>			49.060	8.473		-		-		-		-	0.000	57.533	N/A



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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S58 / <i>Soldier Enhancement Program</i>
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Evaluate Initiatives 1-2Q FY19	Test approved proposals																											
SEP Council of Colonel approval/prioritization process 2Q FY19	1																											
	Approval/prioritization of SEP Proposals																											
Evaluate Initiatives 3-4Q FY19	Test approved proposals																											
SEP Council of Colonel approval/prioritization process 4QFY19				2																								
	Approval/prioritization of SEP Proposals																											

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**Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S58 / <i>Soldier Enhancement Program</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Evaluate Initiatives 1-2Q FY19	1	2019	2	2019
SEP Council of Colonel approval/prioritization process 2Q FY19	2	2019	2	2019
Evaluate Initiatives 3-4Q FY19	3	2019	4	2019
SEP Council of Colonel approval/prioritization process 4QFY19	4	2019	4	2019

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>				<b>Project (Number/Name)</b> S60 / <i>Clothing &amp; Equipment</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
S60: <i>Clothing &amp; Equipment</i>	-	8.152	6.453	6.717	-	6.717	5.010	4.846	3.697	6.814	0.000	41.689
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Funding in this project supports the Army's Cross Functional Teams (CFT) initiatives. It supports engineering and manufacturing development tasks related to individual clothing and equipment with the goal of enhancing the lethality, survivability, and mobility as well as the quality of life of the individual Soldier. It funds formal Developmental Testing/Operational Testing of preproduction and production representative systems leveraging advancements in materials, fabrication techniques, moisture management, flame resistant, insect protection, extreme environmental protection and camouflage, to include evaluation, test, and conduct of Soldier evaluations of Organizational Clothing and Individual Equipment appropriate for use in extreme or multi-climate environments; not to be precluded other climates and environments. Goal is to increase the capabilities and durability of tactical and non-tactical clothing and individual equipment. Includes integration and interface on the Soldier system. This project will transition capabilities from our Science and Technology partners to increase performance and safety of Soldier clothing and equipment. It will continue to support cross-service initiatives to increase commonality.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Soldier Uniforms and Clothing	4.522	5.016	3.632	-	3.632
<b>Description:</b> Evaluate superior and sustainable integrated clothing for the Soldier in a rapidly changing global environment.					
<b>FY 2020 Plans:</b> Continue fabric and Flame Resistant upgrades that support improved protection against insects and flame while increasing moisture management, signature management, breathability, and durability for tactical clothing. Continue Clothing Bag upgrades and evaluations. Conduct Modular Cold/Extreme Glove System MS C. Conduct sizing and body scanning study. Cold Weather Combat boot source selection verification testing.					
<b>FY 2021 Base Plans:</b> Continue fabric and Flame Resistant upgrades. Continue Clothing Bag Upgrades and Evaluations. Conduct ensemble level evaluations of novel materials and fabrics in clothing and equipment in all climates. Continue user evaluations of modernized Cold Weather clothing items and fabrics that support improved protection against extreme cold weather. Continue design considerations for female garments, items such as sports bra, maternity uniforms, A2CU female, etc. Continue athletic shoe certification efforts.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S60 / <i>Clothing &amp; Equipment</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Funding increase from FY 2020 to FY 2021 is due to anticipated requirements changes.					
<b>Title:</b> Individual Equipment <b>Description:</b> Develop and provide superior and sustainable integrated individual equipment for the Soldier in a rapidly changing global environment.  <b>FY 2020 Plans:</b> Continue on-the-move Hydration Operational Life Testing (TIC/TIM/Desalinization). Complete development of increased capacity Multi-Purpose Hydration System (MPHS). Begin testing on Cold Weather Mobility items (i.e. skis, accessories, snow shoes, etc.). The parachutist flotation device MS C is schedule for 2nd quarter of FY 2020. Conduct testing for the Law Enforcement Ensemble Kit (LEEK).  <b>FY 2021 Base Plans:</b> Procure sufficient Individual Water Treatment Device (IWTD) quantities to complete large scale Operational Test (OT). Complete evaluation of the USMC water hydration system, evaluate it to determine applicability to Army requirements in support of cross-service initiatives to improve commonality. Begin testing on Cold Weather Mobility items. Complete redesign of load carriage equipment in support of weapon modernization. Continue testing of load carriage equipment to address interoperability with improved Army capabilities.  <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding increase from FY 2020 to FY 2021 is due to large scale IWTD OT.	3.630	1.144	3.085	-	3.085
<b>Title:</b> FY 2020 SBIR/STTR Transfer <b>Description:</b> Funding transferred in accordance with Title 15 USC ?638  <b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638  <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638	-	0.293	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	8.152	6.453	6.717	-	6.717

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• S53: <i>Clothing And Equipment</i>	1.765	6.466	1.808	-	1.808	2.414	4.474	5.073	8.726	Continuing	Continuing

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S60 / <i>Clothing &amp; Equipment</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

**D. Acquisition Strategy**

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

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S60 / <i>Clothing &amp; Equipment</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	Allot	PM SCIE : Ft Belvoir	10.405	0.718		0.768		0.862		-		0.862	Continuing	Continuing	Continuing
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.293		-		-		-	0.000	0.293	-
<b>Subtotal</b>			10.405	0.718		1.061		0.862		-		0.862	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	Various	NSRDEC : Natick, MA	16.785	-		0.531		0.614		-		0.614	Continuing	Continuing	Continuing
Development Contracts	Various	Various : Various	48.636	2.890		2.625		2.790		-		2.790	Continuing	Continuing	Continuing
FY 2019 SBIR / STTR Transfer/FFRDC	TBD	TBD : TBD	-	0.203		-		-		-		-	0.000	0.203	-
<b>Subtotal</b>			65.421	3.093		3.156		3.404		-		3.404	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 Office Support Costs	Various	Natick, MA : Natick, MA	16.886	1.620		0.417		0.495		-		0.495	Continuing	Continuing	Continuing
<b>Subtotal</b>			16.886	1.620		0.417		0.495		-		0.495	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Developmental Testing	MIPR	Various : Various	28.201	2.721		1.819		1.956		-		1.956	Continuing	Continuing	Continuing
<b>Subtotal</b>			28.201	2.721		1.819		1.956		-		1.956	Continuing	Continuing	N/A



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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S60 / <i>Clothing &amp; Equipment</i>
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>UNIFORM CLOTHING</b>																												
Cold Weather Boot Milestone C	▲ 1																											
Continue Fabric & FR Upgrades																												
Clothing Bag Upgrades and Evaluations																												
Develop Improved Hot Weather Combat Uniform - Female (IHWCU-F)																												
Develop Extreme Cold Weather Boot																												
Continue Upgrades for Extreme Cold Weather Protections																												
Evaluate Cold Weather Glove System																												
Modular Cold/Extreme Cold Glove Sys Milestone C					▲ 2																							
Cold Weather Mobility Testing																												
FR Next Gen Materials Testing																												
Cold/Extreme Cold Weather System Milestone C																									▲ 5			
<b>INDIVIDUAL EQUIPMENT</b>																												

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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S60 / <i>Clothing &amp; Equipment</i>
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
On-the-Move Hydration Operational Life Testing (TIC/TIM/Desalination)									████████████████				████████████████															
Tactical Holster Testing (final solution)	████████████████																											
Law Enforcement Ensemble Kit (LEEK) Development					██████████																							
LEEK Milestone C					▲ 3																							
Evaluate of Cold Weather Mobility items									████████████████				████████████████															
Imporved Ghillie Suit Milestone C													▲ 4															
Evaluate Cold Weather Canteen									██████████																			
Individual Water Treatment Device (IWTD) OT									██████████																			
Testing Load Carriage Equipment Interoperability									██████████																			
Athletic Shoe Certification													████████████████				████████████████				████████████████							

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S60 / <i>Clothing &amp; Equipment</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
UNIFORM CLOTHING	1	2011	4	2025
Cold Weather Boot Milestone C	3	2019	3	2019
Continue Fabric & FR Upgrades	3	2009	4	2025
Clothing Bag Upgrades and Evaluations	1	2013	4	2025
Develop Improved Hot Weather Combat Uniform - Female (IHWCU-F)	1	2020	4	2020
Develop Extreme Cold Weather Boot	1	2020	4	2023
Continue Upgrades for Extreme Cold Weather Protections	1	2020	4	2025
Evaluate Cold Weather Glove System	1	2020	3	2020
Modular Cold/Extreme Cold Glove Sys Milestone C	3	2020	3	2020
Cold Weather Mobility Testing	1	2021	4	2023
FR Next Gen Materials Testing	3	2020	4	2025
Cold/Extreme Cold Weather System Milestone C	4	2025	4	2025
INDIVIDUAL EQUIPMENT	2	2008	4	2025
On-the-Move Hydration Operational Life Testing (TIC/TIM/Desalinization)	2	2021	4	2023
Tactical Holster Testing (final solution)	2	2018	4	2021
Law Enforcement Ensemble Kit (LEEK) Development	1	2020	2	2020
LEEK Milestone C	3	2020	3	2020
Evaluate of Cold Weather Mobility items	2	2021	3	2023
Imporved Ghillie Suit Milestone C	1	2022	1	2022
Evaluate Cold Weather Canteen	1	2021	4	2021
Individual Water Treatment Device (IWTD) OT	1	2021	4	2021
Testing Load Carriage Equipment Interoperability	1	2021	4	2021
Athletic Shoe Certification	1	2022	4	2026

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>				<b>Project (Number/Name)</b> S61 / <i>Acis Engineering Development</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
S61: <i>Acis Engineering Development</i>	-	3.492	2.988	1.857	-	1.857	2.768	2.372	1.449	0.463	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This project conducts development, integration, and qualification activities in support of the Air Soldier System (Air SS). The Air SS is Army aircrew survival and mission equipment that improves safety, survivability, and human performance. The Air SS Capability Production Document (CPD) addresses capability gaps identified during combat operations in Iraq and Afghanistan including crew station compatibility challenges caused by equipment bulk, aircraft mishaps as a result of limited Situational Awareness (SA), and lack of functionally integrated aircrew mission and survival equipment. Air SS delivers reduced bulk and weight of survival equipment; improved crew station compatibility; and improved pilot SA and safety. The Air SS provides enhanced terrain, threat, and obstacle avoidance information; improved heads-up display (HUD) technologies that increase the aviator's SA; the capability to perform extended missions in extreme environmental and chemical/biological threat conditions; the capability to digitally replace paper-based DoD Flight Information Publications (Electronic Flight Bag); develops and tests a modernized replacement for the Air Warrior survival vest that integrates with the Soldier Protection System body armor (Aircrew Combat Equipment); and develops and tests aircrew helmet ballistic protection.

This project also funds the development and test of deferred Capability Development Document (CDD) capabilities including implementation of a next generation visor projected HUD, implementation of tactical cueing and/or 3D audio capabilities aimed at further reduction of pilot workload and increased SA. This program does not duplicate any aircraft platform program efforts. Includes integration and interface of products on Soldiers.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Air Soldier System	3.215	2.852	1.857	-	1.857
<b>Description:</b> This project conducts development, integration and qualification activities in support of the Air Soldier System (Air SS) program. The Air SS addresses capability gaps identified during combat operations in Iraq and Afghanistan. Including crew station compatibility challenges caused by the burden of excessive equipment bulk and weight; impacts to safety resulting from excessive pilot workload and limited aircrew situational awareness (SA); and inadequate aircrew protection from environmental extremes, hostile threats, and induced threats resulting from aircraft mishaps or crashes.					
<b>FY 2020 Plans:</b> Funds will be used to conduct Windows 10 qualification test for the Electronic Data Manager, developmental and operational test of Aircrew Combat Equipment, and operational test of the Common Helmet Mounted Display.					
<b>FY 2021 Base Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S61 / <i>Acis Engineering Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<p>Completes Operational Testing of fully integrated Aircrew Combat Equipment (ACE) vest on each Army rotary wing platform to inform a production decision for FY 2022. Begins evaluation, development, and testing of candidate technologies for an improved laser eye protection (LEP) solution providing protection better aligned with today's threat. Future focus (beyond FY 2021) is on additional deferred capabilities including, but not limited to, development and testing of an obsolescence replacement for the Encrypted Aircraft Wireless Intercom System (EAWIS) leveraging Voice over Internet Protocol (VoIP) or ultra-wideband (UWB) technologies, and development and testing of aircrew helmet ballistic protection.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 funding decreases due to re-phasing of Laser Eye Protection Phase II into FY 2022, and re-phasing Next Generation EAWIS development program from FY 2021 to FY 2022. Re-phasing of these efforts was necessary after ACE Developmental Testing was extended and Operational Testing was delayed to incorporate the Modular Scalable Vest (MSV) body armor into the design in order to further reduce weight and bulk and achieve commonality and convergence with the Soldier Ground portfolio.</p>					
<p><b>Title:</b> FY 2019 Rescission</p> <p><b>Description:</b> Rescission Infantry support weapons - S62 counter-defilade target engagement</p>	0.277	-	-	-	-
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638</p>	-	0.136	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	3.492	2.988	1.857	-	1.857

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• AZ3110: <i>Aircrew Integrated Systems</i>	27.243	48.255	48.265	3.028	51.293	43.124	28.666	24.814	14.042	0.000	237.437

**Remarks**

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S61 / <i>Acis Engineering Development</i>
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**D. Acquisition Strategy**

Air Soldier System Milestone C was conducted in April 2019 for initial capabilities to include: Aircraft-mounted hardware and helmet worn displays that provide integrated helmet capabilities and increase aircrew situational awareness; and, Protective and Survival Soldier Kit items that reduce equipment weight and bulk and improve aircrew mission effectiveness and survivability. Air SS capabilities are being phased into production over time. Efforts for the Air SS program include development, integration, test, and airworthiness qualification of aviator flight display symbology technologies that will increase crew member situational awareness, and aircrew protective and survival equipment that reduces bulk and weight and improves crew station compatibility and mission effectiveness. Air SS includes improvements to the current flight helmet; improvements to the survival gear carriage system; lightweight body armor; environmental protective clothing and personal survival equipment; and a day/night helmet-mounted flight symbology display for UH-60 and CH-47 aviators. Efforts continue to develop deferred capabilities as defined within the Capability Development Document (CDD) to include Common Operating Environment modernization initiatives and enhanced laser eye protection.

Development efforts are conducted using a mix of both Cost and Firm Fixed Price Contracts with industry utilizing full and open competition. Each development effort is individually evaluated and the appropriate contract type is selected in order to appropriately share risk between industry and the government. Risk reduction, developmental, and operational testing are conducted utilizing Reimbursable orders placed with Other Government Agencies under either Project Order Law, Title 41, United States Code, section 6307 or the Economy Act, Title 31, United States Code, section 1535.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S61 / <i>Acis Engineering Development</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PM Administration	Allot	Various Government : Huntsville, Alabama	3.997	0.199		0.163		0.050		-		0.050	Continuing	Continuing	Continuing
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.136		-		-		-	0.000	0.136	-
<b>Subtotal</b>			3.997	0.199		0.299		0.050		-		0.050	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Air Warrior and Air Soldier System Development	C/CPFF	Various Government : Various Locations	62.290	1.286		0.691		0.750		-		0.750	Continuing	Continuing	Continuing
<b>Subtotal</b>			62.290	1.286		0.691		0.750		-		0.750	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	RO	Various Government : Various Locations	4.399	0.055		0.021		0.057		-		0.057	Continuing	Continuing	Continuing
<b>Subtotal</b>			4.399	0.055		0.021		0.057		-		0.057	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Developmental and Operational Testing	RO	Various Activities : Various Locations	15.327	1.952		1.977		1.000		-		1.000	Continuing	Continuing	Continuing
<b>Subtotal</b>			15.327	1.952		1.977		1.000		-		1.000	Continuing	Continuing	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b>	<b>R-1 Program Element (Number/Name)</b>				<b>Project (Number/Name)</b>				
2040 / 5	PE 0604601A / <i>Infantry Support Weapons</i>				S61 / <i>Acis Engineering Development</i>				
	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	86.013	3.492	2.988	1.857	-	1.857	Continuing	Continuing	N/A

**Remarks**  
 FY 2019 R-2A Project Funding Total of \$3,491 reflects revised funding after FFRDC/SBIR Title 15 USC 638(f)(1) adjustments.

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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S61 / <i>Acis Engineering Development</i>
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Air SS Full Rate Production (FRP) Decision			▲ FRP																									
Air SS Pre-planned Product Improv (P3I) Phase																												
Electronic Flight Bag (EFB) Integration & Qualification																												
EFB Production Decision				■																								
Aircrew Combat Equipment (ACE) Integration and Qualification																												
ACE Developmental Test/Operational Test (DT/OT)																												
ACE Production Decision											■																	
Deferred Air SS Capabilities Develop & Qual																												
Laser Eye Protection (LEP) Integration & Qualification																												
LEP DT & OT																												
LEP Production Decision																			■									
Next Gen EAWIS Integration & Qualification																												
Next Gen EAWIS DT & OT																												



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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S61 / <i>Acis Engineering Development</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Air SS Full Rate Production (FRP) Decision	3	2019	3	2019
Air SS Pre-planned Product Improv (P3I) Phase	1	2016	4	2024
Electronic Flight Bag (EFB) Integration & Qualification	1	2017	4	2019
EFB Production Decision	4	2019	4	2019
Aircrew Combat Equipment (ACE) Integration and Qualification	1	2017	2	2020
ACE Developmental Test/Operational Test (DT/OT)	2	2020	2	2021
ACE Production Decision	2	2021	3	2021
Deferred Air SS Capabilities Develop & Qual	1	2019	4	2025
Laser Eye Protection (LEP) Integration & Qualification	3	2021	3	2022
LEP DT & OT	3	2022	4	2022
LEP Production Decision	1	2023	1	2023
Next Gen EAWIS Integration & Qualification	2	2022	4	2023
Next Gen EAWIS DT & OT	4	2023	4	2023
Next Gen EAWIS Production Decision	1	2024	1	2024
Visor Projected Heads Up Display (VPHUD) Integration & Qualification	1	2024	4	2025
VPHUD DT & OT	1	2025	4	2026
Aircrew Ballistic Helmet Development, Integration & Qualification	1	2027	4	2027

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / Infantry Support Weapons	<b>Project (Number/Name)</b> S62 / Counter-Defilade Target Engagement - SDD
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
S62: Counter-Defilade Target Engagement - SDD	-	0.330	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.330
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

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

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<b>Title:</b> Support Next Generation Counter Defilade Weapon Requirements Development	0.313	-	-	-	-
<b>Description:</b> Support Next Generation Counter Defilade Weapon Requirements Development					
<b>Title:</b> FY 2019 Rescission	0.017	-	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	0.330	-	-	-	-

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

N/A

**Remarks**

**D. Acquisition Strategy**

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

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2021 Army</b>											<b>Date:</b> February 2020				
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>				<b>Project (Number/Name)</b> S62 / <i>Counter-Defilade Target Engagement - SDD</i>							

<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	Various	Performed by Government : Various Activities	4.908	0.110	Mar 2019	-		-		-		-	0.000	5.018	-
Contract Management Services	MIPR	ACC-APG : Aberdeen	0.146	-		-		-		-		-	0.000	0.146	-
FY2019 SBIR / STTR Transfer	FFRDC	Army Budget Office : Pentagon, Washington DC	-	0.064	Nov 2018	-		-		-		-	0.000	0.064	-
FY 2019 Rescission	TBD	Army Budget Office : Pentagon	-	0.017		-		-		-		-	0.000	0.017	-
<b>Subtotal</b>			5.054	0.191		-		-		-		-	0.000	5.245	N/A

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

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Contract Termination Costs	SS/BA	ATK : Plymouth, MN	135.840	-		-		-		-		-	0.000	135.840	-
<b>Subtotal</b>			135.840	-		-		-		-		-	0.000	135.840	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Contractor Support	Option/ FFP	Various : PMSW, Picatinny Arsenal. NJ	0.620	-		-		-		-		-	0.000	0.620	-
Training Development Support	MIPR	TACOM/PEO STRI : TACOM/PEO STRI	0.993	-		-		-		-		-	0.000	0.993	-



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S62 / <i>Counter-Defilade Target Engagement - SDD</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Design, Develop, Engineer, Test & Manage Improvements	█				█																							
Production Qualification Test (PQT)	█																											
Live Fire Test & Evaluation (LFT&E)	█																											
Initial Operational Test & Evaluation (IOT&E)			█																									
Natural Environments/Airborne LUT			█																									
Type Classification - Standard											▲ 1																	
Full Rate Production (FRP)											█																	
Design, Develop & Fabricate Support Requirements Develop	█																											
Engineering Support	█																											
Test and Evaluation	█																											
Program Management FY19	█																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S62 / <i>Counter-Defilade Target Engagement - SDD</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MS B	1	2011	1	2011
Design, Develop & Fabricate	1	2011	4	2017
Engineering and Training Development	1	2011	4	2017
Development Tests & Evaluation	1	2011	4	2017
Program Management	1	2011	4	2018
Design, Develop, Engineer, Test & Manage Improvements	4	2018	4	2019
Pre-Production Qualification Testing (PPQT #2)	4	2016	2	2017
Limited User Testing (LUT)	2	2017	2	2017
MS C/Type Classification-Limited Procurement	2	2017	2	2017
Low Rate Initial Production (LRIP)-IOT&E	3	2017	4	2017
Production Qualification Test (PQT)	3	2018	1	2019
Live Fire Test & Evaluation (LFT&E)	1	2019	2	2019
Initial Operational Test & Evaluation (IOT&E)	3	2019	1	2020
Natural Environments/Airborne LUT	2	2019	1	2020
Type Classification - Standard	2	2020	2	2020
Full Rate Production (FRP)	2	2020	3	2020
Design, Develop & Fabricate Support Requirements Development	1	2019	4	2019
Engineering Support	1	2019	4	2019
Test and Evaluation	1	2019	4	2019
Program Management FY19	1	2019	4	2019

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>				<b>Project (Number/Name)</b> S63 / <i>Individual Weapons Engineering Development</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
S63: <i>Individual Weapons Engineering Development</i>	-	12.454	2.697	4.374	-	4.374	4.214	4.280	4.270	4.216	0.000	36.505
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Individual Weapons Engineering Development program provides funds to transition components or prototypes from Budget Activity 4 (BA 4) Element (PE) 0603827A Soldier Systems - Advanced Development Project S54 Small Arms Improvement Program and other domestic and foreign sources of small arms weapon systems to demonstrate, test and evaluate capability near or at planned operational requirements. The Maneuver Center of Excellence (MCoE), Fort Benning, GA (User Community) identifies the Individual Weapons Engineering Development as a critical capability gap for our Soldiers in combat and Soldier Lethality Cross Functional Team (CFT) has assumed this need as a task. Small arms systems include weapons up to 40 millimeter (mm) in caliber. Current and future efforts focus on system improvements designed to enhance lethality, target acquisition, fire control, usability, training effectiveness and reliability of weapons to include ammunition when developing and/or evaluating standard and non-standard weapons. Focus areas include system development, integration (to include human-systems), demonstration, test and evaluate components, prototypes and operational system prototypes of small arms weapon systems and/or enhancements. Benefits include continuous improvements to small arms weapon systems, fire control equipment, optics, gun barrels, ancillary equipment, training devices, component mounts, weapon mounts, and weapon/ammunition interface of current small arms fleet or new weapon systems.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> New Weapon Systems	10.905	-	3.524	-	3.524
<b>Description:</b> Development of new weapon systems					
<b>FY 2021 Base Plans:</b> Next Generation Defeat: Will continue to design, develop, and prototype fabrication of advanced technologies to incorporate into Soldier employable system that will be capable of on-target effects against multiple types of targets (i.e. targets behind cover, targets that are exposed, thin skin vehicles, unmanned aerial systems)					
Sub-Compact Weapon (SCW): Continue to complete documentation, production qualification, safety and other test efforts required for Type-Classification and Full Material Release (TC-FMR)					
Weapon System Upgrades and Accessories: Will continue to test, evaluate, and analyze ongoing and new activities for small arms weapon systems and accessories to facilitate rapid acquisition of increased capabilities.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S63 / <i>Individual Weapons Engineering Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
FY 2021 Increase in funds to support Next Generation Defeat and to complete Sub-Compact Weapon (SCW).					
<p><b>Title:</b> Small Arms Weapon Systems Enhancements</p> <p><b>Description:</b> Enhancements and development of small arms weapon systems</p> <p><b>FY 2020 Plans:</b> Current and Legacy Weapon Improvements: Assessed and evaluated selected capabilities and improvements for all current and legacy weapon systems.</p> <p>Small Business Innovation Research (SBIR) Enhancements: Continued to support Phase II Enhancement and/or initialization of Phase III SBIR activities.</p> <p><b>FY 2021 Base Plans:</b> New Weapon Evaluation and Assessment: Will continue to focus on evaluation of current state-of-the-art technologies and integration of those technologies for individual weapons across the spectrum of small arms from pistols through rifles. Evaluation will focus on terminal effects and those technologies utilized to achieve those on-target effects.</p> <p>Small Business Innovation Research (SBIR): Will continue to support Phase II Enhancement and/or initialize Phase III SBIR activities.</p> <p>Weapon Systems and Accessories Enhancements: Will continue to test, evaluate, and analyze ongoing and new activities to enhance small arms weapon systems and accessories.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 Decrease as Adaptive Lubricious Coatings achieves desired results for individual weapons (IW) and continues test and evaluation efforts as Protective Coatings for Crew Served Weapon systems.</p>	0.570	2.454	0.700	-	0.700
<p><b>Title:</b> Ammunition</p> <p><b>Description:</b> Improvement of small arms ammunition</p> <p><b>FY 2020 Plans:</b> Ammunition Upgrades: Evaluated the effect of new ammunition on small arms weapon systems.</p> <p><b>FY 2021 Base Plans:</b></p>	0.049	0.050	0.050	-	0.050

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army			<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S63 / <i>Individual Weapons Engineering Development</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Ammunition Upgrades: Will continue evaluations of new ammunition effects on small arms weapons.					
<b>Title:</b> Combat Optics					
<b>Description:</b> Improvement of combat optics					
<b>FY 2020 Plans:</b> Next Generation Optics: Continued to perform engineering, evaluations, verification and validation of weapon optics and electro-optic capabilities and improvements.					
<b>FY 2021 Base Plans:</b> Next Generation Optics: Will continue to perform engineering evaluations, verification and validation of weapon optics performance requirements.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 Decrease as less funds are required for optics engineering support.					
	0.010	0.020	0.050	-	0.050
<b>Title:</b> Research and Analysis					
<b>Description:</b> Market Research and Cost Benefit Analysis					
<b>FY 2020 Plans:</b> Continued Market Research and Cost Benefit Analysis of new small arms weapon systems and/or enhancements for engineering and manufacturing development.					
<b>FY 2021 Base Plans:</b> Will continue Market Research and Cost Benefit Analysis of new small arms weapons and/or enhancements. Continue research & analysis of mature technologies will inform engineering and manufacturing development required to facilitate rapid acquisition of increased capabilities where applicable.					
	0.010	0.050	0.050	-	0.050
<b>Title:</b> FY 2019 Rescission					
	0.910	-	-	-	-
<b>Title:</b> FY 2020 SBIR/STTR Transfer					
<b>Description:</b> Funding transferred in accordance with Title 15 USC ?638					
<b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b>					
	-	0.123	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S63 / <i>Individual Weapons Engineering Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Funding transferred in accordance with Title 15 USC 7638					
<b>Accomplishments/Planned Programs Subtotals</b>	12.454	2.697	4.374	-	4.374

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• S54: <i>Small Arms Improvement</i>	7.395	14.555	16.082	-	16.082	19.213	17.423	10.477	10.583	0.000	95.728
• G01507: <i>COMPACT SEMI-AUTOMATIC SNIPER SYSTEM</i>	46.236	9.860	0.999	-	0.999	-	-	-	-	0.000	57.095
• G13503: <i>M4A1 CARBINE</i>	69.606	31.514	7.411	-	7.411	4.341	-	-	-	0.000	112.872
• GB3007: <i>M4 Carbine Mods</i>	38.075	17.595	4.824	-	4.824	4.899	4.404	4.405	-	Continuing	Continuing
• G01501: <i>XM320 Grenade Launcher Module (GLM)</i>	18.197	0.717	5.969	-	5.969	9.907	11.872	14.441	17.982	Continuing	Continuing
• G15325: <i>Handgun</i>	48.251	6.422	4.662	-	4.662	5.126	-	-	-	Continuing	Continuing
• GL3200: <i>Items Less Than \$5.0m (WOCV-WTCV)</i>	4.571	3.066	2.763	-	2.763	2.866	2.974	3.171	3.196	Continuing	Continuing
• GC0925: <i>Modifications Less Than \$5.0m (WOCV-WTCV)</i>	6.362	4.327	2.604	-	2.604	2.360	2.336	2.713	3.608	Continuing	Continuing

**Remarks**  
 In support of Small Arms Requirements, components or prototypes developed in BA 4 PE 0603827A Soldier Systems - Advanced Development Project S54 Small Arms Improvement Program is transitioned to BA 5 PE 0604601A Infantry Support Weapons Project S63 Individual Weapons Engineering Development to conduct engineering and manufacturing development. Once the component, prototype or operational prototype achieves Milestone C and type classification the item transitions to small arms weapon systems production or modification program.

**D. Acquisition Strategy**  
 Primary strategy is to mature and finalize design efforts, award Research, Development, Test and Evaluation (RDT&E) Defense Ordnance Technology Consortium (DOTC) and Other Transaction Authority (OTA) type hardware contracts. Test and evaluate systems that result in type classification, material release, and follow-on production contract awards.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S63 / <i>Individual Weapons Engineering Development</i>
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<b>Management Services (\$ in Millions)</b>				<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>		<b>FY 2021 OCO</b>		<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Program Management	Allot	PM Soldier Weapons, : Picatinny Arsenal	10.131	0.400	Mar 2019	0.035	Mar 2020	0.050	Mar 2021	-		0.050	Continuing	Continuing	Continuing
Travel	MIPR	PM Soldier Weapons, : Picatinny Arsenal	1.424	0.113	Mar 2019	0.047	Mar 2020	0.062	Mar 2021	-		0.062	Continuing	Continuing	Continuing
FY2019 SBIR / STTR Transfer	FFRDC	Army Budget Office : Pentagon, Washington DC	-	0.211	Nov 2018	-		-		-		-	Continuing	Continuing	Continuing
FY 2019 Rescission	TBD	Army Budget Office : Pentagon	-	0.910		-		-		-		-	0.000	0.910	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.123		-		-		-	0.000	0.123	-
<b>Subtotal</b>			11.555	1.634		0.205		0.112		-		0.112	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>		<b>FY 2021 OCO</b>		<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Fabrication	Various	Various : Multiple Contractors	3.700	0.420	Mar 2019	-		1.300	Apr 2021	-		1.300	Continuing	Continuing	Continuing
Hardware Development	MIPR	Army Research Development Engineering Centers, : Multiple	8.100	9.140	Mar 2019	-		1.300	Apr 2021	-		1.300	Continuing	Continuing	Continuing
<b>Subtotal</b>			11.800	9.560		-		2.600		-		2.600	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604601A / Infantry Support Weapons				S63 / Individual Weapons Engineering Development							
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering	MIPR	Army Research Development Engineering Centers, : Multiple	67.621	0.400	Mar 2019	0.261	Mar 2020	0.400	Mar 2021	-		0.400	Continuing	Continuing	Continuing
Logistics	MIPR	TACOM, : Warren	4.970	0.100	Mar 2019	0.108	Mar 2020	0.125	Mar 2021	-		0.125	Continuing	Continuing	Continuing
Human Research and Engineering	MIPR	Army Research Laboratory, : Aberdeen Proving Ground	3.845	0.150	Mar 2019	0.108	Mar 2020	0.125	Mar 2021	-		0.125	Continuing	Continuing	Continuing
<b>Subtotal</b>			76.436	0.650		0.477		0.650		-		0.650	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Testing	MIPR	Army Developmental Test Command, : Aberdeen Proving Ground	26.329	0.250	Mar 2019	0.685	Mar 2020	0.360	Mar 2021	-		0.360	Continuing	Continuing	Continuing
Operational Testing	MIPR	Army Test and Evaluation Command, : Aberdeen Proving Ground	16.750	0.250	Mar 2019	0.995	Mar 2020	0.350	Mar 2021	-		0.350	Continuing	Continuing	Continuing
Validation Testing	MIPR	Army Test and Evaluation Centers, : Multiple	9.862	0.110	Mar 2019	0.335	Mar 2020	0.302	Mar 2021	-		0.302	Continuing	Continuing	Continuing
<b>Subtotal</b>			52.941	0.610		2.015		1.012		-		1.012	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			152.732	12.454		2.697		4.374		-		4.374	Continuing	Continuing	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S63 / <i>Individual Weapons Engineering Development</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025																															
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																												
<b>NEW WEAPON SYSTEMS</b>																																																								
Next Generation Airburst																																																								
Sub-Compact Weapons																																																								
Squad Designated Marksman Rifle (SDMR)																																																								
Weapon System Upgrades and Accessories																																																								
<b>SMALL ARMS WEAPON SYSTMS ENHANCEMENTS</b>																																																								
New Weapon Systems Evaluations and Assessments																																																								
Small Business Innovation Research (SBIR) Enhancements																																																								
Weapon Systems and Accessories Enhancements																																																								
Adaptive Lubricious Coatings																																																								
Current and Legacy Weapon Improvements																																																								
AMMUNITION																																																								
Ammunition Upgrades																																																								

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S63 / <i>Individual Weapons Engineering Development</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
<b>COMBAT OPTICS</b>																																				
Next Generation Optics																																				
Grenadier Sighting System (GSS) for the M320 Grenade Lau																																				
Rifle Combat Optic (RCO) Technology Refresh																																				
Optics Upgrades																																				
<b>RESEARCH AND ANALYSIS</b>																																				
Research and Analysis of Small Arms																																				

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S63 / <i>Individual Weapons Engineering Development</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
NEW WEAPON SYSTEMS	1	2007	4	2024
Next Generation Airburst	1	2020	4	2025
Sub-Compact Weapons	1	2018	4	2021
Squad Designated Marksman Rifle (SDMR)	1	2014	4	2019
Weapon System Upgrades and Accessories	1	2008	4	2025
Individual Carbine Competition	1	2010	4	2013
Modular Handgun System (MHS)	1	2012	4	2018
Precision Sniper Rifle (PSR)	1	2015	4	2016
SMALL ARMS WEAPON SYSTMS ENHANCEMENTS	1	2008	4	2024
New Weapon Systems Evaluations and Assessments	1	2018	4	2025
Small Business Innovation Research (SBIR) Enhancements	1	2017	4	2025
Weapon Systems and Accessories Enhancements	1	2017	4	2025
Compact Semi-Automatic Sniper System (CSASS)	1	2015	4	2016
Powered Rail now known as Intelligent Rail	1	2013	4	2016
Adaptive Lubricious Coatings	1	2018	4	2020
Current and Legacy Weapon Improvements	1	2020	4	2025
AMMUNITION	1	2008	4	2024
XM1112 40MM Airburst Non-Lethal Munitions	1	2010	4	2016
Ammunition Upgrades	1	2008	4	2025
COMBAT OPTICS	1	2008	4	2024
Next Generation Optics	1	2020	4	2025
Mounted Machine Gun Optics (MMO)	1	2015	4	2016

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S63 / <i>Individual Weapons Engineering Development</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
Squad Fire Control Optic	1	2014	4	2015
Grenadier Sighting System (GSS) for the M320 Grenade Launcher	1	2009	4	2019
Rifle Combat Optic (RCO Technology Refresh	1	2017	4	2019
Intelligent Rail	1	2017	4	2018
Optics Upgrades	1	2018	4	2019
RESEARCH AND ANALYSIS	1	2012	4	2024
Research and Analysis of Small Arms	1	2015	4	2025

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>				<b>Project (Number/Name)</b> S64 / <i>Common Remotely Operated Wpn Sys (CROWS)</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
S64: <i>Common Remotely Operated Wpn Sys (CROWS)</i>	-	0.000	0.000	1.499	-	1.499	0.000	0.000	0.000	0.000	0.000	1.499
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Project S64 Common Remotely Operated Wpn Sys (CROWS) had a skip year of funding in Fiscal Year (FY) 2019 and was last funded in FY 2018. This program supports the Army Modernization priorities (Build a More Lethal Force) through enhancement of Joint Lethality in contested environments by minimizing and eliminating erosion of close combat capability relative to peer competitors in complex terrain as outlined in the National Defense Strategy (NDS).

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

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

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

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

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Contractor Development and Prototype Fabrication	-	-	0.050	-	0.050
<b>Description:</b> Contractor development of system improvements, modifications, and fabrication of prototypes.					
<b>FY 2021 Base Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army			<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S64 / <i>Common Remotely Operated Wpn Sys (CROWS)</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
Contractor will resume development of multiple system improvements and modifications to enhance situational awareness and lethality, escalation of force and non-lethal capabilities. These improvements will include a multi-user/multi-weapon capability, an embedded trainer to replace the current appended trainer device, and an enhanced, digital, high definition visual imaging module. These improvements will also include the integration of new weapons and other effectors and the development and modification for integration into new vehicles and other platforms.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase due to contractor development of system improvements and modifications.					
<b>Title:</b> Engineering Support					
<b>Description:</b> Government engineering support and technical oversight.					
<b>FY 2021 Base Plans:</b> Will provide government engineering support, technical oversight, and development of multiple system improvements and modifications to enhance situational awareness and lethality, escalation of force and non-lethal capabilities.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase in funding for government engineering support.					
	-	-	0.700	-	0.700
<b>Title:</b> Test and Evaluation					
<b>Description:</b> Testing and evaluation at government ranges and facilities.					
<b>FY 2021 Base Plans:</b> Will provide government testing and evaluation of system improvements and modifications to enhance situational awareness and lethality, escalation of force and non-lethal capabilities.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase for government testing and evaluation of system improvements and modifications.					
	-	-	0.500	-	0.500
<b>Title:</b> Program Management					
<b>Description:</b> Program office management and oversight of government and contractor efforts.					
<b>FY 2021 Base Plans:</b>					
	-	-	0.249	-	0.249

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S64 / <i>Common Remotely Operated Wpn Sys (CROWS)</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Program office will provide oversight and management of contractor and government efforts for system improvements and modifications to enhance situational awareness and lethality, escalation of force and non-lethal capabilities.  <b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> Increase in funding for program office management.					
<b>Accomplishments/Planned Programs Subtotals</b>	-	-	1.499	-	1.499

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• G04700: <i>Common Remotely Operated Weapons Station</i>	21.604	28.189	24.534	-	24.534	-	-	-	-	0.000	74.327

**Remarks**

**D. Acquisition Strategy**

The program objective is to continue developing, improving and fielding the current generation (Increment I) and next generation (Increment II) of CROWS on various platforms in accordance with the Basis of Issue Plan (BOIP) utilizing Other Government Agencies (OGA) to complete efforts.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604601A / Infantry Support Weapons				S64 / Common Remotely Operated Wpn Sys (CROWS)								
<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Management	MIPR	PM Soldier Weapons : Picatinny Arsenal, NJ	4.440	-		-		0.299	Oct 2019	-		0.299	0.000	4.739	-	
<b>Subtotal</b>			4.440	-		-		0.299		-		0.299	0.000	4.739	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	
Technology Refresh, Obsolescence and Increment II Enhancements	C/FFP	Kongsberg Protech Systems USA : Johnstown, PA	11.634	-		-		-		-		-	0.000	11.634	-	
Contractor Development and Prototype Fabrication	C/FFP	TBD : TBD	22.083	-		-		-		-		-	0.000	22.083	-	
<b>Subtotal</b>			33.717	-		-		-		-		-	0.000	33.717	N/A	
<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Engineering Support	MIPR	ARDEC : Picatinny Arsenal, NJ	10.820	-		-		0.700	Oct 2019	-		0.700	0.000	11.520	-	
<b>Subtotal</b>			10.820	-		-		0.700		-		0.700	0.000	11.520	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 Planning and Execution	MIPR	Multiple : Multiple	1.758	-		-		0.500	Dec 2019	-		0.500	0.000	2.258	-	



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S64 / <i>Common Remotely Operated Wpn Sys (CROWS)</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Contractor Design and Prototype Fabrication (II)																												
Engineering Support (II)																												
Test and Evaluation (II)																												
Program Management (II)																												
Engineering Support (Government II)																												
Test and Evaluation (Government II)																												
Program Management (Government II)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S64 / <i>Common Remotely Operated Wpn Sys (CROWS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Contractor Design and Prototype Fabrication	1	2016	4	2018
Engineering Support (Government)	3	2015	4	2018
Development Test & Evaluation	3	2015	4	2018
Program Management	3	2015	4	2018
Increment II Product Improvement	2	2017	4	2017
Contractor Design and Prototype Fabrication (II)	1	2020	4	2020
Engineering Support (II)	1	2020	4	2020
Test and Evaluation (II)	1	2020	4	2020
Program Management (II)	1	2020	4	2020
Engineering Support (Government II)	1	2021	4	2021
Test and Evaluation (Government II)	1	2021	4	2021
Program Management (Government II)	1	2021	4	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>				<b>Project (Number/Name)</b> S70 / <i>Personnel Recovery Support System (PRSS)</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
<i>S70: Personnel Recovery Support System (PRSS)</i>	-	0.936	0.000	0.000	-	0.000	0.000	0.395	0.796	0.649	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Provides system research, development and testing of the Personal Recovery Support System (PRSS)/Personnel Recovery Support Equipment (PRSE) supporting operations to report and locate isolated, missing, detained or captured (IMDC) Soldiers. This project provides the continued maturation of PRSS products that enable operations to report and locate isolated Soldiers. The PRSS program consists of the enhancement of existing products to ensure continued successful interoperability within the relevant theater of operations and the Continental United States (CONUS), and testing of the Personnel Recovery Device (PRD) that provides Low Probability of Intercept (LPI)/Low Probability of Detection (LPD).

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Development of Personnel Recovery Support System (PRSS)	0.936	-	-	-	-
<b>Description:</b> Integration, evaluation, testing and qualification of PRSS products to ensure continued successful interoperability within the relevant theater of operation, and development of a PRD that operates over a secure architecture.					
<b>Accomplishments/Planned Programs Subtotals</b>	0.936	-	-	-	-

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

<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• G01101: <i>Personnel Recovery Support System (PRSS)</i>	10.175	9.382	4.625	3.721	8.346	4.593	4.599	5.373	6.668	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

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

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S70 / <i>Personnel Recovery Support System (PRSS)</i>

In FY 2023 PRSS products will be adapted and tested for integration onto various Army and sister service aerial platforms to increase coverage beyond current theaters of operation.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604601A / Infantry Support Weapons				S70 / Personnel Recovery Support System (PRSS)							
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PM Administration	Allot	Various Government : Huntsville, Alabama	0.972	0.016		-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			0.972	0.016		-		-		-		-	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Personnel Recovery Support System Development Systems Engineering	MIPR	Various Organizations : Various Locations	8.348	0.440		-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			8.348	0.440		-		-		-		-	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Matrix Support	MIPR	Various Organizations : Various Locations	2.075	0.273		-		-		-		-	Continuing	Continuing	Continuing
FY 2019 SBIR/STTR/ FFRDC Transfer	Various	FY2019 SBIR/STTR Transfer : FY2019 SBIR/STTR Transfer	-	0.032		-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			2.075	0.305		-		-		-		-	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2021 Army</b>												<b>Date:</b> February 2020			
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>				<b>Project (Number/Name)</b> S70 / <i>Personnel Recovery Support System (PRSS)</i>							
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>		<b>FY 2021 OCO</b>		<b>FY 2021 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Developmental Testing/ Operational Testing	MIPR	Various Organizations : Various Locations	3.334	0.175		-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			3.334	0.175		-		-		-		-	Continuing	Continuing	N/A
			<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>		<b>FY 2021 Base</b>		<b>FY 2021 OCO</b>		<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	
<b>Project Cost Totals</b>			14.729	0.936	0.000		-		-		-	Continuing	Continuing	N/A	
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S70 / <i>Personnel Recovery Support System (PRSS)</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Personnel Recovery Support System (PRSS) Development Oversight	PRSS Oversight																											
Resume PRSS Development Oversight																	PRSS Oversight											
PRSS Development and Test	PRSS Development and Test																											
Resume PRSS Development and Test																	PRSS Development and Test											
PRSS LUT and Operational Testing	LUT and Operational Testing																											
PRSS Upgrades and Adaptations to New Platforms	PRSS Upgrades and Adaptations																											
Next Generation PRSS Upgrades and Adaptations to New Platforms																	PRSS Upgrades and Adaptations											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> S70 / <i>Personnel Recovery Support System (PRSS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Personnel Recovery Support System (PRSS) Development Oversight	1	2010	4	2019
Resume PRSS Development Oversight	1	2023	4	2025
PRSS Development and Test	1	2010	4	2019
Resume PRSS Development and Test	3	2023	4	2025
PRSS Prototype Hardware Build and Integration	3	2010	2	2016
PRSS LUT and Operational Testing	3	2018	1	2019
PRSS Upgrades and Adaptations to New Platforms	1	2015	4	2019
Next Generation PRSS Upgrades and Adaptations to New Platforms	1	2023	4	2025

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> VS5 / <i>Soldier Protective Equipment</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
<i>VS5: Soldier Protective Equipment</i>	-	4.667	6.627	8.319	-	8.319	9.656	9.480	8.498	9.063	0.000	56.310
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Funding in this project supports the Army's Cross Functional Teams (CFT) initiatives. It supports Engineering and Manufacturing Development (EMD) and full rate production decision reviews of Soldier Protective Equipment. It leverages advancements in technology to continue improvements to the Army's Personal Protective Equipment (PPE) portfolio to include hard and soft body armor components (Vital Torso Protection (VTP) and Torso and Extremity Protection (TEP) respectfully), helmets (Integrated Head Protection System (IHPS) and other personal protective equipment (Military Combat Eye Protection (MCEP)). This project will continue to support cross-service initiatives to increase commonality.

In March 2019 \$1.162 million of FY19 funding was realigned to Individual Weapons Engineering Development Program Element 0604601A, Project S63.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<b>Title:</b> Soldier Protective Equipment	4.360	6.326	8.319	-	8.319
<b>Description:</b> Project VS5 (Soldier Protective Equipment) supports engineering and manufacturing development of Individual Soldier Ballistic Protection equipment. It will leverage advancements in technology to continue incremental improvements to Personal Protective Equipment (PPE).					
<b>FY 2020 Plans:</b> Continue to evaluate and develop system and subsystem technologies across the PPE portfolio from emerging ballistic/blast threats. Continue to test ballistic properties of current PPE after exposure to extreme storage conditions for better shelf and service life predictions. Continue Soldier Protection System (SPS) system human factors and environmental/exposure testing, including Cold & Tropical regions, durability, etc.). Plan to conduct First Article Test (FAT) of Next GEN IHPS. Plan for introducing advanced Technology and materials into production processes as these technologies mature.					
<b>FY 2021 Base Plans:</b> Continue to evaluate and develop system and subsystem technologies across the PPE portfolio from emerging ballistic/blast threats. Continue to test ballistic properties of current PPE after exposure to extreme storage conditions for better shelf and service life predictions. Continue Soldier Protection System (SPS) system human					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> VS5 / <i>Soldier Protective Equipment</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
factors and environmental/exposure testing, including Cold & Tropical regions, durability, etc.). Refine planning for introducing advanced Technology and materials into production processes as these technologies mature. <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding increase in Soldier Protective Equipment portfolio is due to anticipated requirement changes in FY 2021.					
<b>Title:</b> FY 2019 Rescission <b>Description:</b> Rescission Infantry support weapons - S62 counter-defilade target engagement	0.307	-	-	-	-
<b>Title:</b> FY 2020 SBIR/STTR Transfer <b>Description:</b> Funding transferred in accordance with Title 15 USC ?638 <b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638 <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638	-	0.301	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	4.667	6.627	8.319	-	8.319

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• VS4: <i>Soldier Protective Equipment</i>	20.828	2.836	4.441	-	4.441	4.905	6.482	8.143	8.143	Continuing	Continuing

**Remarks**

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

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> VS5 / <i>Soldier Protective Equipment</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	Allot	Various SPIE : Various	0.436	0.580		0.367		0.645		-		0.645	Continuing	Continuing	Continuing
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.301		-		-		-	0.000	0.301	-
<b>Subtotal</b>			0.436	0.580		0.668		0.645		-		0.645	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Prototype Contracts	Various	Various : Various	33.660	1.125		0.940		0.681		-		0.681	Continuing	Continuing	Continuing
Prod Sys Engineering Spt	MIPR	Various : Various	8.109	-		1.940		3.121		-		3.121	Continuing	Continuing	Continuing
FY 2019 FFRDC /SBIR / STTR	TBD	TBD : TBD	-	0.228		-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			41.769	1.353		2.880		3.802		-		3.802	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 Engineering Spt	MIPR	Various : Various	3.102	0.627		0.440		1.880		-		1.880	Continuing	Continuing	Continuing
<b>Subtotal</b>			3.102	0.627		0.440		1.880		-		1.880	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Environmental/HFE	MIPR	Various DTC & OTC : Various DTC & OTC	10.810	2.107		2.639		-		-		-	Continuing	Continuing	Continuing



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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> VS5 / <i>Soldier Protective Equipment</i>
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025					
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
Test and Qualify Improvements to SPS through FY23																														
VTP LRIP Production																														
VTP FRP Decision								▲ 3																						
IHPS FRP	▲ 1																													
Transition Combat Eye Protection - Authorized Protective Eyewear (APEL) Upd				▲ 2																										
Transition Combat Eye Protection Durability/Cold Weather Test																														
SPS System Level Test Technology Insertions																														
Next Gen IHPS Contract Award												▲ 4																		
Next Gen IHPS Deliveries																														

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604601A / <i>Infantry Support Weapons</i>	<b>Project (Number/Name)</b> VS5 / <i>Soldier Protective Equipment</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Test and Qualify Improvements to SPS through FY23	1	2015	4	2023
TEP Transition to FRP	1	2017	1	2017
VTP LRIP Production	1	2017	1	2021
VTP FRP Decision	1	2020	1	2020
IHPS FRP	1	2019	1	2019
Transition Combat Eye Protection - Authorized Protective Eyewear (APEL) Update	3	2019	3	2019
Transition Combat Eye Protection Durability/Cold Weather Test	2	2019	3	2019
SPS System Level Test Technology Insertions	1	2017	4	2023
Next Gen IHPS Contract Award	1	2021	1	2021
Next Gen IHPS Deliveries	4	2021	4	2025

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>Medium Tactical Vehicles</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	3.905	0.000	8.523	-	8.523	6.448	3.455	3.472	3.472	0.000	29.275
BX8: <i>Cold Weather All-Terrain Vehicle (CATV)</i>	-	0.000	0.000	6.294	-	6.294	1.998	0.000	0.000	0.000	0.000	8.292
H07: <i>Family Of Med Tac Veh</i>	-	3.905	0.000	2.229	-	2.229	4.450	3.455	3.472	3.472	0.000	20.983

**Note**  
Cold Weather All-Terrain Vehicle (CATV) Project BX8 is a new start effort in FY 2021.  
Family of Medium Tactical Vehicles (MTV) Project H07 is not a new start effort.

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

This Program Element (PE) supports continued modernization of the Army's Medium Tactical Wheeled Vehicle fleets by investigating technology insertions including, but not limited to: condition based maintenance, vetronics, vehicle electrification, Victory Architecture, autonomous operations and other emerging technologies. Furthermore, the PE supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement operating concepts.

The Family of Medium Tactical Vehicles (FMTV) includes Cargo, Tractor, Load Handling System (LHS), Wrecker, Expandible Van, Shop Van, and Dump variants with payloads ranging from 2 1/2-tons to 10-tons and associated companion trailers. FMTV trucks perform over 55 percent of the Army's local haul, line haul, and unit resupply missions. It operates throughout theater as multi-purpose transportation vehicles in combat, combat support, and combat service support units.

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

FY 2021 Project H07 Base funds in the amount of \$2.229 million will be used to conduct Operational Testing of the FMTVA2 truck and design and development of an LVAD Technical Demonstrator.

The Cold-weather All-Terrain Vehicle (CATV) is a tracked vehicle new start effort in FY 2021 that will provide transportation for up to a 10-Soldier element, emergency medical evacuation, command and control capability, and general cargo transportation on- and off-road in an Arctic environment under a wide range of otherwise impassable terrain, to include frozen ice, and extreme cold weather conditions to support year-round training as well as to conduct Homeland Defense (HD), Homeland Security (HS), and Defense support of Civil Authorities (DSCA) mission. The CATV will employ four carrier variants: General-purpose carrier variant capable of providing transport for not less than 9 Soldiers, plus the driver within a cab/enclosure (10 Soldiers) with equipment and supplies to sustain three days of combat

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2021 Army	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>Medium Tactical Vehicles</i>
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operations. Ambulance capable of transporting medical equipment, two caregivers, and not less than two litter patients or four ambulatory patients in addition to the driver within a cab/enclosure. Command and Control (C2) providing the space weight and power to hosting standard Joint communications and common operating picture (COP) platforms. The C2 and COP equipment should be able to be used enroute or with minimal setup upon halt by six Soldiers in addition to the driver within a cab/enclosure. Cargo/flatbed capable of carrying outsized equipment and cargo. The cargo variant should allow for loading cargo with a forklift from either side (i.e. dropside or flatbed configuration) and have a cab/enclosure for two Soldiers (driver and vehicle commander).

FY 2021 CATV budget activities in the amount of \$6.294 million include a contract award under an Other Transaction Authority (OTA) to evaluate the technical, manufacturing feasibility and military utility of the Cold- weather All-Terrain Vehicle (CATV) Prototypes.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	3.699	2.152	3.325	-	3.325
Current President's Budget	3.905	0.000	8.523	-	8.523
Total Adjustments	0.206	-2.152	5.198	-	5.198
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-2.152			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.206	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	5.198	-	5.198

**Change Summary Explanation**

FY 2021 MTV budget activities include Operational Testing of FMTVA2 truck and the design and development of a LVAD Technical Demonstrator.

FY 2021 increase of \$6.294M is for Cold weather All-Terrain Vehicle (CATV), new start effort in FY 2021.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>Medium Tactical Vehicles</i>				<b>Project (Number/Name)</b> BX8 / <i>Cold Weather All-Terrain Vehicle (CATV)</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
BX8: <i>Cold Weather All-Terrain Vehicle (CATV)</i>	-	0.000	0.000	6.294	-	6.294	1.998	0.000	0.000	0.000	0.000	8.292
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

This is a new start in FY2021.

New start of Cold Weather All-Terrain Vehicle (CATV).

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

The Cold-weather All-Terrain Vehicle (CATV) is a tracked vehicle new start effort in FY 2021 that will provide transportation for up to a 10-Soldier element, emergency medical evacuation, command and control capability, and general cargo transportation on- and off-road in an Arctic environment under a wide range of otherwise impassable terrain, to include frozen ice, and extreme cold weather conditions to support year-round training as well as to conduct Homeland Defense (HD), Homeland Security (HS), and Defense support of Civil Authorities (DSCA) mission. The CATV will employ four carrier variants: General-purpose carrier variant capable of providing transport for not less than 9 Soldiers, plus the driver within a cab/enclosure (10 Soldiers) with equipment and supplies to sustain three days of combat operations. Ambulance capable of transporting medical equipment, two caregivers, and not less than two litter patients or four ambulatory patients in addition to the driver within a cab/enclosure. Command and Control (C2) providing the space weight and power to hosting standard Joint communications and common operating picture (COP) platforms. The C2 and COP equipment should be able to be used enroute or with minimal setup upon halt by six Soldiers in addition to the driver within a cab/enclosure. Cargo/flatbed capable of carrying outsized equipment and cargo. The cargo variant should allow for loading cargo with a forklift from either side (i.e. dropside or flatbed configuration) and have a cab/enclosure for two Soldiers (driver and vehicle commander).

FY 2021 CATV budget activities in the amount of \$6.294 million include a contract award under an Other Transaction Authority (OTA) to evaluate the technical, manufacturing feasibility and military utility of the Cold- weather All-Terrain Vehicle (CATV) Prototypes.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> CATV Prototype	-	-	4.277	-	4.277
<b>Description:</b> Funding is provided for the procurement of the CATV Prototypes.					
<b>FY 2021 Base Plans:</b> Funding is provided for the procurement of the CATV Prototypes.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>Medium Tactical Vehicles</i>	<b>Project (Number/Name)</b> BX8 / <i>Cold Weather All-Terrain Vehicle (CATV)</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
New start effort is FY 2021.					
<b>Title:</b> CATV Systems Engineering/Management Support <b>Description:</b> Funding is provided for Matrix personnel and Program Management (PM) support of the CATV program. <b>FY 2021 Base Plans:</b> Funding is provided for Matrix personnel and Program Management (PM) support of the CATV program. <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> New start effort in FY 2021.	-	-	1.017	-	1.017
<b>Title:</b> CATV Test and Evaluation <b>Description:</b> Funding is provided for endurance, performance, and production verification testing for CATV. <b>FY 2021 Base Plans:</b> Funding is provided for endurance, performance, and production verification testing for CATV. <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> New start effort is FY 2021.	-	-	1.000	-	1.000
<b>Accomplishments/Planned Programs Subtotals</b>	-	-	6.294	-	6.294

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• D15620: <i>Family of Cold Weather All-Terrain Vehicle (CATV)</i>	-	-	0.999	-	0.999	16.648	23.307	28.857	39.956	0.000	109.767

**Remarks**

**D. Acquisition Strategy**  
Cold Weather All-Terrain Vehicle (CATV): Per the Army Resource Oversight Committee (AROC) on 15 April 2019 the Army approved the procurement of 110 Cold-weather All-Terrain Vehicle (CATV).

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>Medium Tactical Vehicles</i>	<b>Project (Number/Name)</b> BX8 / <i>Cold Weather All-Terrain Vehicle (CATV)</i>
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<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
CATV Prototypes	TBD	TBD : TBD	-	-		-		4.277	Mar 2021	-		4.277	0.000	4.277	-
<b>Subtotal</b>			-	-		-		4.277		-		4.277	0.000	4.277	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
CATV Engineering and Management Support	Various	Various : Various	-	-		-		1.017	Dec 2020	-		1.017	0.000	1.017	-
<b>Subtotal</b>			-	-		-		1.017		-		1.017	0.000	1.017	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
CATV Test and Evaluation	MIPR	Various : Various	-	-		-		1.000	Jun 2021	-		1.000	0.000	1.000	-
<b>Subtotal</b>			-	-		-		1.000		-		1.000	0.000	1.000	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
		Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
<b>Project Cost Totals</b>		-	-	0.000		6.294		-		6.294	0.000	6.294	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>Medium Tactical Vehicles</i>	<b>Project (Number/Name)</b> BX8 / <i>Cold Weather All-Terrain Vehicle (CATV)</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
CATV OTA Prototype Contract Award									1 Contract Award																			
CATV Endurance/Performance/Production Verification Testing									Testing																			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>Medium Tactical Vehicles</i>	<b>Project (Number/Name)</b> BX8 / <i>Cold Weather All-Terrain Vehicle (CATV)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CATV OTA Prototype Contract Award	2	2021	2	2021
CATV Endurance/Performance/Production Verification Testing	3	2021	4	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>Medium Tactical Vehicles</i>				<b>Project (Number/Name)</b> H07 / <i>Family Of Med Tac Veh</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
H07: <i>Family Of Med Tac Veh</i>	-	3.905	0.000	2.229	-	2.229	4.450	3.455	3.472	3.472	0.000	20.983
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The FMTVA2 production and ECP modernization effort restores vehicle performance that was lost due to the addition of armor protection kits as the threat to tactical vehicles and the FMTV has increased. The FMTVA2 also addresses Space, Weight, Power, and Cooling (SWaP-C) constraints from having to host an increasing amount of C4ISR and Counter-IED equipment. PD MTV is executing the FMTVA2 effort documented in a signed Acquisition Decision Memorandum by the AAE on 16 November 2015. FY 2021 Project H07 Base funds in the amount of \$1.850 million will be used to conduct Operational Testing required per Chapter 141, Title 10 USC.

The FMTVA1P2 represents the FMTV model currently in production with over 40,000 vehicles fielded to date. The FMTVA1P2 will remain in the tactical vehicle fleet until 2040 and beyond. To keep the A1P2 fleet viable into the future and able to perform its mission in austere environments, upgrades to Survivability and Crew Protection Kits will be required as the threat on the battlefield evolves.

The three FMTV LVAD models (M1081, M1093, M1094) ended production in 2009 and represent the oldest vehicles in the FMTV fleet. Updates to the LVAD are needed to address obsolescence issues and bring the configuration up to today's standards. FY 2021 Project H07 Base funds in the amount of \$0.381 million will be used for testing of an LVAD Technical Demonstrator developed using FY 2019 Project H07 funds.

To ensure supportability of the FMTVA1P2 through FY 2040 and beyond, the PD MTV, as lifecycle managers for the system, shall address potential obsolescence issues with the powertrain and Material Handling Equipment used on the FMTV.

Increasing survivability and crew protection of the FMTVA1P2 comes at the expense of decreased vehicle mobility and performance in soft soil and winter environments. The A1P2 is being asked to carry more weight than what it was originally designed for. Low risk, highly commercial improvements to the A1P2 driveline, suspension, and tires can be made to minimize the loss in mobility performance.

Funding supports modernization of the current Tactical Wheeled Vehicle fleets by investigating technology insertions including, but not limited to: condition based maintenance, vetronics, Victory Architecture, autonomous operations and other emerging technologies. Funding also supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement operating concepts.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> FMTVA2 Production and ECP Modernization Effort	1.000	-	1.850	-	1.850
<b>Description:</b> Live Fire test assets are needed to support Live Fire Testing required per Chapter 139, Title 10 USC. Operational Testing required per Chapter 141, Title 10 USC.					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>Medium Tactical Vehicles</i>	<b>Project (Number/Name)</b> H07 / <i>Family Of Med Tac Veh</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<p><b><i>FY 2021 Base Plans:</i></b> Funding will be used to conduct Operational Testing of FMTVA2 truck.</p> <p><b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> Budget adjustment of -\$1.850 FY 2021.</p>					
<p><b><i>Title:</i></b> Next Generation FMTV LVAD Model</p> <p><b><i>Description:</i></b> Analysis to determine updates to the FMTV Low Velocity Air Drop (LVAD) which are needed to address obsolescence issues and bring the configuration up to today?s standards.</p>	0.750	-	-	-	-
<p><b><i>Title:</i></b> FMTV Obsolescence Concerns</p> <p><b><i>Description:</i></b> Address potential obsolescence issues with the powertrain and Material Handling Equipment (MHE) used on the FMTV.</p>	0.500	-	-	-	-
<p><b><i>Title:</i></b> FMTV Armor Kit Testing</p> <p><b><i>Description:</i></b> Testing of the FMTV Armor Kit improvements to support Full Material Release.</p>	0.700	-	-	-	-
<p><b><i>Title:</i></b> FMTV LVAD Technical Demonstrator Vehicle Design and Build</p> <p><b><i>Description:</i></b> Updates to the Low Velocity Air Drop (LVAD) are needed to address obsolescence issues and bring the configuration up to today?s standards.</p> <p><b><i>FY 2021 Base Plans:</i></b> Funding will be used for design and development of the FMTV LVAD technical demonstrator.</p> <p><b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> FY 2021 MTV budget activities include the design and development of a LVAD Technical Demonstrator.</p>	-	-	0.379	-	0.379
<p><b><i>Title:</i></b> FMTV LVAD/A1R Replacement Cab Redesign</p> <p><b><i>Description:</i></b> Develop concept, prototype and test of an LVAD/A1R replacement cab to support SLEP Sustainment</p>	0.630	-	-	-	-
<p><b><i>Title:</i></b> CBM+</p>	0.325	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>Medium Tactical Vehicles</i>	<b>Project (Number/Name)</b> H07 / <i>Family Of Med Tac Veh</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Description:</b> Demonstrate the collection, migration, integration, and analysis of high-fidelity vehicle CBM data in an operational environment, while also demonstrating improved efficiencies in vehicle maintenance and repair tasks. Integrated suite of CBM+ capabilities that can improve readiness of the TWV fleet.					
<b>Accomplishments/Planned Programs Subtotals</b>	3.905	-	2.229	-	2.229

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• D15500: <i>Family Of Medium Tactical Veh (FMTV)</i>	123.464	138.057	95.092	-	95.092	68.384	34.210	37.065	40.044	0.000	536.316
• D04016: <i>MEDIUM TACTICAL VEHICLE PROTECTION KITS</i>	36.017	44.019	17.527	27.066	44.593	13.371	1.108	1.310	1.680	0.000	142.098

**Remarks**

**D. Acquisition Strategy**

The strategy for the FMTVA2 Production and ECP Modernization Effort led to award of a Firm-Fixed Price Requirements contract that will have a base award of five years (two years for vehicle testing and three production years) with two, one-year option production periods and to conduct FMTVA2 Live Fire and Operational Testing. These efforts will utilize Government test facilities.

The strategy for the Next Generation FMTV LVAD Model Configuration is to address obsolescence issues and bring the configuration up to today's standards. This effort will utilize a System Technical Support contract with the current FMTV OEM.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>Medium Tactical Vehicles</i>	<b>Project (Number/Name)</b> H07 / <i>Family Of Med Tac Veh</i>
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<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
FMTVA1P2 Underbody Armor Kit Improvement.	C/FFP	Oshkosh Defense Corp : Oshkosh, WI	2.874	-		-		-		-		-	0.000	2.874	-
FMTV LVAD Next Generation Model Analysis	TBD	TBD : TBD	-	0.750	Jan 2019	-		-		-		-	0.000	0.750	-
FMTV Obsolescence Concerns	TBD	TBD : TBD	-	0.500	Sep 2019	-		-		-		-	0.000	0.500	-
FMTVA1P2 Mobility Improvement Study	C/FFPLOE	NATC : Stagecoach, NV	1.556	-		-		-		-		-	0.000	1.556	-
FMTV LVAD/A1R Replacement Cab Redesign	TBD	TBD : TBD	-	0.630	Apr 2019	-		-		-		-	0.000	0.630	-
CBM+	TBD	TBD : TBD	-	0.325	Aug 2019	-		-		-		-	0.000	0.325	-
<b>Subtotal</b>			4.430	2.205		-		-		-		-	0.000	6.635	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Engineering/ Program Management (SEPM)	MIPR	PM MTV : TACOM LCMC, Warren, MI	0.009	-		-		-		-		-	0.000	0.009	-
<b>Subtotal</b>			0.009	-		-		-		-		-	0.000	0.009	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FMTVA2 Live Fire Vehicle Test Assets	C/FFP	Oshkosh Defense : Oshkosh, WI	1.290	-		-		-		-		-	0.000	1.290	-
FMTVA2 Live Fire Testing	MIPR	ATC : Aberdeen Proving Ground, MD	-	1.000	Jul 2019	-		-		-		-	0.000	1.000	-



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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>Medium Tactical Vehicles</i>	<b>Project (Number/Name)</b> H07 / <i>Family Of Med Tac Veh</i>
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>FMTVA2</b>																												
FMTVA2 Delivery Order 2 (DO2)					▲ 1 DO2																							
FMTVA2 Production Validation Testing (PVT)	████████████████																											
FMTVA2 Live Fire Test & Evaluation (LFT&E)	████████																											
FMTVA2 Delivery Order 3 (DO3)					▲ 2 DO3																							
FMTVA2 Operational Testing (OT)									████████████████																			
FMTVA2 Type Classification and Material Release (TC/MR)													▲ 3 TC/MR															
FMTVA2 First Unit Equipped (FUE)																	▲ 4 FUE											
<b>FMTVA1P2</b>																												
FMTVA1P2 FY 2018 Vehicle Delivery	████████████████																											
<b>FMTVA1P2 UNDERBODY ARMOR KIT (UAK)</b>																												
FMTVA1P2 Underbody Armor Kit Improvement Development	████████████████				████████████████																							
FMTVA1P2 Underbody Armor Kit Improvement Test													████████████████															

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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>Medium Tactical Vehicles</i>	<b>Project (Number/Name)</b> H07 / <i>Family Of Med Tac Veh</i>
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>FMTV LVAD NEXT GENERATION MODEL</b>	<div style="display: flex; justify-content: space-between; margin: 0 10px;"> <div style="width: 20%;"><b>FMTV LVAD Next Generation Model</b></div> <div style="width: 20%;"><b>FMTV LVAD Technical Demonstrator Vehicle Design and Build</b></div> <div style="width: 20%;"><b>FMTV LVAD Technical Demonstrator Testing</b></div> </div>																											
FMTV LVAD Next Generation Model																												
FMTV LVAD Technical Demonstrator Vehicle Design and Build																												
FMTV LVAD Technical Demonstrator Testing																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604604A / <i>Medium Tactical Vehicles</i>	<b>Project (Number/Name)</b> H07 / <i>Family Of Med Tac Veh</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
FMTVA2	1	2019	4	2024
FMTVA2 Contract Award/Delivery Order 1	2	2018	2	2018
FMTVA2 Allocated Baseline Review (ABR)	3	2018	3	2018
FMTVA2 Product Baseline Review (PBR)	4	2018	4	2018
FMTVA2 Delivery Order 2 (DO2)	2	2020	2	2020
FMTVA2 Production Validation Testing (PVT)	3	2019	2	2020
FMTVA2 Live Fire Test & Evaluation (LFT&E)	3	2019	4	2019
FMTVA2 Delivery Order 3 (DO3)	3	2020	3	2020
FMTVA2 Operational Testing (OT)	2	2021	2	2022
FMTVA2 Type Classification and Material Release (TC/MR)	1	2022	1	2022
FMTVA2 First Unit Equipped (FUE)	2	2022	2	2022
FMTVA1P2	1	2019	4	2019
FMTVA1P2 FY 2018 Vehicle Delivery	4	2018	4	2019
FMTVA1P2 UNDERBODY ARMOR KIT (UAK)	4	2018	4	2022
FMTVA1P2 Underbody Armor Kit Improvement Development	4	2018	3	2020
FMTVA1P2 Underbody Armor Kit Improvement Test	1	2021	3	2021
FMTV LVAD NEXT GENERATION MODEL	4	2019	4	2023
FMTV LVAD Next Generation Model	4	2019	1	2021
FMTV LVAD Technical Demonstrator Vehicle Design and Build	4	2020	1	2022
FMTV LVAD Technical Demonstrator Testing	2	2021	2	2022

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604611A / JAVELIN
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	5.250	14.997	7.493	-	7.493	7.493	7.493	7.493	9.992	0.000	60.211
499: <i>Javelin (AAWS-M)</i>	-	5.250	14.997	7.493	-	7.493	7.493	7.493	7.493	9.992	0.000	60.211

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

Compared to the Block I Command Launch Unit (CLU), the Lightweight CLU will double target identification range and increase system engagement range from 2.5 kilometers (km) to 4 km. Lightweight CLU reduces Soldier burden by providing a minimum of 25% reduction in weight and 30% reduction in size. Javelin Lightweight CLU is a result of user feedback on weight and bulk, and addresses the Close Combat Missile System - Medium Capability Production Document objective system weight requirement.

Fiscal Year (FY) 2021 Base dollars in the amount of \$7.493 million will complete development of the Javelin Lightweight CLU and begin operational test. The Lightweight CLU schedule has been replanned and is on track to complete qualification in FY 2021 and operational test in FY 2022.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	5.616	17.897	7.500	-	7.500
Current President's Budget	5.250	14.997	7.493	-	7.493
Total Adjustments	-0.366	-2.900	-0.007	-	-0.007
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-2.900			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.366	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-0.007	-	-0.007

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604611A / JAVELIN				Project (Number/Name) 499 / Javelin (AAWS-M)			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
499: Javelin (AAWS-M)	-	5.250	14.997	7.493	-	7.493	7.493	7.493	7.493	9.992	0.000	60.211
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Compared to the Block I Command Launch Unit (CLU), the Lightweight CLU will double target identification range and increase system engagement range from 2.5 kilometers (km) to 4 km. Lightweight CLU reduces Soldier burden by providing a minimum of 25% reduction in weight and 30% reduction in size. Javelin Lightweight CLU is a result of user feedback on weight and bulk, and addresses the Close Combat Missile System - Medium Capability Production Document objective system weight requirement.

Fiscal Year (FY) 2021 Base dollars in the amount of \$7.493 million will complete development of the Javelin Lightweight CLU and begin operational test. The Lightweight CLU schedule has been replanned and is on track to complete qualification in FY 2021 and operational test in FY 2022.

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

	FY 2019	FY 2020	FY 2021
<p><b>Title:</b> Javelin System Improvements</p> <p><b>Description:</b> Develop Lightweight Command Launch Unit.</p> <p><b>FY 2020 Plans:</b> Continued the design/ build of qualification units.</p> <p><b>FY 2021 Plans:</b> To complete design/build of qualification units. Continue to perform qualification tests to include portability, maintenance and logistics demonstrations. Plan to begin Operational Testing.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> The FY 2020 to FY 2021 decrease of \$7.504 million is due to the completion of Lightweight CLU development in FY 2021.</p>	5.250	14.316	7.493
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638</p>	-	0.681	-
<b>Accomplishments/Planned Programs Subtotals</b>			
	5.250	14.997	7.493

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604611A / JAVELIN	<b>Project (Number/Name)</b> 499 / Javelin (AAWS-M)
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• H06102: JAVELIN (AAWS-M)	222.985	142.794	165.355	-	165.355	77.703	98.026	152.874	160.177	0.000	1,019.914
• H06103: Javelin Lightweight Command Launch Unit (CLU)	22.500	-	24.970	-	24.970	59.935	69.923	76.323	78.483	0.000	332.134

**Remarks**

Prior to FY 2021, procurement funds procure missiles and Block I CLU retrofits; FY 2021-2025 procurement funds procure missiles and Lightweight CLUs.

**D. Acquisition Strategy**

Javelin Lightweight CLU development is Sole Source to the Javelin Joint Venture (Raytheon, Tucson, AZ, and Lockheed Martin, Orlando, FL). A Cost Plus contract with the Javelin Joint Venture will be utilized for Lightweight CLU development efforts. Competition will be used for major sub-assemblies which are the primary cost drivers. The Javelin Joint Venture has invested Independent Research and Development in the Lightweight CLU. Development, prototype, and testing will occur FY 2015-2022 with Low-Rate Initial Production (LRIP) beginning in FY 2021. Army Acquisition Objective (AAO) is 4,979. Current plan is to field to priority Infantry and Stryker Brigade Combat Teams and Special Forces.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604611A / JAVELIN	<b>Project (Number/Name)</b> 499 / Javelin (AAWS-M)
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Engineering/ Program Management, Govt	Allot	Multiple : Redstone Arsenal, AL	4.273	-		0.729	Oct 2019	0.212	Jan 2021	-		0.212	0.000	5.214	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.681		-		-		-	0.000	0.681	-
<b>Subtotal</b>			4.273	-		1.410		0.212		-		0.212	0.000	5.895	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Lightweight CLU Development	SS/CPFF	JJV/Raytheon/ Lockheed Martin : Orlando, FL/ Tucson, AZ	38.209	4.032	May 2019	13.587	Nov 2019	1.236	Jan 2021	-		1.236	0.000	57.064	-
Lightweight CLU Development	MIPR	Redstone Test Center : Redstone Arsenal, AL	0.548	-		-		-		-		-	0.000	0.548	-
Lightweight CLU Trade Studies and Demonstrations	MIPR	AMRDEC : Redstone Arsenal, AL	2.043	-		-		-		-		-	0.000	2.043	-
<b>Subtotal</b>			40.800	4.032		13.587		1.236		-		1.236	0.000	59.655	N/A

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

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604611A / JAVELIN	<b>Project (Number/Name)</b> 499 / Javelin (AAWS-M)
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Lightweight CLU Design Verification Testing	SS/CPFF	JJV/Raytheon/ Lockheed Martin : Orlando, FL/Tucson, AZ	1.923	1.218	Mar 2019	-		-		-		-	0.000	3.141	-
Lightweight CLU Design Verification Testing	MIPR	Redstone Test Center : Redstone Arsenal, AL	0.293	-		-		-		-		-	0.000	0.293	-
Lightweight CLU Qualification	SS/CPFF	JJV/Raytheon/ Lockheed Martin : Orlando, FL/Tucson, AZ	-	-		-		4.074	Jan 2021	-		4.074	0.000	4.074	-
Lightweight CLU Qualification	MIPR	Redstone Test Center : Redstone Arsenal, AL	-	-		-		1.048	Jan 2021	-		1.048	0.000	1.048	-
Lightweight CLU Operational Testing	MIPR	Operational Test Command : Ft. Hood, TX	-	-		-		0.923	Jul 2021	-		0.923	0.154	1.077	-
<b>Subtotal</b>			2.216	1.218		-		6.045		-		6.045	0.154	9.633	N/A
<b>Project Cost Totals</b>			47.289	5.250		14.997		7.493		-		7.493	0.154	75.183	N/A

**Remarks**  
Low-Rate Initial Procurement decision will be made upon completion of critical qualification test events but prior to Operational Test.

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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604611A / JAVELIN	<b>Project (Number/Name)</b> 499 / Javelin (AAWS-M)
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
LW CLU Design / Build DVT Units																												
LW CLU Design Verification Testing																												
LW CLU Design Review									▲ 1																			
LW CLU Design / Build Qualification Units																												
LW CLU Qualification Testing																												
LW CLU Operational Testing																												
LW CLU Operational Testing - Desert																					▲ 2							
System Improvements to Meet Emerging Threats																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

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

Events	Start		End	
	Quarter	Year	Quarter	Year
LW CLU Design / Build DVT Units	3	2016	4	2019
LW CLU Design Verification Testing	2	2019	1	2020
LW CLU Design Review	1	2020	1	2020
LW CLU Design / Build Qualification Units	1	2020	3	2021
LW CLU Qualification Testing	2	2021	3	2021
LW CLU Operational Testing	4	2021	1	2022
LW CLU Operational Testing - Desert	3	2022	3	2022
System Improvements to Meet Emerging Threats	1	2022	4	2025

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / <i>Family of Heavy Tactical Vehicles</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	11.182	13.125	24.792	-	24.792	12.494	8.849	8.803	16.331	0.000	95.576
659: <i>Family Of Hvy Tac Veh</i>	-	1.339	5.639	5.635	-	5.635	0.000	0.000	0.000	0.000	0.000	12.613
E50: <i>TRAILER DEVELOPMENT</i>	-	2.300	0.000	6.921	-	6.921	0.000	0.000	0.000	0.000	0.000	9.221
EZ8: <i>Leader/Follower</i>	-	0.000	5.000	10.637	-	10.637	9.412	5.881	5.324	12.852	0.000	49.106
VR5: <i>TWV Protection Kits</i>	-	7.543	2.486	1.599	-	1.599	3.082	2.968	3.479	3.479	0.000	24.636

**Note**  
The Medium Equipment Trailer (MET) with planned execution from project E50 is a new start program in FY 2021. PdM ALUGS Leader/Follower efforts transitioned from the 0604017A Robotics Development FD9 Robotic Systems line in FY 2018 and FY 2019 to a Program of Record under 0604622A Family of Heavy Tactical Vehicles EZ8 Leader/Follower in FY 2020.

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

This Program Element (PE) aligns system development and demonstration of Heavy Tactical Vehicles (HTV) with Multi-Domain Operations (MDO) requirements to support combat and combat support missions, to include line haul, local haul, and unit resupply. HTV trucks transport water, ammunition, and general cargo over all terrains and throughout the battle-space. Systems include the Heavy Expanded Mobility Tactical Truck (HEMTT), Palletized Load System (PLS), Heavy Equipment Transporter System (HETS), Line Haul, Heavy Dump Truck (HDT) as well as recovery systems such as the Modular Catastrophic Recovery System (MCRS) that rescue large wheeled vehicle platforms in severe off-road conditions. Funding will also be used for developing the Army's next generation of tactical trucks as part of the Army's Tactical Wheeled Vehicle (TWV) Modernization Strategy.

This Program Element also supports the development and demonstration of enablers, active safety technologies and heavy and medium tactical trailers including the Medium Equipment Trailers (MET). Periodic evolutionary upgrade of survivability and crew protection as described in the Long Term Protection Strategy (LTPS) is supported by this PE for both the HTV family of vehicles and the Family of Medium Tactical Vehicles (FMTV).

The Tactical Wheeled Vehicle - Leader Follower (TWV-LF) program provides transportation units with the capability for Tactical Wheeled Vehicles (TWVs) to operate in an unmanned mode, initially the Palletized Loading System (PLS) vehicles, while operating in a convoy. This is accomplished by integrating technology to the unmanned vehicles which enables them to follow a manned Lead vehicle. This is done in a March Unit of up to (8) TWVs initially PLS vehicles, with (1) manned Lead vehicle and (3) to (7) unmanned Follower vehicles. This capability provides increased Soldier Force Protection and increased convoy logistics throughput by giving Commanders more options on Soldier utilization, removing Soldiers from threat zones and/or utilizing vehicle operators for convoy security, and allowing supply convoys to run more often. The PLSA1 is the initial tactical vehicle used to support By-Wire Active Safety which provides the foundation for automated capabilities such as Leader/Follower and Automated Convoy Operations effectively taking Soldiers out of harm's way.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2021 Army	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / <i>Family of Heavy Tactical Vehicles</i>
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Funding also supports modernization of the current Tactical Wheeled Vehicle fleets by investigating technology insertions including, but not limited to: predictive based maintenance, vetronics, Victory Architecture, vehicle electrification, autonomous operations and other emerging technologies. Funding also supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement operating concepts.

In accordance with Section 1815 of the FY 2008 National Defense Authorization Act (P.L. 110-181), this item is necessary for use by the active and reserve components of the Armed Forces for homeland defense missions, domestic emergency responses, and providing military support to civil authorities.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	11.935	16.745	26.889	-	26.889
Current President's Budget	11.182	13.125	24.792	-	24.792
Total Adjustments	-0.753	-3.620	-2.097	-	-2.097
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-3.620			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.753	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-2.097	-	-2.097

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / Family of Heavy Tactical Vehicles	<b>Project (Number/Name)</b> 659 / Family Of Hvy Tac Veh
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
659: Family Of Hvy Tac Veh	-	1.339	5.639	5.635	-	5.635	0.000	0.000	0.000	0.000	0.000	12.613
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

The Enhanced Heavy Equipment Transporter System (EHETS) is the replacement system for the Heavy Equipment Transporter System (HETS). It is intended to transport, deploy, and evacuate the latest and future combat configured M1A2 MBT vehicles and provide a maximum payload transport capacity of 90 tons. It will provide increased payload, highway transportability, and force protection over its predecessor and support flexible theatre postures to enhance the ability to compete and provide the transport for freedom of maneuver during combat.

FY 2021 Project 659 Base funds in the amount of \$5.635 million supports the Enhanced Heavy Equipment Transporter System (EHETS) new production prototype trailers under a competitive down-select. The EHETS supports the National Defense Strategy for modernization with an increased payload that provides the ability for transport, recovery and evacuation of heavy, oversized combat equipment such as the M1A2 Abrams main battle tank (MBT) and M88 recovery vehicle to support flexible theater postures and enhance the ability to compete and provide the transport for freedom of maneuver of the largest track combat weapon systems.

In accordance with Section 1815 of the FY 2008 National Defense Authorization Act (P.L. 110-181), this item is necessary for use by the active and reserve components of the Armed Forces for homeland defense missions, domestic emergency responses, and providing military support to civil authorities.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p><b>Title:</b> EHETS Acquisition Planning and Documentation Development</p> <p><b>Description:</b> Acquisition planning and documentation development includes matrix personnel program support for the development of contracting/acquisition milestone documentation and systems engineering plans for the Enhanced Heavy Equipment Transporter System (EHETS) program.</p>	0.292	-	-	-	-
<p><b>Title:</b> Enhanced heavy Equipment Transporter System (EHETS) Trailer Prototypes</p> <p><b>Description:</b> Replacement system for the legacy Heavy Equipment Transporter System (HETS) to transport, deploy, and evacuate payloads up to 90 tons.</p> <p><b>FY 2021 Base Plans:</b> Build EHETS new production trailer prototypes in preparation for follow-on testing.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b></p>	-	-	5.635	-	5.635

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / Family of Heavy Tactical Vehicles	<b>Project (Number/Name)</b> 659 / Family Of Hvy Tac Veh

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
FY 2021 increase due to the procurement of EHETS new production prototype trailers.					
<p><b>Title:</b> HETS M1070A1 Tractor Modifications &amp; System-level Testing</p> <p><b>Description:</b> HETS M1070A1 tractor modifications and system-level testing are required to develop a near term interim solution in response to the USAREUR ONS for a transportation system capable of carrying 78.5 Tons of payload while achieving host country road permits at a reduced weight of 75 tons with an ultimate carrying capacity of 85 tons.</p> <p><b>FY 2020 Plans:</b> HET System-level testing and evaluation of modified M1070A1 tractors and new commercial trailers required for the USAREUR ONS to meet up to 85 ton capability.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> No FY 2021 funding for the HETS M1070A1 Tractor Modifications and System level testing required.</p>	1.047	3.449	-	-	-
<p><b>Title:</b> 25T STLB Test</p> <p><b>Description:</b> Feasibility testing required to evaluate prototype semitrailers from two vendors produced under the OT project agreement award.</p> <p><b>FY 2020 Plans:</b> Feasibility testing required to evaluate prototype semitrailers from two vendors produced under Other Transaction (OT) project agreement award. Test results will be evaluated to determine single vendor for project agreement production award.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Feasibility test complete and no FY 2021 funds for 25T STLB required.</p>	-	1.934	-	-	-
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b></p>	-	0.256	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / Family of Heavy Tactical Vehicles	<b>Project (Number/Name)</b> 659 / Family Of Hvy Tac Veh

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Funding transferred in accordance with Title 15 USC 7638					
<b>Accomplishments/Planned Programs Subtotals</b>	1.339	5.639	5.635	-	5.635

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• DA0924: <i>Modification Of In Svc Equip</i>	256.642	83.627	114.977	-	114.977	29.661	0.456	-	-	0.000	485.363
• DA0500: <i>Family Of Heavy Tactical Vehicles (FHTV)</i>	160.897	36.886	0.000	6.500	6.500	6.500	5.000	-	-	0.000	215.783
• D16506: <i>PLS ESP</i>	-	23.221	21.969	15.163	37.132	-	-	-	-	0.000	60.353
• DV0021: <i>Hvy Expanded Mobile Tactical Truck Ext Serv</i>	109.764	194.575	65.635	-	65.635	11.225	-	-	-	0.000	381.199
• D01650: <i>SEMITRAILER LOW BED 25 TON</i>	1.942	4.619	9.586	-	9.586	9.765	9.842	9.422	9.284	0.000	54.460

**Remarks**

DA0924 - Modification Of In Svc Equip is a shared funding line with other product offices in FY 2019 and FY 2020.

**D. Acquisition Strategy**

The Enhanced Heavy Equipment Transporter System (EHETS) is the replacement system for the Heavy Equipment Transporter System (HETS). The EHETS will acquire new production prototype trailers under a competitive down-select. Currently developing the course of action for the acquisition strategy to present an efficient and effective streamlined acquisition approach to the Milestone Decision Authority (MDA) and in accordance with Army Requirements Oversight Council (AROC) approval to support force modernization.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604622A / Family of Heavy Tactical Vehicles				659 / Family Of Hvy Tac Veh							
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.256		-		-		-	0.000	0.256	-
<b>Subtotal</b>			-	-		0.256		-		-		-	0.000	0.256	N/A
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
HETS M1070A1 Tractor Modification	SS/CPIF	Oshkosh Defense : Oshkosh, WI	-	1.047	Dec 2019	-		-		-		-	0.000	1.047	-
EHETS Trailer Prototypes	C/TBD	TBD : TBD	-	-		-		5.635	Jan 2021	-		5.635	0.000	5.635	-
<b>Subtotal</b>			-	1.047		-		5.635		-		5.635	0.000	6.682	N/A
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
EHETS Acquisition Planning and Documentation Development	MIPR	TACOM LCMC : Warren, MI	-	0.292	Mar 2019	-		-		-		-	0.000	0.292	-
<b>Subtotal</b>			-	0.292		-		-		-		-	0.000	0.292	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
USAREUR HETS ONS System Level Testing	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	-		3.449	Jan 2020	-		-		-	0.000	3.449	-



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / Family of Heavy Tactical Vehicles	<b>Project (Number/Name)</b> 659 / Family Of Hvy Tac Veh

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Enhanced Heavy Equipment Transporter System (EHETS)</b>																												
EHETS Contract Documentation and Test Plans Development																												
EHETS Request for Proposal (RFP) release																												
EHETS Prototype Contract Award																												
EHETS Prototype Trailers																												
EHETS Run Off Testing																												
EHETS Milestone C																												
<b>USAREUR HETS ONS</b>																												
USAREUR HETS ONS Testing																												
<b>25-Ton Semitrailer Lowbed (25T STLB)</b>																												
25T STLB Prototype Testing																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / <i>Family of Heavy Tactical Vehicles</i>	<b>Project (Number/Name)</b> 659 / <i>Family Of Hvy Tac Veh</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Enhanced Heavy Equipment Transporter System (EHETS)	1	2017	4	2022
EHETS Contract Documentation and Test Plans Development	1	2019	4	2021
EHETS Request for Proposal (RFP) release	1	2021	1	2021
EHETS Prototype Contract Award	2	2021	2	2021
EHETS Prototype Trailers	2	2021	4	2021
EHETS Run Off Testing	1	2022	3	2022
EHETS Milestone C	3	2022	3	2022
USAREUR HETS ONS	1	2018	4	2022
USAREUR HETS ONS Testing	1	2019	4	2020
25-Ton Semitrailer Lowbed (25T STLB)	2	2020	4	2020
25T STLB Prototype Testing	3	2020	4	2020

**UNCLASSIFIED**

**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / Family of Heavy Tactical Vehicles	<b>Project (Number/Name)</b> E50 / TRAILER DEVELOPMENT
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
E50: TRAILER DEVELOPMENT	-	2.300	0.000	6.921	-	6.921	0.000	0.000	0.000	0.000	0.000	9.221
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

This is a new start in FY2021.

The Medium Equipment Trailer (MET) with planned execution from project E50 is a new start program in FY 2021.

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

The Medium Equipment Trailer (MET) supports Large Scale Combat Operations and is capable of transporting track combat platforms weighing 60 tons or less in an Armored Brigade Combat Team (ABCT) and Infantry Brigade Combat Team (IBCT). MET directly supports Multi-Domain Operations and provides the capability to transport the tallest combat platforms (i.e. Paladin and Bradley) under 4 meter underpasses which are common in OCONUS. The MET shall also provide transportation of construction equipment used by units for horizontal construction projects in support of military or other national goals and objectives. It will also be capable of transporting 20 foot International Organization for Standardization (ISO) containers and general cargo when the situation requires.

FY 2021 Project E50 Base funds in the amount of \$6.921 million supports the MET new production prototype trailers under a competitive down-select. The MET will provide flexible capability that reduces duplicative systems. The MET supports the National Defense Strategy for modernization with a 60 ton payload that provides the capability for transport of two thirds of the track combat platforms to include the tallest combat platforms to support flexible theater postures and enhance the ability to compete and provide freedom of maneuver.

In accordance with Section 1815 of the FY 2008 National Defense Authorization Act (P.L. 110-181), this item is necessary for use by the active and reserve components of the Armed Forces for homeland defense missions, domestic emergency responses, and providing military support to civil authorities.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<b>Title:</b> 25-Ton STLB Prototypes	1.782	-	-	-	-
<b>Description:</b> Award of 25-Ton STLB prototypes, test services support and data item deliverables for test.					
<b>Title:</b> 25-Ton Functional Matrix Support	0.518	-	-	-	-
<b>Description:</b> Build six (6) armored Heavy Dump Trucks (HDTs) and one (1) armored cab. The armor solution will be developed concurrently with the armor capable truck.					
<b>Title:</b> Medium Equipment Trailer (MET) Prototype Manufacturing	-	-	6.921	-	6.921

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / Family of Heavy Tactical Vehicles	<b>Project (Number/Name)</b> E50 / TRAILER DEVELOPMENT
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p><b>Description:</b> MET is a trailer capable of transporting track combat platforms weighing 60 tons or less in an Armored Brigade Combat Team (ABCT). METS will provide flexible capability that reduces duplicative systems.</p> <p><b>FY 2021 Base Plans:</b> Competitive acquisition of Medium Equipment Trailer prototypes in preparation for test and down-select.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 increase to procure MET prototypes.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	2.300	-	6.921	-	6.921

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• D01650: SEMITRAILER LOW BED 25 TON	1.942	4.619	9.586	-	9.586	9.765	9.842	9.422	9.284	0.000	54.460
• DA0926: MODIFICATION APPLICATION	41.904	21.582	21.227	-	21.227	-	-	-	-	0.000	84.713

**Remarks**

**D. Acquisition Strategy**  
MET will be executed as a competitive Other Transaction Agreement (OTA) awarded to two Original Equipment Manufacturers (OEMs). The plan is to procure three prototypes per vendor in preparation to test and down-select to one vendor for follow-on production.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / Family of Heavy Tactical Vehicles	<b>Project (Number/Name)</b> E50 / TRAILER DEVELOPMENT

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Medium Equipment Trailer (MET)</b>																												
MET Materiel Development Decision																												
MET Request Prototype Proposal (RPP)																												
MET Prototype Contract Award																												
MET Prorotype Manufacturing																												
MET Run-off Testing																												
MET Milestone C Decision Point																												
<b>SEMI-TRAILER LOW-BED 25-Ton Trailer</b>																												
25T Materiel Development Decision																												
25T Prototype Project Agreement Award																												
25T Prototype Build																												
25T Run-off Testing for Prototypes																												
25T Milestone C																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / <i>Family of Heavy Tactical Vehicles</i>	<b>Project (Number/Name)</b> E50 / <i>TRAILER DEVELOPMENT</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Medium Equipment Trailer (MET)	2	2020	4	2022
MET Materiel Development Decision	2	2020	2	2020
MET Request Prototype Proposal (RPP)	1	2021	1	2021
MET Prototype Contract Award	3	2021	3	2021
MET Prorotype Manufacturing	4	2021	1	2022
MET Run-off Testing	1	2022	4	2022
MET Milestone C Decision Point	1	2023	1	2023
SEMI-TRAILER LOW-BED 25-Ton Trailer	1	2018	4	2020
25T Materiel Development Decision	3	2019	3	2019
25T Prototype Project Agreement Award	1	2020	1	2020
25T Prototype Build	1	2020	2	2020
25T Run-off Testing for Prototypes	3	2020	4	2020
25T Milestone C	2	2021	2	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604622A / Family of Heavy Tactical Vehicles				<b>Project (Number/Name)</b> EZ8 / Leader/Follower			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EZ8: Leader/Follower	-	0.000	5.000	10.637	-	10.637	9.412	5.881	5.324	12.852	0.000	49.106
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Tactical Wheeled Vehicle Leader Follower program provides transportation units with the capability for Tactical Wheeled Vehicles (TWVs) to operate in an unmanned mode, beginning with the Palletized Loading System (PLS) vehicles, while operating in a convoy. This is accomplished by integrating technology to the unmanned vehicles which enables them to follow a manned lead vehicle. This is done in a March Unit of up to (8) TWVs initially PLS vehicles, with (1) manned Lead vehicle and (3) to (7) unmanned follower vehicles. This capability provides increased Soldier Force Protection and increased convoy logistics throughput by giving commanders more options on Soldier utilization, removing Soldiers from threat zones and/or utilizing vehicle operators for convoy security, and allowing supply convoys to run more often.

FY 2021 Project EZ8 Base funds will execute testing for the Tactical Wheeled Leader Follower program for safety and performance evaluations by the Army Test & Evaluation Command (ATEC) to support a production decision by the Milestone Decision Authority, fund Program Management office lifecycle planning, and engagements with industry to plan and solicit proposals for the program of record contracts. In addition, Project EZ8 Base funds exploration and development of the Expedient Leader Follower (ExLF) Applique on additional systems (Heavy Expanded Mobility Tactical Truck (HEMTT), Family of Medium Tactical Vehicles (FMTV), and 915 truck fleets) beyond the Palletized Load System (PLS).

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Tactical Wheeled Vehicle Leader Follower	-	4.773	10.637	-	10.637
<b>Description:</b> Funding line in FY 2021 for Project Manager Force Projection, Product Manager Applique and Large Unmanned Systems, to be used to execute the Program of Record (POR) for the Leader Follower capability of removing Soldier Operators from the PLS. This provides increased Soldier protection and logistics throughput.					
<b>FY 2020 Plans:</b> FY 2020 funding will be used for the execution and management of the Leader Follower Transition Agreement (TA) and support LF Capability requirements development. It will also fund the chartering and support of the Test and Evaluation Working Integrated Product Team (T&E WIPT), Risk Management support, Logistics planning and IPT initiation. Technical Manual Validation and Logistics Demo will be funded in FY20. Funding will complete testing of the Expedient Leader Follower system design as it completes the engineering and operational demonstration phase under a directed requirement. Pre-Production Qualification Testing which includes RAM testing, Obstacle Detection and Avoidance Testing and Degraded System Testing will occur in					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / Family of Heavy Tactical Vehicles	<b>Project (Number/Name)</b> EZ8 / Leader/Follower

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>FY 2020. Funding will support formal validation of the demonstrated capability, and manpower support for production planning and Milestone C execution.</p> <p><b>FY 2021 Base Plans:</b> FY 2021 funding for Leader Follower will support follow-on testing of the Leader Follower configuration fielded assets. It will fund a competitive run-off of multiple vendors during FY 2021 for a down-select of (1) Leader Follower autonomy solution. Funding includes delivery of vendor prototypes, field service representatives, early logistics and product support analysis, independent testing, data analysis, source selection activities, contracting support, and program documentation to support the follow-on production decision. In addition, Project EZ8 Base funds exploration and development of the Expedient Leader Follower (ExLF) Applique on additional systems (Heavy Expanded Mobility Tactical Truck (HEMTT), Family of Medium Tactical Vehicles (FMTV), and 915 truck fleets) beyond the Palletized Load System (PLS).</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2020 funding provides minimal funding for program initiation. FY 2021 funding supports ramp-up of testing multiple vendors with multiple prototypes to support full and open competitive down-select.</p>					
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638</p>	-	0.227	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	-	5.000	10.637	-	10.637

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• FD9: Robotics Systems	67.868	3.051	3.060	-	3.060	3.009	2.961	3.006	3.014	0.000	85.969
• R06806: Leader/ Follower Applique (L/F)	-	-	7.624	-	7.624	33.128	106.998	125.788	139.838	0.000	413.376

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / <i>Family of Heavy Tactical Vehicles</i>	<b>Project (Number/Name)</b> EZ8 / <i>Leader/Follower</i>

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

Prior to FY 2020, PM LF efforts were funded under the Robotics Development 6.4 line along with United States Army Combat Capabilities Development Command Ground Vehicle Systems Center, formerly TARDEC, who had most of the funding.

**D. Acquisition Strategy**

The TWV LF Acquisition Strategy, where appropriate, leverages prior developed and demonstrated technology, developed under a HQDA G-8 Directed Requirement effort by Ground Vehicle Systems Center (GVSC), and transitions to the Program Manager Force Projection, PdM ALUGS in FY 2021. PdM ALUGS will use a competitive prototyping effort in FY 2021 leading to a single source Engineering & Manufacturing Development phase in FY 2022. The funding allows for the Army to mature the technology demonstrated under the directed requirement, fully validate the production solution and ensure safe and suitable operation, develop the appropriate logistics products, operations manuals, and supportability strategy, and field an enduring unmanned, robotic, autonomous PLS convoy capability to Soldiers.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / Family of Heavy Tactical Vehicles	<b>Project (Number/Name)</b> EZ8 / Leader/Follower
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
LF Program Management	Allot	PM FP : Warren, MI; Harrison Twp, MI	-	-		0.874	Oct 2019	1.000	Oct 2020	-		1.000	0.000	1.874	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.227		-		-		-	0.000	0.227	-
<b>Subtotal</b>			-	-		1.101		1.000		-		1.000	0.000	2.101	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
LF Competitive Prototyping	C/CPFF	TBD : TBD	-	-		-		7.337	Dec 2020	-		7.337	0.000	7.337	-
<b>Subtotal</b>			-	-		-		7.337		-		7.337	0.000	7.337	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
LF Tech Support	MIPR	TARDEC, TACOM : Warren, MI	-	-		1.334	Oct 2019	0.300	Oct 2020	-		0.300	0.000	1.634	-
<b>Subtotal</b>			-	-		1.334		0.300		-		0.300	0.000	1.634	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
LF Test Support ATEC	MIPR	ATEC : Aberdeen, MD	-	-		2.565	Oct 2019	2.000	Oct 2020	-		2.000	0.000	4.565	-
<b>Subtotal</b>			-	-		2.565		2.000		-		2.000	0.000	4.565	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2021 Army</b>								<b>Date:</b> February 2020			
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604622A / <i>Family of Heavy Tactical Vehicles</i>				<b>Project (Number/Name)</b> EZ8 / <i>Leader/Follower</i>			
	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>		
<b>Project Cost Totals</b>	-	-	5.000	10.637	-	10.637	0.000	15.637	N/A		

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / Family of Heavy Tactical Vehicles	<b>Project (Number/Name)</b> EZ8 / Leader/Follower

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
LEADER FOLLOWER (LF) ALUGS	[Blue bar spanning all quarters from FY 2020 to FY 2025]																											
LF Safety Release Testing					[Blue bar]																							
LF Operational Technology Demonstration					[Blue bar]																							
LF Sustain Operational Technology Demonstration									[Blue bar]																			
LF RPP Release									1 [Blue bar]																			
LF OTA Flyoff 1									[Blue bar]																			
LF OTA Flyoff 2													[Blue bar]															
LF EMD RPP													2 [Blue bar]															
LF EMD Award													3 [Blue bar]															
LF Pre-Production Qualification Testing													[Blue bar]															
LF Milestone C																	4 [Blue bar]											
LF Production Qualification Testing																					[Blue bar]							
LF Follow-on Operational Test & Evaluation																									[Blue bar]			

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / <i>Family of Heavy Tactical Vehicles</i>	<b>Project (Number/Name)</b> EZ8 / <i>Leader/Follower</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				
	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	
LF Full Materiel Release																									5				
LF Full Rate Production																													

5  
LF FMR

LF F

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / <i>Family of Heavy Tactical Vehicles</i>	<b>Project (Number/Name)</b> EZ8 / <i>Leader/Follower</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
LEADER FOLLOWER (LF) ALUGS	1	2020	4	2027
LF Safety Release Testing	4	2019	4	2020
LF Operational Technology Demonstration	1	2020	4	2020
LF Sustain Operational Technology Demonstration	1	2021	4	2021
LF RPP Release	4	2020	4	2020
LF OTA Flyoff 1	1	2021	2	2021
LF OTA Flyoff 2	3	2021	4	2021
LF EMD RPP	4	2021	4	2021
LF EMD Award	2	2022	2	2022
LF Pre-Production Qualification Testing	2	2022	4	2023
LF Milestone C	4	2023	4	2023
LF Production Qualification Testing	1	2024	4	2024
LF Follow-on Operational Test & Evaluation	1	2025	3	2025
LF Full Materiel Release	3	2025	3	2025
LF Full Rate Production	4	2025	4	2029

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604622A / Family of Heavy Tactical Vehicles				<b>Project (Number/Name)</b> VR5 / TWV Protection Kits			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
VR5: TWV Protection Kits	-	7.543	2.486	1.599	-	1.599	3.082	2.968	3.479	3.479	0.000	24.636
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

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

FY 2021 Project VR5 Base funds in the amount of \$1.599 million supports Developmental Test (DT), Operational Test (OT) and Live Fire Test (LFT) of the armored Heavy Dump Truck prototypes. The armor solution is in compliance with the Long Term Armor Strategy (LTAS) perimeter ballistic specification and Mine Resistant Ambush Protected (MRAP) underbody ballistic specification in support of the Tactical Wheeled Vehicle (TWV) strategy for Soldier protection.

In accordance with Section 1815 of the FY 2008 National Defense Authorization Act (P.L. 110-181), this item is necessary for use by the active and reserve components of the Armed Forces for homeland defense missions, domestic emergency responses, and providing military support to civil authorities.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Heavy Dump Truck (HDT) Testing	0.687	2.373	1.599	-	1.599
<b>Description:</b> Reliability, Availability, and Maintainability (RAM) testing and system performance testing / evaluation of the armored HDTs. Developmental Test, Operational Test and Live Fire Test of armored vehicle.					
<b>FY 2020 Plans:</b> Armored HDT testing costs include system testing, evaluation and report production for the HDT program. The Government will conduct Production Verification Testing (PVT), First Production Vehicle Inspection (FPVI), Reliability, Availability, and Maintainability (RAM) testing and Live Fire Testing (LFT), as well as OEM test services support, familiarization training and refurbishment of test assets.					
<b>FY 2021 Base Plans:</b> Continuation of Live Fire Testing of HDT armored prototypes. Developmental and Operational Testing for HDT armored vehicles.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / Family of Heavy Tactical Vehicles	<b>Project (Number/Name)</b> VR5 / TWV Protection Kits

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
FY 2021 funding is decreased as RAM and performance testing for the HDT is finalized and all testing for armored prototypes is completed in FY 2021.					
<b>Title:</b> HDT Prototypes <b>Description:</b> Build six (6) armored Heavy Dump Trucks (HDTs) and one (1) armored cab. The armor solution will be developed concurrently with the armor capable truck.	6.856	-	-	-	-
<b>Title:</b> FY 2020 SBIR/STTR Transfer <b>Description:</b> Funding transferred in accordance with Title 15 USC ?638 <b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638 <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638	-	0.113	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	7.543	2.486	1.599	-	1.599

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• D16001: TRUCK, DUMP, 20T (CCE)	5.061	10.838	29.368	-	29.368	-	-	-	-	0.000	45.267

**Remarks**

**D. Acquisition Strategy**  
The Heavy Dump Truck (HDT) entered the acquisition cycle pre-Milestone C, based on a competitive source selection process that resulted in the award of a five year plus two option years firm-fixed price (FFP) indefinite delivery indefinite quantity (IDIQ) contract. The contract award was for one Original Equipment Manufacturer (OEM) to develop an armor solution for a commercially-based dump truck. The commercially-based dump truck will be armor-capable and will be produced concurrently with the development of the armor solution, which will ensure that the armor solution correctly interfaces with the commercially-based dump truck.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604622A / Family of Heavy Tactical Vehicles				VR5 / TWV Protection Kits							
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.113		-		-		-	0.000	0.113	-
<b>Subtotal</b>			-	-		0.113		-		-		-	0.000	0.113	N/A
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Heavy Dump Truck (HDT) Prototype Design of Armored Cab	C/IDIQ	Mack Defense : Allentown, PA	-	6.856	Jul 2019	-		-		-		-	0.000	6.856	-
<b>Subtotal</b>			-	6.856		-		-		-		-	0.000	6.856	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
HDT - Production Verification Testing	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	-		1.444	Jan 2020	-		-		-	0.000	1.444	-
HDT - Live Fire Testing	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	0.260	Jun 2019	0.255	Mar 2020	-		-		-	0.000	0.515	-
HDT - Familiarization Training	C/IDIQ	Mack Defense : Allentown, PA	-	-		0.016	Dec 2019	-		-		-	0.000	0.016	-
HDT - Test Services Representative	C/IDIQ	Mack Defense : Allentown, PA	-	0.224	Jul 2019	-		-		-		-	0.000	0.224	-
HDT - Refurb of Test Assets	C/IDIQ	Mack Defense : Allentown, PA	-	-		0.037	Sep 2020	-		-		-	0.000	0.037	-
HDT - DT/OT	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	0.203	Aug 2019	0.621	Mar 2020	1.599	Jan 2021	-		1.599	0.000	2.423	-



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / Family of Heavy Tactical Vehicles	<b>Project (Number/Name)</b> VR5 / TWV Protection Kits

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>HEAVY DUMP TRUCK (HDT)</b>																												
HDT Armor Development																												
HDT Armored Prototypes					 Armored Prototype Build																							
HDT Armored Cab Live Fire Exploitation Test					 1																							
HDT Armored PVT					 Production Verification Testing																							
HDT Armored Live Fire Testing									 Live Fire Testing																			
HDT Armored Developmental/Operational Test									 DT/OT																			
HDT Type Classification/Materiel Release													 2 TC/MR															
HDT Initial Operating Capability													 3 IOC															

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604622A / <i>Family of Heavy Tactical Vehicles</i>	<b>Project (Number/Name)</b> VR5 / <i>TWV Protection Kits</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
HEAVY DUMP TRUCK (HDT)	1	2017	4	2021
HDT Armor Development	3	2019	4	2019
HDT Armored Prototypes	4	2019	3	2020
HDT Armored Cab Live Fire Exploitation Test	1	2020	1	2020
HDT Armored PVT	4	2019	3	2021
HDT Armored Live Fire Testing	4	2020	2	2021
HDT Armored Developmental/Operational Test	3	2021	3	2021
HDT Type Classification/Materiel Release	1	2022	1	2022
HDT Initial Operating Capability	2	2022	2	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / <i>Air Traffic Control</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	11.580	5.781	3.511	-	3.511	9.823	2.563	2.127	1.605	0.000	36.990
586: <i>Air Traffic Control</i>	-	11.580	5.781	3.511	-	3.511	9.823	2.563	2.127	1.605	0.000	36.990

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

Program Element (PE) 0604633A Air Traffic Control funds continuous efforts in the development of modernized tactical Air Traffic Control (ATC) systems that enable safety of aircraft operations. ATC systems are required to achieve or maintain compliance with civil, military, domestic and international ATC mandates and combat identification requirements.

The Tactical Airspace Integration System (TAIS) is the Army's program of record for Airspace Control and enroute Air Traffic Services. It requires development, testing and integration of new web-based services for Airspace Control in order to maintain compatibility and interoperability with the Army Mission Command Information System. TAIS includes development and testing of improvements to incorporate emerging Air Force interfaces, ability to simultaneously connect to multiple sensor systems to receive and process situational awareness information, the capability to connect to sensors to enhance available situational awareness thus reducing risk to aviation and ground forces, and to implement new software features for use in multiple computing environments.

The Air Traffic Navigation Integration and Coordination System (ATNAVICS) is a highly mobile Airport Surveillance Radar and Precision Approach Radar system that provides Air Traffic Services at Army airfields and landing sites at Division, Corps, and Echelons above Corps to include services for Joint and Allied aircraft. ATNAVICS integrates capabilities to control aircraft both Outside of the Continental United States and in the Continental United States. ATNAVICS is upgrading the Interrogation Identification Friend-or-Foe (IFF) system to maintain international airspace compatibility, capture flight information through the reception of aircraft self-reporting data broadcasts, and process into an interconnected air picture.

The Tactical Terminal Control System (TTCS) is a mobile ATC communications system that provides initial Air Traffic Services at remote landing sites and drop zones. It enables secure ground-to-air and ground-to-ground communications between Army aircraft, other services, Allied aircraft, and ground stations. TTCS provides aircraft separation and ground control capabilities, a meteorological measuring system for basic weather information, and Blue Force Tracker which provides near real time situational awareness and precision location capability.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2021 Army	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / <i>Air Traffic Control</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	12.332	6.989	7.523	-	7.523
Current President's Budget	11.580	5.781	3.511	-	3.511
Total Adjustments	-0.752	-1.208	-4.012	-	-4.012
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-1.208			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.752	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-4.012	-	-4.012

**Change Summary Explanation**

Fiscal Year (FY) 2021 reflects a decrease in funding to better align with Army Air Traffic Control requirements.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604633A / Air Traffic Control				<b>Project (Number/Name)</b> 586 / Air Traffic Control			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
586: Air Traffic Control	-	11.580	5.781	3.511	-	3.511	9.823	2.563	2.127	1.605	0.000	36.990
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project 586 Air Traffic Control funds continuous efforts in the development of modernized tactical Air Traffic Control (ATC) systems that enable safety of aircraft operations. ATC systems are required to achieve or maintain compliance with civil, military, domestic and international ATC mandates and combat identification requirements.

The Tactical Airspace Integration System (TAIS) is the Army's program of record for Airspace Control and enroute Air Traffic Services. It requires development, testing and integration of new web-based services for Airspace Control in order to maintain compatibility and interoperability with the Army Mission Command Information System. TAIS includes development and testing of improvements to incorporate emerging Air Force interfaces, ability to simultaneously connect to multiple sensor systems to receive and process situational awareness information, the capability to connect to sensors to enhance available situational awareness thus reducing risk to aviation and ground forces, and to implement new software features for use in multiple computing environments.

The Air Traffic Navigation Integration and Coordination System (ATNAVICS) is a highly mobile Airport Surveillance Radar and Precision Approach Radar system that provides Air Traffic Services at Army airfields and landing sites at Division, Corps, and Echelons above Corps to include services for Joint and Allied aircraft. ATNAVICS integrates capabilities to control aircraft both Outside of the Continental United States and in the Continental United States. ATNAVICS is upgrading the Interrogation Identification Friend-or-Foe (IFF) system to maintain international airspace compatibility, capture flight information through the reception of aircraft self-reporting data broadcasts, and process into an interconnected air picture.

The Tactical Terminal Control System (TTCS) is a mobile ATC communications system that provides initial Air Traffic Services at remote landing sites and drop zones. It enables secure ground-to-air and ground-to-ground communications between Army aircraft, other services, Allied aircraft, and ground stations. TTCS provides aircraft separation and ground control capabilities, a meteorological measuring system for basic weather information, and Blue Force Tracker which provides near real time situational awareness and precision location capability.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> Tactical Airspace Integration System (TAIS)	7.017	2.810	2.546
<b>Description:</b> The TAIS is the Army's program of record for Airspace Control and enroute Air Traffic Services. It requires development, testing and integration of new web-based services for Airspace Control in order to maintain compatibility and interoperability with the Army Mission Command Information System. TAIS includes development and testing of improvements to incorporate emerging Air Force interfaces, ability to simultaneously connect to multiple sensor systems to receive and process situational awareness information, the capability to connect to sensors to enhance available situational awareness thus reducing risk to aviation and ground forces, and to implement new software features for use in multiple computing environments.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / Air Traffic Control	<b>Project (Number/Name)</b> 586 / Air Traffic Control

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p><b>FY 2020 Plans:</b> Continued Army's Common Operating Environment (COE) and Airspace Integration Improvements and certification in support of the interoperability within the Army's Mission Command Information Systems (MCIS). Incorporate emerging Federal Aviation Administration (FAA) requirements. Developed software solutions to provide FAA Notice to Airman, Pilot Reports and adjust critical performance and loading software.</p> <p><b>FY 2021 Plans:</b> Will continue with the initiation of System Modification testing which includes reliability and maintainability, communications range testing, transportability, and mobility tests. Plan to continue COE and Airspace Integration Improvements and certification in support of the interoperability within the Army's Mission Command Information Systems (MCIS). Plan to incorporate emerging FAA requirements &amp; will develop software solutions to provide FAA Notice to Airman, Pilot Reports and adjust critical performance and loading software.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decreases in FY 2021 due the completion of Non-Recurring Engineering efforts.</p>			
<p><b>Title:</b> Air Traffic Navigation Integration and Coordination System (ATNAVICS) Modernization</p> <p><b>Description:</b> The ATNAVICS is a highly mobile Airport Surveillance Radar and Precision Approach Radar system that provides Air Traffic Services at Army airfields and landing sites at Division, Corps, and Echelons above Corps to include services for Joint and Allied aircraft. ATNAVICS integrates capabilities to control aircraft both Outside of the Continental United States and in the Continental United States. ATNAVICS is upgrading the IFF system to maintain international airspace compatibility, capture flight information through the reception of aircraft self-reporting data broadcasts, and process into an interconnected air picture.</p> <p><b>FY 2020 Plans:</b> Continued TPX-59 integration, Risk Management Framework (RMF) compliance, and product support analysis efforts for ATNAVICS.</p> <p><b>FY 2021 Plans:</b> Will continue to complete RMF compliance efforts and product support analysis efforts.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decreases in FY 2021 due to completion of RMF compliance efforts and product support analysis efforts.</p>	3.656	2.709	0.965
<p><b>Title:</b> Tactical Terminal Control System (TTCS)</p> <p><b>Description:</b> The TTCS is a mobile ATC communications system that provides initial ATS at remote landing sites and drop zones. It enables secure ground-to-air and ground-to-ground communications between Army aircraft, other services, Allied aircraft and ground stations. TTCS also provides aircraft separation and ground control capabilities, a meteorological measuring system for</p>	0.907	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / Air Traffic Control	<b>Project (Number/Name)</b> 586 / Air Traffic Control

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
basic weather information, and Blue Force Tracker which provides near real time situational awareness and precision location capability.			
<b>Title:</b> FY 2020 SBIR/STTR Transfer <b>Description:</b> Funding transferred in accordance with Title 15 USC ?638 <b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638 <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638	-	0.262	-
<b>Accomplishments/Planned Programs Subtotals</b>	11.580	5.781	3.511

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• AA0050: Air Traffic Control	63.872	32.738	26.408	-	26.408	20.471	23.627	17.665	11.554	0.000	196.335

**Remarks**

**D. Acquisition Strategy**

This project is comprised of multiple systems supporting ATC development and test efforts. While the detailed acquisition strategy varies by program, the general strategy for each program is to complete development and testing efforts through contract modifications, engineering service tasks, and new/follow-on contracts. ATC systems are required to achieve or maintain compliance with civil, military, domestic and international air traffic control and upcoming Next Gen requirements and mandates as well as current aircraft self-reporting transponders.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / Air Traffic Control	<b>Project (Number/Name)</b> 586 / Air Traffic Control
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PM Support	Various	PM ATC : Redstone Arsenal, AL	2.227	-		-		-		-		-	0.000	2.227	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.262		-		-		-	0.000	0.262	-
<b>Subtotal</b>			2.227	-		0.262		-		-		-	0.000	2.489	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TAIS (Web Based Services Dev)	SS/T&M	General Dynamics C4S : Huntsville, AL	30.815	7.017	Aug 2019	2.810	May 2020	2.546	May 2021	-		2.546	Continuing	Continuing	Continuing
ATNAVICS Modernization, TPX-59	Various	Various : Various	20.944	3.656	Aug 2019	2.709	Jan 2020	0.965	Jan 2021	-		0.965	0.000	28.274	-
Tactical Terminal Control System (TTCS)	Various	Various : Various	3.628	0.907	Mar 2019	-		-		-		-	0.000	4.535	-
<b>Subtotal</b>			55.387	11.580		5.519		3.511		-		3.511	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		57.614	11.580	5.781	3.511	3.511	Continuing	Continuing	N/A

**Remarks**  
 PM: Program Management  
 TAIS: Tactical Airspace Integration System  
 ATNAVICS: Air Traffic Navigation Integration and Coordination System

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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / Air Traffic Control	<b>Project (Number/Name)</b> 586 / Air Traffic Control
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
TAIS (Web Based Services Dev)																												
TAIS																												
ATNAVICS Modernization TPX-59																												
TPX-59																												
Tactical Terminal Control System (TTCS) - 198C Upgrade																												
198C Upgrade																												

**Note**  
 TAIS: Tactical Airspace Integration System  
 ATNAVICS: Air Traffic Navigation Integration and Coordination System

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604633A / <i>Air Traffic Control</i>	<b>Project (Number/Name)</b> 586 / <i>Air Traffic Control</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
TAIS (Web Based Services Dev)	1	2015	4	2025
ATNAVICS Modernization TPX-59	3	2017	4	2021
Tactical Terminal Control System (TTCS) - 198C Upgrade	2	2018	4	2020

**Note**

TAIS: Tactical Airspace Integration System  
 ATNAVICS: Air Traffic Navigation Integration and Coordination System

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / Light Tactical Wheeled Vehicles
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	1.013	2.965	1.976	-	1.976	1.974	0.000	0.000	0.000	0.000	7.928
E40: LTV Prototype	-	1.013	2.965	1.976	-	1.976	1.974	0.000	0.000	0.000	0.000	7.928

**Note**

This project includes GMV (AGMV1.1, Infantry Squad Vehicle (ISV), & SOCOM GMV1.1).

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

The Army Ground Mobility Vehicle (GMV) provides Infantry Battalions with motorized expeditionary mobility platforms to provide needed operational mobility for the infantry squad with their associated equipment to move quickly around the battlefield. This capability is required across the range of military operations facing IBCT units conducting crises response, initial entry, and selected decisive action missions. GMV deploys worldwide by sea, air, and land modes to support strategic deployment and operational maneuver in accordance with Army and Joint doctrine. This capability provides flexibility for entry operations (permissive and non-permissive) to counter threat anti-access strategies by using multiple austere entry points to bring in combined arms configured units.

Funding supports modernization of the current Tactical Wheeled Vehicle fleets by investigating technology insertions including, but not limited to: condition based maintenance, vetronics, Victory Architecture, autonomous operations and other emerging technologies. Funding also supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement operating concepts.

FY 2021 GMV budget activities in the amount of \$1.976 million include ISV performance, operational, qualification testing, and contractor test support.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	1.276	10.465	1.977	-	1.977
Current President's Budget	1.013	2.965	1.976	-	1.976
Total Adjustments	-0.263	-7.500	-0.001	-	-0.001
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-7.500			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.263	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-0.001	-	-0.001

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / <i>Light Tactical Wheeled Vehicles</i>	
<b><u>Change Summary Explanation</u></b> FY 2020: \$7.5M Congressional reduction for Up-Armored High Mobility Multi-purpose Wheeled Vehicle (UAH HMMWV) Recapitalization Program.		

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / <i>Light Tactical Wheeled Vehicles</i>	<b>Project (Number/Name)</b> E40 / <i>LTV Prototype</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
E40: <i>LTV Prototype</i>	-	1.013	2.965	1.976	-	1.976	1.974	0.000	0.000	0.000	0.000	7.928
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**  
This project includes GMV (AGMV1.1), Infantry Squad Vehicle (ISV), & SOCOM GMV1.1).

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

The Army Ground Mobility Vehicle (GMV) provides enhanced tactical mobility for an Infantry Brigade Combat Team (IBCT) 9-Soldier infantry squad with their associated equipment to move quickly around the battlefield. This capability is required across the range of military operations facing IBCT units conducting crises response, initial entry, and selected decisive action missions. GMV deploys worldwide by sea, air, and land modes to support strategic deployment and operational maneuver in accordance with Army and Joint doctrine. This capability provides flexibility for entry operations (permissive and non-permissive) to counter threat anti-access strategies by using multiple austere entry points to bring in combined arms configured units.

Funding supports modernization of the current Tactical Wheeled Vehicle fleets by investigating technology insertions including, but not limited to: condition based maintenance, vetronics, Victory Architecture, autonomous operations and other emerging technologies. Funding also supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement operating concepts.

FY 2021 GMV budget activities in the amount of \$1.976 million include ISV performance, operational, qualification testing, and contractor test support.

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

	FY 2019	FY 2020	FY 2021
<b>Title:</b> GMV Contract Test Support	-	0.225	0.273
<b>Description:</b> Funding is provided for Ground Mobility Vehicle (GMV) contractor test support.			
<b>FY 2020 Plans:</b> GMV ISV contractor test support.			
<b>FY 2021 Plans:</b> Continuation of ISV GMV contractor test support.			
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase in funding due to inflation.			
<b>Title:</b> GMV Test and Evaluation	1.013	2.111	1.703

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / <i>Light Tactical Wheeled Vehicles</i>	<b>Project (Number/Name)</b> E40 / <i>LTV Prototype</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p><b>Description:</b> Funding is provided for Ground Mobility Vehicle (GMV) testing events in the support of Full Rate Production (FRP) decision.</p> <p><b>FY 2020 Plans:</b> GMV ISV performance and quality testing. (Production Qualification Testing (PQT), Low Velocity Air Drop ( LVAD), and operational testing)</p> <p><b>FY 2021 Plans:</b> Continuation of ISV GMV testing which include Production Qualification Testing (PQT), Low Velocity Air Drop ( LVAD), and operational testing.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Decrease in funding due to the ramp down of ISV testing events.</p>				
<p><b>Title:</b> GMV Test Assets</p> <p><b>Description:</b> Funding is provided for GMV Test Assets.</p> <p><b>FY 2020 Plans:</b> LVAD test assets for ISV.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Test asset procurement completed.</p>		-	0.495	-
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638</p>		-	0.134	-
<b>Accomplishments/Planned Programs Subtotals</b>		1.013	2.965	1.976

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / <i>Light Tactical Wheeled Vehicles</i>	<b>Project (Number/Name)</b> E40 / <i>LTV Prototype</i>

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

Line Item	FY 2019	FY 2020	FY 2021	FY 2021	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Cost To	Total Cost
			Base	OCO	Total					Complete	
• D15505: <i>Ground Mobility Vehicles (Light) GMV (L)</i>	42.695	37.038	37.932	-	37.932	33.016	33.645	36.363	-	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

Ground Mobility Vehicle (GMV) Phase I: Per AROC on 10 August 2018 following the Army's funding reprioritization, the Army's direction was to procure 127 vehicles for USASOC, and 170 for Army GMV 1.1 for 3 Airborne IBCTs.

GMV Phase II: Pursue development of the GMV ISV to fulfill the requirements for IBCTs using a non-developmental item. A firm fixed priced production contract will be awarded following successful prototype determination and findings from the ISV OTA. Production contract award is anticipated to be in FY 2020. Per AROC on 08 February 2019, the Vice Chief Secretary of Army (VCSA) approved the procurement objective of 11 IBCT sets at 59 vehicles per IBCT (649 vehicles) to be completed by FY 2024. During a follow on AROC on 22 February 2019, the VCSA approved the ISV annex to the approved SOCOM GMV1.1 Capabilities Production Document which approved the total requirement for the ISV program.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604642A / Light Tactical Wheeled Vehicles				E40 / LTV Prototype								
<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.134		-		-		-	0.000	0.134	-	
<b>Subtotal</b>			-	-		0.134		-		-		-	0.000	0.134	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	
GMV Contractor Test Support	TBD	TBD : TBD	0.009	-		0.225	Jun 2020	0.273	Jan 2021	-		0.273	0.000	0.507	-	
GMV Test Assets	TBD	TBD : TBD	-	-		0.495	Jun 2020	-		-		-	0.000	0.495	-	
GMV Prototypes	TBD	TBD : TBD	3.143	-		-		-		-		-	0.000	3.143	-	
<b>Subtotal</b>			3.152	-		0.720		0.273		-		0.273	0.000	4.145	N/A	
<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	
GMV Program Management Support	Various	PM Office : Selfridge ANG	0.337	-		-		-		-		-	0.000	0.337	-	
<b>Subtotal</b>			0.337	-		-		-		-		-	0.000	0.337	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	
GMV performance and qualification testing	MIPR	Various : Various	0.593	1.013	Aug 2019	2.111	Aug 2020	1.703	Nov 2020	-		1.703	0.000	5.420	-	
<b>Subtotal</b>			0.593	1.013		2.111		1.703		-		1.703	0.000	5.420	N/A	

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2021 Army</b>								<b>Date:</b> February 2020			
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604642A / <i>Light Tactical Wheeled Vehicles</i>				<b>Project (Number/Name)</b> E40 / <i>LTV Prototype</i>			
	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>		
<b>Project Cost Totals</b>	4.082	1.013	2.965	1.976	-	1.976	0.000	10.036	N/A		

**Remarks**

Prior Years: FY18 includes AGMV1.1 and Infantry Squad Vehicle (ISV).

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / <i>Light Tactical Wheeled Vehicles</i>	<b>Project (Number/Name)</b> E40 / <i>LTV Prototype</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
AGMV1.1 Log Development	 Log Development																											
GMV ISV OTA Prototype Contract Award					 1																							
GMV ISV OTA Run-off Testing																												
GMV ISV MS C					 2																							
GMV ISV Production Contract					 3 Contract Award																							
GMV ISV Production Qualification Testing (PQT)																												
GMV ISV Operational Testing																												
GMV ISV First Unit Equipped (FUE)									 4																			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604642A / <i>Light Tactical Wheeled Vehicles</i>	<b>Project (Number/Name)</b> E40 / <i>LTV Prototype</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
AGMV1.1 Log Development	1	2019	1	2020
GMV ISV OTA Prototype Contract Award	4	2019	4	2019
GMV ISV OTA Run-off Testing	1	2020	2	2020
GMV ISV MS C	3	2020	3	2020
GMV ISV Production Contract	3	2020	3	2020
GMV ISV Production Qualification Testing (PQT)	4	2020	4	2021
GMV ISV Operational Testing	4	2021	1	2022
GMV ISV First Unit Equipped (FUE)	2	2021	2	2021

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / <i>Armored Systems Modernization (ASM) - Eng Dev</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	359.017	285.136	135.488	-	135.488	123.143	37.203	56.879	71.421	0.000	1,068.287
EV8: <i>Mobile Protected Firepower</i>	-	359.017	285.136	135.488	-	135.488	123.143	37.203	56.879	71.421	0.000	1,068.287

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

Infantry Brigade Combat Teams (IBCTs) lack the mobile, protected firepower capability necessary to defeat enemy prepared positions, destroy enemy armored vehicles, close with the enemy through fire and maneuver, and ensure freedom of maneuver and action in close contact with the enemy. Mobile Protected Firepower (MPF) will provide the protected, long range, precision direct-fire capability to ensure freedom of movement during offensive operations and defeat attacking enemy during defensive operations. This program supports the Next Generation Combat Vehicle (NGCV) Cross Functional Team (CFT).

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

	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>
Previous President's Budget	373.337	310.152	135.619	-	135.619
Current President's Budget	359.017	285.136	135.488	-	135.488
Total Adjustments	-14.320	-25.016	-0.131	-	-0.131
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-25.016			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-14.320	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-0.131	-	-0.131

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / Armored Systems Modernization (ASM) - Eng Dev	<b>Project (Number/Name)</b> EV8 / Mobile Protected Firepower
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
EV8: Mobile Protected Firepower	-	359.017	285.136	135.488	-	135.488	123.143	37.203	56.879	71.421	0.000	1,068.287
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

Infantry Brigade Combat Teams (IBCTs) lack the mobile, protected firepower capability necessary to defeat enemy prepared positions, destroy enemy armored vehicles, close with the enemy through fire and maneuver, and ensure freedom of maneuver and action in close contact with the enemy. Mobile Protected Firepower (MPF) will provide the protected, long range, precision direct-fire capability to ensure freedom of movement during offensive operations and defeat attacking enemy during defensive operations. This program supports the Next Generation Combat Vehicle (NGCV) Cross Functional Team (CFT).

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

	FY 2019	FY 2020	FY 2021
<p><b>Title:</b> Product Development</p> <p><b>Description:</b> MPF Middle Tier Acquisition (MTA) Rapid Prototyping, to include integration engineering, prototype builds, technical support to government test, and logistics products development efforts contracted to BAE Systems and General Dynamics Land Systems (GDLS).</p> <p><b>FY 2020 Plans:</b> Continued MTA Rapid Prototyping efforts, built completion of 24 prototypes and 4 Ballistic Hull &amp; Turret (BH&amp;T) assets. Fiscal Year (FY) 2020 efforts also included Technical Manual (TM) and Training Support Package (TSP) development, system protection, survivability, and subsystem performance analyses, engineering and logistics support necessary to conduct BH&amp;T test and Soldier Vehicle Assessment (SVA) readiness reviews, and root cause analysis, corrective action implementation, and test asset maintenance to support BH&amp;T testing and Pre-Production Testing (PPT).</p> <p><b>FY 2021 Plans:</b> Continuation of MTA Rapid Prototyping efforts, to include TM and TSP development, spare parts provisioning, Repair Parts and Special Tools List (RPSTL) creation, and development of plans to enable execution of the FY 2022 MPF Supportability Assessment (SA). FY 2021 product development actions will also include manufacturing readiness maturation efforts, engineering and logistics support to integrate emerging, mature technologies to meet system requirements, and test failure root cause analysis, corrective action application, user training, and test asset maintenance for PPT, SVA, and the Limited User Testing (LUT).</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Decrease from FY 2020 to FY 2021 is due to completion of resourcing of MPF prototype builds in FY 2020.</p>	345.944	243.099	90.860
<p><b>Title:</b> Government Test and Evaluation (Performance Testing)</p>	2.806	12.895	19.702

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / <i>Armored Systems Modernization (ASM) - Eng Dev</i>	<b>Project (Number/Name)</b> EV8 / <i>Mobile Protected Firepower</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p><b>Description:</b> During the MPF Rapid Prototyping phase, the Government will execute performance testing on 16 prototypes (eight per contractor) and four BH&amp;T assets (two per contractor). Performance testing during the Rapid Prototyping phase will include BH&amp;T survivability testing and PPT, which consists of vehicle-level lethality, Reliability, Availability, and Maintainability (RAM), and electromagnetic compatibility and interference testing. PPT will also contain an initial cybersecurity evaluation.</p> <p>BH&amp;T testing will provide Force Protection and vehicle-level survivability data while PPT will provide vehicle-level automotive, lethality, and RAM performance data. The results of Rapid Prototyping performance testing will inform the planned FY 2022 Milestone C decision.</p> <p><b>FY 2020 Plans:</b> In FY 2020, BH&amp;T was completed at Aberdeen Test Center (ATC). BH&amp;T testing provided preliminary ballistic penetration and selected vulnerability data.</p> <p>FY 2020 PPT, to include safety, automotive performance, fire control, lethality, and RAM tests, was conducted at ATC and Yuma Test Center (YTC). Safety testing assessed automotive, weapon, and software safety, while automotive testing assessed system weight, center of gravity, human factors, transportability, acceleration, maximum speed, fuel consumption, and ability to traverse slopes, obstacles, and water. Fire control and lethality testing assessed accuracy, frequency response, sight performance, target handoff, and control and communications, while RAM testing will evaluate system reliability, availability, and maintainability metrics.</p> <p>Government test activities were necessary to perform FY 2020 BH&amp;T testing and PPT, to include conduct of Test Readiness Reviews (TRR), integration and installation of instrumentation, execution of test events, collection and storage of data, processing of Test Incident Reports (TIR), and Failure Analysis and Corrective Action (FACAR) resolution.</p> <p><b>FY 2021 Plans:</b> In FY 2021, PPT will be completed, to include all safety, automotive performance, fire control, lethality, RAM, and electromagnetic environmental effects (E3) testing in addition to an initial cybersecurity assessment.</p> <p>Safety testing will assess automotive, weapon, and software safety, while automotive testing will assess system weight, center of gravity, human factors, transportability, acceleration, maximum speed, fuel consumption, and ability to traverse slopes, obstacles, and water. Fire control and lethality testing will assess accuracy, frequency response, sight performance, target handoff, and control and communications. RAM testing will evaluate system reliability, availability, and maintainability metrics while E3 testing will measure system electromagnetic compatibility, interference, and safety. The initial cybersecurity assessment will evaluate system cybersecurity and resilience.</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / <i>Armored Systems Modernization (ASM) - Eng Dev</i>	<b>Project (Number/Name)</b> EV8 / <i>Mobile Protected Firepower</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p>Government test activities necessary to perform FY 2021 PPT include the integration and installation of instrumentation, execution of test events, collection and storage of data, processing of Test Incident Reports (TIR), and Failure Analysis and Corrective Action (FACAR) resolution.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase from FY 2020 to FY 2021 is due to volume of performance testing planned for FY 2021 (12 months) versus FY 2020 (6 months).</p>			
<p><b>Title:</b> Government Test and Evaluation (Operational Testing)</p> <p><b>Description:</b> During the MPF Rapid Prototyping phase, the Government will execute operational testing on eight prototypes (four per contractor) through a Limited User Test (LUT). The LUT will provide early data regarding the operational effectiveness and suitability of the MPF.</p> <p><b>FY 2021 Plans:</b> In FY 2021, the Government will complete a LUT to assess the MPF system's operational effectiveness and suitability. The LUT will include eight prototype systems (four per contractor) and will be conducted at Ft. Bragg, NC. Government activities necessary to complete the LUT include test planning, system instrumentation, test execution, maintenance of opposing force vehicles, and test report development.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase from FY 2020 to FY 2021 is due to the execution of LUT in FY 2021.</p>	-	-	8.700
<p><b>Title:</b> Soldier Vehicle Assessment (SVA)</p> <p><b>Description:</b> The SVA will place eight prototype vehicles (four per contractor) into the hands of soldiers to develop MPF Tactics, Techniques, and Procedures (TTPs), assess Doctrine, Organization, Training materiel Leadership and educational Personal Facilities and Policy (DOTmLPPF-P) domains, collect data to support preparations for the FY 2021 LUT, and inform future MPF Product Improvements. SVA force-on-force and maneuver exercises will be conducted at Ft. Bragg, NC while SVA gunnery events will be at Ft. Campbell, KY.</p> <p><b>FY 2020 Plans:</b> In FY 2020, the Government completed preparatory activities for SVA, to include finalization of the detailed data collection plan and early TTP development.</p> <p><b>FY 2021 Plans:</b></p>	-	0.817	2.407

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / <i>Armored Systems Modernization (ASM) - Eng Dev</i>	<b>Project (Number/Name)</b> EV8 / <i>Mobile Protected Firepower</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p>In FY 2021, the Government will complete the MPF SVA, to include contractor-led soldier training on the MPF, force-on-force training missions, Platoon and Section Gunnery events, and maneuver Live Fire exercises to assess MPF TTPs and DOTmLPPF-P domains.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase from FY 2020 to FY 2021 is due to SVA execution initiating in FY 2021.</p>				
<p><b>Title:</b> Training Aids and Devices Development</p> <p><b>Description:</b> Development of aids and devices to facilitate institutional training for MPF operators and maintainers. MPF training aids and devices will include Hands on Trainers (HOT), Diagnostic/Troubleshooting Trainers (DTT), Part Task Trainers (PTT), an Advanced Gunnery Training System (AGTS), and an MPF Combat Vehicle Tactical Engagement Simulation System (CVTESS). MPF aids and devices will be interoperable/compatible with the Army's current live Tactical Engagement Simulation (TES) systems, instrumentation systems, Common Training Instrumentation Architecture (CTIA), Live, Virtual Constructive-Integrated Architecture (LVC-IA) training enablers, and the future Synthetic Training Environment (STE).</p> <p><b>FY 2020 Plans:</b> In FY 2020, an assessment of MPF prototype designs was conducted to inform refinements of training device requirements. Additionally, development of contract performance specifications for the suite of MPF training devices was initiated.</p> <p><b>FY 2021 Plans:</b> FY 2021 efforts plan to include finalization of contract performance specifications for the suite of MPF training devices and the development of a familiarization trainer in support of the MPF Limited User Test (LUT).</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase from FY 2020 to FY 2021 is due to the FY 2021 effort to develop a familiarization trainer for the MPF LUT.</p>		0.135	0.140	0.308
<p><b>Title:</b> Government Engineering and Project Management</p> <p><b>Description:</b> Government program management and system engineering support, to include salaries, travel, training, supplies, facilities, equipment, and support contractors necessary to manage the MPF MTA Rapid Prototyping effort.</p> <p><b>FY 2020 Plans:</b> Engineering, logistics, product assurance and test, financial management, acquisition, and operations support for MPF MTA Rapid Prototyping activities from January 2020 through October 2020. Includes salaries, training, travel, supplies, facilities, and equipment to manage MPF integration design, prototype build, test and evaluation, logistics products development, Soldier touch-point feedback collection and analysis, and system vulnerability assessment efforts.</p> <p><b>FY 2021 Plans:</b></p>		9.866	12.292	13.511

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / <i>Armored Systems Modernization (ASM) - Eng Dev</i>	<b>Project (Number/Name)</b> EV8 / <i>Mobile Protected Firepower</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p>To continue the engineering, logistics, product assurance and test, financial management, acquisition, and operations support for the MPF MTA Rapid Prototyping activities from November 2020 through October 2021. Will include salaries, training, travel, supplies, facilities, and equipment to manage MPF test and evaluation, logistics products development, Soldier touch-point feedback collection and analysis, system vulnerability and environmental impact assessments, and future capability enhancement acquisition strategy development.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase in FY 2021 due to the number of months of support provided in the FY 2021 request (12 months) versus the FY 2020 budget (10 months). The FY 2020 budget supports only 10 months to eliminate program management carryover in the future.</p>				
<p><b>Title:</b> Government Support to Product Development</p> <p><b>Description:</b> Government support to MPF MTA Rapid Prototyping efforts, to include Source Selection activities and Large Caliber Weapon System development.</p> <p><b>FY 2020 Plans:</b> Completion of Large Caliber Weapon System development, to include finalization of the Technical Data Package (TDP) and completion of safety confirmation testing necessary to obtain weapon system safety release for the SVA and a materiel release to enable system fielding to Army IBCTs.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Decrease from FY 2020 to FY 2021 is due to the completion of engineering support necessary to complete the Large Caliber Weapon TDP and safety confirmation testing.</p>		0.266	4.190	-
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638</p>		-	11.703	-
<b>Accomplishments/Planned Programs Subtotals</b>		359.017	285.136	135.488

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / <i>Armored Systems Modernization (ASM) - Eng Dev</i>	<b>Project (Number/Name)</b> EV8 / <i>Mobile Protected Firepower</i>

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

Line Item	FY 2019	FY 2020	FY 2021	FY 2021	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Cost To	
			Base	OCO	Total					Complete	Total Cost
• G80820: <i>Mobile Protected Firepower</i>	-	-	0.000	-	0.000	351.262	339.276	571.731	559.892	4,458.219	6,280.380

**Remarks**

Standard Serial Number (SSN) G80820 resources production of MPF. FY 2022 - FY 2023 resourcing supports MPF Low Rate Initial Production (LRIP) while FY 2024 - FY 2025 resourcing supports MPF Full Rate Production (FRP).

**D. Acquisition Strategy**

The MPF RFP was issued on 21 November 2017 as a full and open, best value competitive action. On 25 September 2018, the Army Acquisition Executive (AAE) approved the execution of MPF Rapid Prototyping activities under Section 804 of the 2016 National Defense Authorization Act (NDAA) (Public Law 114-92), Middle Tier Acquisition (Rapid Prototyping). The competitive selection process for MPF Rapid Prototyping contracts included the evaluation of written proposals and optional bid samples to provide additional substantiating data for Source Selection Evaluation. On 17 December 2018, two MPF Rapid Prototyping contracts were awarded, one to BAE Land Systems and the other to General Dynamics Land Systems (GDLS). Upon AAE Milestone C approval in 3rd Quarter (3Q) FY 2022, a Source Selection Evaluation will be finalized to down-select to a single contractor for a Fixed Price Incentive (FPI) Low-Rate Initial Production (LRIP) effort. An MPF FRP decision is targeted for 3Q FY 2025.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / Armored Systems Modernization (ASM) - Eng Dev	<b>Project (Number/Name)</b> EV8 / Mobile Protected Firepower
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 Engineering and Project Management	MIPR	Various : Warren, MI; Picatinny, NJ	16.015	9.866	Dec 2018	12.292	Dec 2019	13.511	Nov 2020	-		13.511	28.209	79.893	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		11.703		-		-		-	0.000	11.703	-
<b>Subtotal</b>			16.015	9.866		23.995		13.511		-		13.511	28.209	91.596	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development - Middle Tier Acquisition (MTA) Rapid Prototyping Contracts	C/FFP	BAE Land Systems; General Dynamics Land Systems (GDLS) : Sterling Heights, MI; Sterling Heights, MI	14.667	345.118	Dec 2018	243.099	Dec 2019	90.860	Dec 2020	-		90.860	210.722	904.466	905.941
Product Development - Government Furnished Material (GFM) Procurement	Various	Various : Various	1.285	0.826	Feb 2019	0.005	Jan 2020	-		-		-	0.000	2.116	-
<b>Subtotal</b>			15.952	345.944		243.104		90.860		-		90.860	210.722	906.582	N/A

**Remarks**  
 Product Development - Middle Tier Acquisition (MTA) Rapid Prototyping Contracts Remark: MTA Rapid Prototyping contract costs are inclusive of both competitors during the Mobile Protected Firepower (MPF) MTA Rapid Prototyping Phase (1Q FY 2019 - 3Q FY 2022) and a single vendor after down-select for Low-Rate Initial Production (LRIP) at Milestone C (3Q FY 2022). Contract product development efforts during the LRIP phase include retrofit of prototypes to LRIP configuration, production of 3 LRIP vehicles for Full Up System Live Fire (FUSL) test, technical support to Government Production Qualification Test (PQT) and Initial Operational Test and Evaluation (IOT&E), and completion of system log products.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / Armored Systems Modernization (ASM) - Eng Dev	<b>Project (Number/Name)</b> EV8 / Mobile Protected Firepower
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<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 Support to Product Development - Large Caliber Weapon System Development	PO	Armament Research, Development and Engineering Center (ARDEC); Watervliet Arsenal (WVA); Rock Island Arsenal (RIA) : Picatinny, NJ; Watervliet, NY; Rock Island, IL	7.697	0.266	Jan 2019	4.190	Jan 2020	-		-		-	0.000	12.153	-
Government Support to Product Development - Source Selection Evaluation Board (SSEB)	Various	Various : Various	5.003	-		-		-		-		-	0.000	5.003	-
Training Aids and Devices Development	Various	Program Executive Office Simulation, Training and Instrumentation (PEO STRI) : Orlando, FL	-	0.135	Aug 2019	0.140	Jan 2020	0.307	Jan 2021	-		0.307	4.866	5.448	-
<b>Subtotal</b>			12.700	0.401		4.330		0.307		-		0.307	4.866	22.604	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 and Evaluation (Performance Test, Operational Test, Soldier Vehicle Assessment)	PO	Aberdeen Test Center (ATC); Yuma Test Center (YTC) : Aberdeen, MD; Yuma, AZ	6.766	2.806	Mar 2019	13.707	Jan 2020	30.810	Nov 2020	-		30.810	44.849	98.938	-
<b>Subtotal</b>			6.766	2.806		13.707		30.810		-		30.810	44.849	98.938	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2021 Army</b>							<b>Date:</b> February 2020				
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604645A / <i>Armored Systems Modernization (ASM) - Eng Dev</i>			<b>Project (Number/Name)</b> EV8 / <i>Mobile Protected Firepower</i>				
	<b>Prior Years</b>	<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	51.433	359.017		285.136		135.488	-	135.488	288.646	1,119.720	N/A

**Remarks**

Fiscal Year (FY) 2019 funding supported the award of two Rapid Prototyping contracts to design and build 24 total Mobile Protected Firepower (MPF) prototypes (12 per vendor) and four Ballistic Hull & Turrets (two per vendor), the execution of armor coupon testing, and the completion of planning for FY 2020 Ballistic Hull & Turret (BH&T) test and Pre-Production Test (PPT). FY 2020 funding supported final assembly and delivery of MPF prototypes and BH&T assets, BH&T testing, PPT, and development of MPF Technical Manuals (TM) and Training Support Packages (TSP). FY 2021 funding will support completion of PPT and Limited User Testing (LUT) in addition to continuing development of MPF Logistics Products (Technical Manuals, Training Support Package, Repair Parts and Special Tools List).

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / Armored Systems Modernization (ASM) - Eng Dev	<b>Project (Number/Name)</b> EV8 / Mobile Protected Firepower

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Milestone C (MS C)													5 MS C																
Full Rate Production (FRP) Decision																													9 FRP Decision
Full Material Release (FMR)																													10 FMR
First Unit Equipped (FUE)																													12 FUE
Risk Reduction of Large Caliber Weapon System																													
Middle Tier Acquisition (MTA) Source Selection Evaluation Board (SSEB)																													
Rapid Prototyping Contract Awards																													
Mobile Protected Firepower (MPF) Rapid Prototyping Phase																													
Design Maturity Review (DMR)																													
Ballistic Hull & Turret (BH&T) Deliveries (4 BH&Ts)																													
BH&T Test Readiness Review (TRR)																													
BH&T Test																													
Prototype Deliveries (24 Prototypes)																													

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / Armored Systems Modernization (ASM) - Eng Dev	<b>Project (Number/Name)</b> EV8 / Mobile Protected Firepower

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Pre-Production Test (PPT)					PPT																							
Soldier Vehicle Assessment (SVA) Readiness Review (RR)					SVA RR																							
SVA									SVA																			
Limited User Training (LUT)													LUT															
Training Support Package (TSP) Development	TSP Development																											
Maintenance Task Analysis (MTA) and Level Of Repair Analysis (LORA)	MTA and LORA																											
Technical Manual (TM) Development	TM Development																											
TM Validation									TM Validation																			
TM Development Update													TM Development Update															
TM Verification																	TM Verification											
Supportability Assessment (SA)													Supportability Assessment (SA)															
Logistics Demonstration (Log Demo)																	Log Demo											
Training Devices Requirements Refinement Performance Spec Development	Train Devices Req and Perf Spec Development				Train Devices Req and Perf Spec Development				Train Devices Req and Perf Spec Development				Train Devices Req and Perf Spec Development															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>			<b>Date: February 2020</b>		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604645A / Armored Systems Modernization (ASM) - Eng Dev		<b>Project (Number/Name)</b> EV8 / Mobile Protected Firepower	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025							
	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				
Training Devices Product Development																	Train Devices Development LRIP Option #1 Award															
Low Rate Initial Production (LRIP) Option #1 Award																																
LRIP Option #1 Deliveries																																
LRIP Option #2 Award																																
LRIP Option #2 Deliveries																																
Initial Operational Test and Evaluation (IOT&E)																																
FRP Lot #1 Early Order Material (EOM) Award																																
FRP Lot #1 Assembly Award																																
FRP Lot #1 Deliveries																																
																	LRIP Option #1 Deliveries															
																	LRIP Option #2 Award															
																	LRIP Option #2 Deliveries															
																	IOT&E															
																	FRP Lot #1 EOM Award															
																					FRP Lot #1 Assembly Award											
																									FRP Lot #1 Deliveries							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / Armored Systems Modernization (ASM) - Eng Dev	<b>Project (Number/Name)</b> EV8 / Mobile Protected Firepower

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Section 804 MTA Rapid Prototyping Designation	4	2018	4	2018
Milestone C (MS C)	3	2022	3	2022
Full Rate Production (FRP) Decision	3	2025	3	2025
Full Material Release (FMR)	3	2025	3	2025
First Unit Equipped (FUE)	4	2025	4	2025
Request for Proposal (RFP) Release	1	2018	1	2018
Risk Reduction of Large Caliber Weapon System	3	2017	4	2020
Middle Tier Acquisition (MTA) Source Selection Evaluation Board (SSEB)	2	2018	1	2019
Rapid Prototyping Contract Awards	1	2019	1	2019
Mobile Protected Firepower (MPF) Rapid Prototyping Phase	1	2019	3	2022
Design Maturity Review (DMR)	3	2019	3	2019
Ballistic Hull & Turret (BH&T) Deliveries (4 BH&Ts)	3	2020	4	2020
BH&T Test Readiness Review (TRR)	2	2020	2	2020
BH&T Test	3	2020	1	2021
Prototype Deliveries (24 Prototypes)	2	2020	2	2021
Pre-Production Test (PPT)	2	2020	4	2021
Soldier Vehicle Assessment (SVA) Readiness Review (RR)	4	2020	4	2020
SVA	1	2021	3	2021
Limited User Training (LUT)	4	2021	4	2021
Training Support Package (TSP) Development	2	2019	3	2022
Maintenance Task Analysis (MTA) and Level Of Repair Analysis (LORA)	2	2019	3	2022
Technical Manual (TM) Development	2	2019	3	2022

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604645A / <i>Armored Systems Modernization (ASM) - Eng Dev</i>	<b>Project (Number/Name)</b> EV8 / <i>Mobile Protected Firepower</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
TM Validation	3	2021	3	2022
TM Development Update	1	2023	1	2025
TM Verification	2	2024	1	2025
Supportability Assessment (SA)	1	2022	1	2022
Logistics Demonstration (Log Demo)	1	2024	1	2024
Training Devices Requirements Refinement Performance Spec Development	2	2019	4	2021
Training Devices Product Development	3	2022	3	2025
Low Rate Initial Production (LRIP) Option #1 Award	4	2022	4	2022
LRIP Option #1 Deliveries	1	2024	1	2025
LRIP Option #2 Award	3	2023	3	2023
LRIP Option #2 Deliveries	4	2024	4	2025
Initial Operational Test and Evaluation (IOT&E)	4	2024	1	2025
FRP Lot #1 Early Order Material (EOM) Award	4	2024	4	2024
FRP Lot #1 Assembly Award	3	2025	3	2025
FRP Lot #1 Deliveries	4	2025	4	2026

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	139.337	143.696	61.445	-	61.445	38.094	31.349	37.520	95.108	Continuing	Continuing
BQ6: <i>Visual Augmentation System Eng Dev</i>	-	0.000	63.200	8.991	-	8.991	4.995	8.108	8.125	70.754	Continuing	Continuing
L67: <i>Soldier Night Vision Devices</i>	-	56.793	35.060	14.653	-	14.653	9.231	12.519	17.161	17.163	Continuing	Continuing
L70: <i>Night Vision Dev Ed</i>	-	57.703	39.026	32.235	-	32.235	18.265	5.687	6.630	1.187	Continuing	Continuing
L76: <i>Dismounted Fire Support Laser Targeting Systems</i>	-	14.761	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	14.761
L79: <i>Joint Effects Targeting Systems (JETS)</i>	-	10.080	6.410	5.566	-	5.566	5.603	5.035	5.604	6.004	Continuing	Continuing

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

This program element provides night vision/reconnaissance, surveillance and target acquisition technologies required for United States defense forces to engage enemy forces twenty-four hours a day under conditions of degraded visibility due to darkness, adverse weather, battlefield obscurants, foliage and man-made structures. These developments and improvements to high performance night vision electro-optics, radar, laser, and thermal systems and integration of related multi-sensor suites will enable near to long range target acquisition, identification and engagement to include significant fratricide reduction, which will improve battlefield command and control in "around-the-clock" combat operations.

Project BQ6 focuses on developing, improving and miniaturizing high performance vision system's electro-optics. It also provides for systems integration of related multi-sensor suites to enable near to long-range target acquisition and engagement as well as improved battlefield command and control in around-the clock combat operations. It focuses on adapting demonstrated technologies that bring improvements to the dismounted Soldier's day/night situational awareness and individual targeting capability. This is a priority of the Secretary's Close Combat Lethality Task Force. Funding in this project aligns with the Army's priorities in support of the National Defense Strategy.

Project L67 project develops, improves and miniaturizes high performance electro-optics, thermal and laser systems. It also provides for systems integration of related multi-sensor suites to enable near to long-range target acquisition and engagement as well as improved battlefield command and control in around-the-clock combat operations. It focuses on adapting demonstrated technologies that bring improvements to the dismounted Soldiers' equipment. This project develops or enhances equipment that provides the individual Soldier's day/night situational awareness and individual targeting capability. This project includes cost associated with efforts for the development, integration and interface of products on Soldiers head, body and weapons. Funding in this project supports the Army's Soldier Lethality Cross Functional Teams (SL CFT) initiatives. Funding in this project aligns with the Army's priorities in support of the National Defense Strategy.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2021 Army	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>
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Project L70 focuses on night vision, reconnaissance, surveillance and target acquisition (RSTA) sensor and suites of sensors to provide well-defined surveillance and targeting capabilities for a variety of Current, Modular, and Future Force platforms. This project includes: 3rd Generation Forward Looking Infra-Red (3GEN FLIR) B-Kit development activities, the 3GEN Long Range Advanced Scout Surveillance System (LRAS3) Modification Work Order (MWO) to integrate 3GEN FLIR B-Kit, and the Assistant Secretary of the Army for Acquisition, Logistics, and Technology ASA(ALT) Common Operating Environment (COE) effort to meet sensor interoperability requirements and improve the soldier-machine interface of the Program of Record (POR).

Project L76 matures and integrates technologies and capabilities which benefit the Lightweight Laser Designator Rangefinder (LLDR) and the Joint Effects Targeting System (JETS). These precision targeting and next generation systems are used by dismounted Soldiers to locate, identify, and target enemy assets. This project focuses on reducing size, weight, power and cost, improving imaging performance, and increasing targeting accuracy. Targeting accuracy improvements will focus on developing and integrating affordable, non-magnetic, high accuracy, full-time (24/7), and all weather Precision Azimuth and Vertical Angle Measurement (PAVAM) devices, with reduced size, weight, and power characteristics into the LLDR system. Long term goals include improving current celestial navigation systems to increase operational availability, developing precision targeting capabilities that will operate in a Global Positioning System (GPS) contested environment to improve situational awareness, and to integrate Military Global Positioning System (GPS) User Equipment (M-Code) (next-generation GPS) receivers into LLDR and JETS, when available. This is a priority of the Secretary's Close Combat Lethality Task Force. Funding in this project aligns with the Army's priorities in support of the National Defense Strategy. Due to a shift in Army priorities the LLDR 3 program is being terminated.

Project L79 is an Army program with joint information (Air Force and Marine Corps). JETS addresses the one-man, hand-held precision targeting gap identified by the Fires Center of Excellence (FCoE). JETS is a light-weight, handheld system that will provide the single dismounted observer with a common, enhanced day and night thermal capability to rapidly acquire, accurately locate, positively identify, and precisely designate targets. JETS Target Location and Designation System (TLDS) will be able to interface with existing and future Forward Entry Systems (FESSs) and operate in environments where global positioning system (GPS) capabilities are degraded or denied including the integration of military GPS user equipment (M-Code) GPS receivers, when they become available. This project will address continued development and integration of improved precision targeting components to reduce size, weight, power, and cost of systems for dismounted precisions Fires mission. Funding in this project aligns with the Army's priorities in support of the National Defense Strategy.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	144.442	181.732	59.469	-	59.469
Current President's Budget	139.337	143.696	61.445	-	61.445
Total Adjustments	-5.105	-38.036	1.976	-	1.976
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-38.036			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-5.105	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	1.976	-	1.976

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>				<b>Project (Number/Name)</b> BQ6 / <i>Visual Augmentation System Eng Dev</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
BQ6: <i>Visual Augmentation System Eng Dev</i>	-	0.000	63.200	8.991	-	8.991	4.995	8.108	8.125	70.754	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This projects focuses on developing, improving and miniaturizing high performance vision system's electro-optics. It also provides for systems integration of related multi-sensor suites to enable near to long-range target acquisition and engagement as well as improved battlefield command and control in around-the clock combat operations. It focuses on adapting demonstrated technologies that bring improvements to the dismounted Soldier's day/night situational awareness and individual targeting capability. This project includes costs for efforts associated with movement of information and high level processing, integration, and interface of products with the Soldiers' head, body, weapon, and transportation. This is a priority of the Secretary's Close Combat Lethality Task Force. Funding for this project aligns with the Army's priorities in support of the National Defense Strategy. This project supports the Soldier Lethality Cross Functional Team.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Heads Up Display (HUD)	-	60.329	8.991	-	8.991
<p><b>Description:</b> Integrated Visual Augmentation System (IVAS) HUD provides a first generation single platform for Soldier/Marines to fight, rehearse, and train in day and night that provides increased lethality, mobility, and situational awareness necessary to achieve overmatch against our current and future adversaries.</p> <p><b>FY 2020 Plans:</b> Complete HUD development efforts by demonstrating and testing capability set 3 (further improved capability) and capability set 4 (final form factor and performance) systems.</p> <p><b>FY 2021 Base Plans:</b> Perform Systems Engineering/Program Management, integration, and test to insert improvements into the first generation IVAS.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decreased from \$63,200,000 in FY 2020 to \$8,991,000 in FY 2021 due to the transition from rapid prototyping to rapid fielding. Major initial development efforts for the first generation IVAS are completed in FY 2020.</p>					
<b>Title:</b> FY 2020 SBIR/STTR Transfer	-	2.871	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> BQ6 / <i>Visual Augmentation System Eng Dev</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Description:</b> Funding transferred in accordance with Title 15 USC 638					
<b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC 638					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC 638					
<b>Accomplishments/Planned Programs Subtotals</b>	-	63.200	8.991	-	8.991

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• K36402: <i>IVAS/Heads Up Display</i>	-	-	906.045	-	906.045	1,045.688	319.670	-	148.426	Continuing	Continuing
• BQ5: <i>Visual Augmentation System Advanced Development</i>	-	193.280	13.986	-	13.986	11.843	11.819	67.534	30.314	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

This project utilizes competitively awarded contracts using best value source selection procedures.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604710A / Night Vision Systems - Eng Dev				BQ6 / Visual Augmentation System Eng Dev							
<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	MIPR	Various : Various	-	-		19.793	Feb 2020	0.991	Nov 2020	-		0.991	Continuing	Continuing	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		2.871		-		-		-	0.000	2.871	-
<b>Subtotal</b>			-	-		22.664		0.991		-		0.991	Continuing	Continuing	N/A
<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
Heads Up Display (HUD)	Various	Various : Various	-	-		18.252	Mar 2020	1.500	Dec 2020	-		1.500	Continuing	Continuing	-
<b>Subtotal</b>			-	-		18.252		1.500		-		1.500	Continuing	Continuing	N/A
<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Matrix Support	MIPR	NVESD : Fort Belvoir, Virginia 22060	-	-		4.127	Feb 2020	0.900	Nov 2020	-		0.900	Continuing	Continuing	-
<b>Subtotal</b>			-	-		4.127		0.900		-		0.900	Continuing	Continuing	N/A
<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
IVAS HUD Testing	MIPR	Various : Various	-	-		18.157	Mar 2020	5.600	Jan 2021	-		5.600	Continuing	Continuing	-
<b>Subtotal</b>			-	-		18.157		5.600		-		5.600	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2021 Army</b>								<b>Date:</b> February 2020			
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>				<b>Project (Number/Name)</b> BQ6 / <i>Visual Augmentation System Eng Dev</i>			
	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>		<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	
<b>Project Cost Totals</b>	-	-	63.200		8.991	-	8.991	Continuing	Continuing	N/A	

**Remarks**  
 In FY 2020, BQ6 Management Services, Support Cost and Test and Evaluation Cost Category Items will include funding in support of PE 0603774A Night Vision Systems - Advanced Development project BQ5 Visual Augmentation System - Advanced Development.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> BQ6 / <i>Visual Augmentation System Eng Dev</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Heads Up Display (HUD)	Development																											
Improved Technology Production Transition									Development																			
Second Generation HUD									Development																			
Operational Test									Development																			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> BQ6 / <i>Visual Augmentation System Eng Dev</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Heads Up Display (HUD)	4	2018	4	2020
Improved Technology Production Transition	1	2021	4	2023
Second Generation HUD	1	2024	4	2025
Operational Test	2	2021	3	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>				<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L67: <i>Soldier Night Vision Devices</i>	-	56.793	35.060	14.653	-	14.653	9.231	12.519	17.161	17.163	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This project develops, improves and miniaturizes high performance electro-optics, thermal and laser systems. It also provides for systems integration of related multi-sensor suites to enable near to long-range target acquisition and engagement as well as improved battlefield command and control in around-the-clock combat operations. It focuses on adapting demonstrated technologies that bring improvements to the dismounted Soldiers' equipment. This project develops or enhances equipment that provides the individual Soldier's day/night situational awareness and individual targeting capability. This project includes cost associated with efforts for the development, integration and interface of products on Soldiers head, body and weapons. Funding in this project supports the Army's Soldier Lethality Cross Functional Teams (SL CFT) initiatives. Funding in this project aligns with the Army's priorities in support of the National Defense Strategy.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Family of Weapon Sights (FWS)	18.410	26.674	6.147	-	6.147
<p><b>Description:</b> There are three variants in the Family of Weapon Sights: FWS-Individual (FWS-I), FWS-Sniper (FWS-S) and FWS-Crew Served (FWS-CS). These sights enable combat forces to acquire and engage targets with small arms and conduct surveillance and fire control under day/night obscuration, no-light, and adverse weather conditions. The FWS utilizes advancements in thermal and low light level sensors to produce sights operable in-line with a day optic or in stand-alone mode. This RDT&amp;E project integrates smaller pixel thermal detectors/imagers in high definition formats with improved sensitivity, clarity, and range, while simultaneously reducing the size, weight and power consumption for all FWS variants and provides a minimum of a 20% overmatch for each of the weapon platforms they are intended for.</p> <p>The FWS-I variant is a weapon mounted thermal sensor that enables Soldiers to fire quickly and accurately from any carry position and with significantly reduced exposure to enemy fire by providing a wirelessly transmitted zeroed weapon aimpoint in the Soldier's Enhanced Night Vision Goggle, helmet mounted display, or Integrated Visual Augmentation system. The FWS-I variant is in production and has no RDT&amp;E requirement in the FY 2021 President's Budget. FWS-I does require RDT&amp;E in FY 2022-2025 to qualify a second vendor.</p> <p>The FWS-CS variant leverages the success of the FWS-I development effort, and will be the primary sight for the MK19, M240B and M2. The FWS- CS system integrates High Definition (HD) Thermal and Day Color</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<p>imagers, an Integrated Laser Range Finder (ILRF) and ballistic calculator to provide Soldiers with an accurate aimpoint that adjusts automatically for range, ammunition characteristics, vertical angle, and weapon cant. The FWS-CS includes a wireless HD Helmet Mounted Display (HMD) that receives weapon sight imagery allowing the Soldier to utilize the weapon sight without requiring them to look through the weapon sights eyepiece. This wireless HMD provides the opportunity for the Soldier to stay in a protected, unexposed posture while still accurately detecting and engaging targets. Additionally, the FWS-CS will integrate into Adaptive Squad Architecture and wirelessly share video and data with the Enhanced Night Vision Goggle-Binocular (ENVG-B) and the Nett Warrior End User Device (EUD). All wireless communication will be through the Intra Soldier Wireless (ISW) Network.</p> <p>The FWS-S variant utilizes a HD thermal sensor and mounts in-line with the Sniper's direct view optic providing a thermal capability without the need to remove or re-boresight the current direct view optic. The FWS-S provides Snipers a large format display with increased pixel density that enables accurate long range engagements in all battlefield conditions while utilizing the direct view optic's aiming features, extending lethality and providing exceptional observation.</p> <p><b>FY 2020 Plans:</b> The FWS-CS program will continue in Engineering and Manufacturing Development (EMD) with major integration efforts for compatibility and interoperability with the Multi-role Anti-armor Anti-personnel Weapon System (MAAWS), and the MK-19 XM1176 High Explosive Dual Purpose ? Air Burst (HEDP-AB) round. Near the end of this fiscal year, the FWS-CS program will request Milestone C approval to begin Low Rate Initial Production (LRIP). Additionally, in FY 2020 FWS-CS will begin incorporating the Intra-Soldier Wireless (ISW) requirement which includes 128-bit encryption and FIPs 140-2 compliance with plans to grow to the 256-bit encryption once available. The FWS-CS has one prime vendor.</p> <p>FWS-S will continue in the EMD Phase with two prime vendors. During this year the vendors will complete Preliminary and Critical Designs. Vendor's progress payments are tied to successfully completing these milestones. The first of two Soldier Touch Points will be conducted in late Spring 2020 to gain user feedback / input into the vendor designs. In parallel, Logistics Product Support key tasks will be underway that build on the vendor's Level of Repair Analysis (LORA). Product Support tasks include vendor's developing an interface from</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<p>their Sniper Sight to the Government's Modular Test Measurement and Diagnostics Equipment. Both vendors will begin Contractor Development Testing at the end of FY 2020.</p> <p><b>FY 2021 Base Plans:</b> In FY 2021, FWS-CS requires RDT&amp;E funding to continue the Intra-Soldier Wireless (ISW) requirement to incorporate the 256-bit encryption technology. The end state is for all production FWS-CS systems to be ISW 256-bit encryption compliant. Also during FY 2021 FWS-CS will conduct Initial Operational Test and Evaluation (IOT&amp;E) testing.</p> <p>FWS-S will conduct the second of two Soldier Touch Points in 1QFY2021 to gain user feedback. Contractor Development Testing of 18 systems will continue through 2QFY2021. FWS-S will conduct Government Developmental Testing in 1QFY2022 prior to the Limited User Test.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Overall FWS RDT&amp;E funding requirements taper off in FY 2021 due to nearing completion of both the FWS-CS and the FWS-S Engineering and Development Phases.</p>					
<p><b>Title:</b> Small Tactical Optical Rifle Mounted (STORM) II</p> <p><b>Description:</b> The STORM Micro-Laser Range Finder (MLRF) is a weapon-mounted multi-function laser system. It provides an eye safe laser range finder, digital compass, Infrared (IR) and visible aiming lights, and an IR illuminator for far target location with continuous range, accuracy, weight and power performance enhanced capabilities. Funding supports qualifying smaller, lighter, and a less expensive STORM variant (STORM II) for Soldiers. Funding also supports integrating ballistics calculator and in-line display capabilities into the STORM as well as a power/data rail interface to support the sharing of laser range finder (LRF) data to other enablers on the weapon.</p> <p><b>FY 2020 Plans:</b> Continue to qualify the STORM II test systems and fund the integration of technology to support wireless transmission of STORM data to other systems. Initiate integration of a power/data rail interface to support the sharing of LRF data to other enablers on the weapon.</p> <p><b>FY 2021 Base Plans:</b></p>	3.475	2.325	1.250	-	1.250

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army			<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
Continue to fund the integration of technology to support wireless transmission of STORM data to other systems. Continue the integration of a power/data rail interface to support the sharing of LRF data to other enablers on the weapon.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 decrease due to the completion of the qualification and testing of the STORM II systems in FY 2020 and the nearing completion of integration of the wireless technology.					
<b>Title:</b> Heads Up Display (HUD)					
<b>Description:</b> This efforts provides support for systems integration of multi-sensor day/night devices that enable near to long-range target acquisition and improved battlefield command and control in around-the clock combat operations.					
	4.800	-	-	-	-
<b>Title:</b> Enhanced Night Vision Goggle - Binocular (ENVG-B)					
<b>Description:</b> The ENVG-B system is a modular helmet-mounted, passive electro-optical fused sensor imaging device in a binocular configuration. The system integrates dual Image Intensification (I2) sensors with the thermal sensor imagery into a single viewing display. The thermal sensor provides the Soldier with the capability to rapidly detect and recognize human-sized targets in adverse weather, obscurants and in varying light conditions. The dual I2 sensors provide the Soldier with depth perception for ease of low-light level maneuvers and the ability to detect rifle-mounted aiming lights to engage targets. The ENVG-B can also be operated in a monocular configuration by moving one of the two individually rotating monoculars. The ENVG- B has a near infrared (NIR) emitting light source that provides illumination for close-up viewing. The ENVG-B mounts on current Soldier equipment, including the Advanced Combat Helmet (ACH), the Enhanced Combat Helmet (ECH) and Integrated Head Protection System (IHPS). The ENVG-B has a multi-point wireless interface to the FWS-I and Nett Warrior in order to support augmented reality requirements. The ENVG-B wirelessly operates with the FWS-I to provide Rapid Target Acquisition (RTA) capability. RTA is the capability to view the boresighted/zeroed weapon sight reticle in the ENVG- B display, enabling the Soldier to accurately engage targets without having to bring the weapon to eye level and without the use of active lasers, all while remaining in defilade.					
	26.893	4.469	4.570	-	4.570
<b>FY 2020 Plans:</b> Continue testing and qualification for ENVG-B.					
<b>FY 2021 Base Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army			<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Continue and complete Phase II testing and qualification of ENVG-B. <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2020 to FY 2021 decrease results from EMD completion.					
<b>Title:</b> Target Acquisition Laser Capabilities <b>Description:</b> Target Acquisition Laser Capabilities develops, improves and miniaturizes high-performance systems to support target acquisition and engagement during day/night operations. This effort will develop a family of modular products incorporating technology that includes laser range finders, laser aiming lights, and laser imaging products to be used by mounted and dismounted forces with capabilities including range finding, marking, designating, illumination, target hand-off, detecting optics, countering threat sensors, point cloud mapping, precision targeting, aimpoint adjustment, auto-targeting, and navigation enhancements. This effort also will integrate and interface with products on the Soldier's head, body, weapons, and handheld devices to enhance situational awareness and lethality.	1.115	-	-	-	-
<b>Title:</b> Laser Target Locator Module (LTLM) <b>Description:</b> LTLM provides the dismounted observer or Scout a fully digital, handheld system to accurately determine target location and the ability of call for fire during all weather and light conditions. <b>FY 2021 Base Plans:</b> Initiate integration and evaluation of technology to support sharing of LTLM data to other systems to support inclusion of LTLM with the Adaptive Squad Architecture. <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 increase due to the ramp up of integration efforts of improved technologies and wireless capability into the LTLM.	2.100	-	2.686	-	2.686
<b>Title:</b> FY 2020 SBIR/STTR Transfer <b>Description:</b> Funding transferred in accordance with Title 15 USC 638 <b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC 638 <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b>	-	1.592	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Funding transferred in accordance with Title 15 USC 638					
<b>Accomplishments/Planned Programs Subtotals</b>	56.793	35.060	14.653	-	14.653

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• VT7: <i>Soldier Maneuver Sensors - Adv Dev</i>	7.072	6.028	7.565	-	7.565	7.675	3.141	2.779	2.037	Continuing	Continuing
• K36400: <i>Helmet Mounted Enhanced Vision Devices</i>	112.251	50.632	207.626	-	207.626	245.012	6.436	318.684	-	Continuing	Continuing
• K22002: <i>FWS-INDIVIDUAL</i>	90.932	81.541	99.160	-	99.160	61.858	71.526	77.718	84.792	Continuing	Continuing
• K35110: <i>Small Tactical Optical Rifle Mounted MLRF</i>	16.990	22.623	13.954	-	13.954	21.355	26.060	29.315	3.131	Continuing	Continuing
• B53800: <i>Laser Target Locator Systems</i>	32.704	24.354	13.704	0.643	14.347	20.817	23.752	21.663	49.820	Continuing	Continuing
• K22003: <i>FWS-CREW SERVED</i>	22.698	-	31.861	-	31.861	78.066	78.193	77.228	64.934	Continuing	Continuing
• K22004: <i>FWS-SNIPER</i>	-	-	2.569	-	2.569	11.336	18.843	19.767	11.489	Continuing	Continuing
• K36401: <i>Night Vision AN/PVS-14 Mods</i>	8.496	10.216	0.000	-	0.000	0.420	0.420	0.429	0.433	Continuing	Continuing
• K36402: <i>IVAS/Heads Up Display</i>	-	-	906.045	-	906.045	1,045.688	319.670	-	148.426	Continuing	Continuing
• BQ5: <i>Visual Augmentation System Advanced Development</i>	-	193.280	13.986	-	13.986	11.843	11.819	67.534	30.314	Continuing	Continuing
• BQ6: <i>Visual Augmentation System Eng Dev</i>	-	63.200	8.991	-	8.991	4.995	8.108	8.125	70.754	Continuing	Continuing

**Remarks**

K22003 / FWS Crew Served Adjusted FY 2020 per the FY 2020 Appropriation Bill mark which zeroed FY 2020 Procurement.

**D. Acquisition Strategy**

The various developmental programs in this project continue to exercise competitively awarded contracts using best value source selection procedures.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PROGRAM MGMT	MIPR	Various : Various	19.097	2.515	Mar 2019	1.850	Mar 2020	0.392	Nov 2020	-		0.392	Continuing	Continuing	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		1.592		-		-		-	0.000	1.592	-
<b>Subtotal</b>			19.097	2.515		3.442		0.392		-		0.392	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Family of Weapon Sights-Crew Served (FWS-CS)	C/CPFF	DRS RSTA, Inc BAE Systems : Dallas, TX/Nashua, NH	44.785	2.998	Mar 2019	9.330	Jan 2020	0.500	Jan 2021	-		0.500	Continuing	Continuing	-
Family of Weapon Sights-Sniper (FWS-S)	C/FFP	Knights Armament Titusville; N2 Imaging Irvine : FL; CA	4.625	8.997	Sep 2019	11.869	Jun 2020	5.000	Jan 2021	-		5.000	Continuing	Continuing	-
Family of Vision and Mobility Capabilities (FVMC)	MIPR	NVESD : Ft Belvoir, VA	2.413	-		-		-		-		-	Continuing	Continuing	-
STORM II Test Systems (L3)	C/FFP	Optics 1 : Bedford, NH	2.093	0.450	Mar 2019	-		-		-		-	Continuing	Continuing	-
STORM II Test Systems (Optics 1)	C/FFP	L3 : Londonderry, NH	3.431	5.135	Nov 2019	-		-		-		-	Continuing	Continuing	-
STORM - Intra Soldier Wireless (ISW)	TBD	TBD : NVESD	-	2.100	Jan 2019	-		-		-		-	Continuing	Continuing	-
STORM II - Wireless Integration	C/FP	TBD : TBD	-	-		0.942	Jun 2020	1.000	Jan 2021	-		1.000	Continuing	Continuing	-
STORM Power Data Rail Integration	C/FFP	TBD : TBD	-	-		0.766	Jun 2020	-		-		-	0.000	0.766	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>
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<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
Enhanced Night Vision Goggle - Binocular (ENVG-B) (Vendor A)	C/CPFF	L3 Corporation : St Louis, MO	-	14.127	May 2019	2.323	Mar 2020	0.612	Mar 2021	-		0.612	Continuing	Continuing	-
Enhanced Night Vision Goggle - Binocular (ENVG-B) (Vendor B)	C/CPFF	Harris Corporation : Melbourne, FL	-	10.277	May 2019	2.323	Mar 2020	0.612	Mar 2021	-		0.612	Continuing	Continuing	-
Laser Target Location Module (Optics 1)	C/CPFF	Army Contracting Center : Aberdeen Proving Ground	-	1.986	Feb 2019	-		2.300	Dec 2020	-		2.300	Continuing	Continuing	-
Target Acquisition Laser Capabilities	MIPR	NVESD : Ft. Belvoir, VA	0.581	0.815	Nov 2018	-		-		-		-	Continuing	Continuing	-
Heads Up Display (HUD)	MIPR	Various : Various	26.270	4.800	Sep 2019	-		-		-		-	Continuing	Continuing	-
SPTD PTD (OVERT) DEVELOPMENT	TBD	Various : VArious	-	0.695	Nov 2019	-		-		-		-	Continuing	Continuing	-
<b>Subtotal</b>			84.198	52.380		27.553		10.024		-		10.024	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Matrix Support	MIPR	NVESD : Ft Belvoir, VA	26.905	0.903	Dec 2018	0.983	Jan 2020	0.300	Nov 2020	-		0.300	Continuing	Continuing	-
<b>Subtotal</b>			26.905	0.903		0.983		0.300		-		0.300	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 Test Support Activity	MIPR	Army Test and Evaluation Command : Various	58.782	0.995	Apr 2019	3.082	Mar 2020	3.937	Nov 2020	-		3.937	Continuing	Continuing	-
<b>Subtotal</b>			58.782	0.995		3.082		3.937		-		3.937	Continuing	Continuing	N/A





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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>			<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Advanced Sensor Development EMD																												
FWS-I Contract 2nd Source																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L67 / <i>Soldier Night Vision Devices</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
FWS-CS Engineering and Manufacturing Development	3	2016	1	2021
FWS-CS MS C	3	2020	3	2020
FWS-S Engineering and Manufacturing Development	3	2016	4	2021
FWS-S MS C	4	2021	4	2021
STORM II Qualification Testing	2	2019	3	2020
STORM II Wireless Technology Integration	2	2019	3	2022
STORM Integration of Power/Data Rail Interface	3	2020	1	2024
ENVG-B Engineering and Manufacturing Development	3	2019	3	2019
ENVG-B Developmental and Operational Testing	3	2019	2	2022
Target Acquisition Laser Capabilities	2	2019	4	2025
LTLM Technology Improvements Development	2	2019	2	2020
LTLM Wireless & Technology Improvements Integration	1	2021	1	2023
Advanced Sensor Development MS B	2	2023	2	2023
Advanced Sensor Development EMD	3	2023	3	2025
FWS-I Contract 2nd Source	2	2022	2	2024

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>				<b>Project (Number/Name)</b> L70 / <i>Night Vision Dev Ed</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L70: <i>Night Vision Dev Ed</i>	-	57.703	39.026	32.235	-	32.235	18.265	5.687	6.630	1.187	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This project performs Engineering and Manufacturing Development (EMD) on high performance night vision, Reconnaissance, Surveillance, and Target Acquisition (RSTA) systems and other related systems that allow forces to locate and track enemy units in day, night, and all battlefield conditions, and through natural and man-made structures and obscurants. It also develops and integrates suites of these sensors to provide well-defined surveillance and targeting capabilities, as well as architectures for these sensors to communicate automatically. These efforts focus on meeting the requisite night vision and RSTA capabilities required for evolving Current Force, Modular Force, and Future Force systems.

The project supports the 3rd Generation Forward Looking Infrared (3GEN FLIR) B-Kit EMD program, which incorporates the next generation of forward looking infrared technologies. The 3GEN FLIR EMD program will develop a common 3GEN FLIR B-Kit for integration into US Army FLIR sensor systems in accordance with the approved Improved Forward Looking Infrared (I-FLIR) Capability Development Document (CDD). The common 3GEN FLIR B-Kit prescribed by the I-FLIR CDD will allow the Army to achieve economies of scale and avoid duplicative engineering and development costs. As a result, 3GEN FLIR capabilities can be delivered at a lower cost to the Abrams and Next Generation Combat Vehicle / Optionally Manned Fighting Vehicle (NGCV/OMFV) platforms, while potentially leveraging 3GEN FLIR components for airborne applications. The 3GEN FLIR B-Kit provides Mid Wave Infrared and Long Wave Infrared digital video and the electronic interfaces required to integrate the 3GEN FLIR technology with the host platform sensor. When integrated in current sensor packages, 3GEN FLIR technology enhances the war-fighters' survivability and lethality through increased identification range performance, while enabling the detection of difficult or obscured targets and faster threat detection through automated processes. The 3GEN FLIR B-Kit EMD program is also a key element in maintaining the Army's FLIR industrial base.

The project supports the LRAS3 Modification Work Order (MWO) to integrate the 3GEN FLIR B-Kit. The LRAS3 MWO effort includes integration of 3GEN FLIR B-Kit technology, an Inertial Measurement Unit (IMU), and an M-code Global Positioning System (GPS) receiver. Collectively, these capabilities will improve the Far Target Location (FTL) accuracy of the LRAS3 and enhance the scout's survivability and lethality through increased detection, recognition and identification range performance.

This project also executes the Army Sensor Computing Environment (CE) effort which is part of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA-ALT) Common Operating Environment (COE) program. The Sensor CE effort focuses on increasing sensor interoperability across the enterprise and improving the Soldier-machine interface. This is done by defining, demonstrating and standardizing Sensor interfaces across the Army networks. Standardized interfaces delivered from this effort will be incorporated into current and future sensor systems and programs.

FY 2021 Base funding in the amount of \$32.235 million supports the 3GEN FLIR B-Kit EMD program activities. Additionally, FY 2021 Base Funding supports the continued activities associated with meeting sensor interoperability requirements and improving the Soldier machine interface in support of the Army's vision of the Common Operating Environment (COE).

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L70 / <i>Night Vision Dev Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<p><b>Title:</b> 3GEN FLIR B-Kit EMD</p> <p><b>Description:</b> 3GEN FLIR EMD requirements and contract awards.</p> <p><b>FY 2020 Plans:</b> FY 2020 Base funding supports 3GEN FLIR B-Kit integration, Hardware/Software Test Readiness Review, Software Functional Qualification Testing, Sight Qualification Testing, Design Verification Testing (DVT), Improved Optical Improvement Dewar Cooler Bench Physical Configuration Audit, Software Verification Review, and development of the Digital Readout Integrated Circuit (DROIC) and Strained Layer Superlattice (SLS).</p> <p><b>FY 2021 Base Plans:</b> FY 2021 Base funding supports 3GEN FLIR B-Kit delivery of hardware to the Abrams and Next Generation Combat Vehicle (NGCV) / Optionally Manned Fighting Vehicle (OMFV) platforms for integration and developmental testing, enables integration of automation and artificial intelligence/machine learning, award of the Manufacturing Risk Reduction option to fabricate hardware in support of platform Operational Test, and initiation of Industrial Base manufacturing readiness activities in preparation for Low Rate Initial Production (LRIP).</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Decrease is due to completion of qualification test activities and long-lead material procurements in FY 2020 resulting in reduced funding requirements in FY 2021.</p>	57.116	37.054	32.135	-	32.135
<p><b>Title:</b> Common Operating Environment (COE)</p> <p><b>Description:</b> This effort supports the Common Operating Environment vision by improving the sensor interoperability requirement and the Soldier-machine interface. Resultant improvements to be made on a program by program basis.</p> <p><b>FY 2020 Plans:</b> FY 2020 Base funding supports continued development of the COE program to include meeting the sensor interoperability requirement and improving the soldier machine interface. Specific FY 2020 activities include continued demonstrations and experimentation for transition into Army programs.</p> <p><b>FY 2021 Base Plans:</b></p>	-	0.100	0.100	-	0.100

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L70 / <i>Night Vision Dev Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
FY 2021 Base funding supports continued development of the COE program to include meeting the sensor interoperability requirement and improving the soldier machine interface. Specific FY 2021 activities include continued demonstrations and experimentation for transition into Army programs.					
<b>Title:</b> 3GEN LRAS3 ECP to integrate 3GEN FLIR B-Kit <b>Description:</b> This effort supports the sensor enhancement activities required to integrate 3GEN FLIR B-Kit technology into the LRAS3. <b>FY 2020 Plans:</b> FY 2020 Base funding supports the 3GEN LRAS3 documentation updates associated with integration of the 3GEN FLIR B-Kit. <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> LRAS3 program no longer funded to integrate the 3GEN FLIR B-Kit.	0.536	0.100	-	-	-
<b>Title:</b> FY 2019 NDAA SEC 825 MDAP Cost Overrun <b>Description:</b> FY 2019 Rapid Prototyping Funds for MDAPs.	0.051	-	-	-	-
<b>Title:</b> FY 2020 SBIR/STTR Transfer <b>Description:</b> Funding transferred in accordance with Title 15 USC 638 <b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC 638 <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC 638	-	1.772	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	57.703	39.026	32.235	-	32.235

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• 330: <i>Abrams Tank Improve Prog</i>	159.688	119.645	83.546	-	83.546	67.899	62.982	99.503	89.527	Continuing	Continuing
• CF6: <i>Next Generation Combat Vehicle (OMFV)</i>	-	205.620	327.732	-	327.732	426.892	65.638	52.251	52.778	0.000	1,130.911

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L70 / <i>Night Vision Dev Ed</i>

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>			<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• K38300: <i>Long Range Advanced Scout Surveillance System</i>	2.861	-	0.000	-	0.000	2.073	69.513	100.468	140.776	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

3GEN FLIR: Materiel Development Decision (MDD) was received from the Army Acquisition Executive (AAE) and the Acquisition Decision Memorandum (ADM) was signed on 22-Dec-2014. Per the ADM, 3GEN FLIR entered the acquisition lifecycle at Milestone B (MS B) in 2Q FY 2016. After a successful MS B decision, competitive EMD contracts were awarded to design, develop, integrate and test the 3GEN FLIR B-Kit prior to production and mitigate the industrial base risk. The host platforms are responsible for integration of the 3GEN FLIR B-Kit.

3GEN Long Range Advanced Scout Surveillance System (LRAS3): After a Milestone Decision Authority (MDA) review, 3GEN LRAS3 performed technical trade studies to determine modifications required to the current LRAS3 to integrate 3GEN FLIR B-Kit technology, an Inertial Measurement Unit (IMU), and an M-coded Global Positioning System (GPS) receiver. Market research and documentation update activities are planned for FY 2019 and FY 2020.

Sensor CE: Additional Fiscal Year 2021 activities include continued development of the sensor interoperability requirement and improving the Soldier-machine interface in support of the Army's vision of the Common Operating Environment (COE).

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L70 / <i>Night Vision Dev Ed</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Project Management	MIPR	PM TS : Ft. Belvoir, VA	15.502	1.365	Jan 2019	0.436	Jan 2020	0.696	Jan 2021	-		0.696	Continuing	Continuing	9.454
FY 2019 NDAA SEC 825 MDAP Cost Overruns	Various	HQDA : HQDA	-	0.051	Sep 2019	-		-		-		-	0.000	0.051	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		1.772		-		-		-	0.000	1.772	-
<b>Subtotal</b>			15.502	1.416		2.208		0.696		-		0.696	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FY 2012-FY 2013: Develop, Fab, and Qual of a common Ground Platform Engine with Block II EOCCM	C/Various	Various : Various	0.049	-		-		-		-		-	0.000	0.049	-
3GEN FLIR B-Kit Engineering/Document Prep	C/Various	Various : Various	21.685	-		-		-		-		-	0.000	21.685	-
3GEN FLIR B-Kit EMD	C/CPIF	Various : Various	98.559	52.456	Nov 2018	33.763	Nov 2019	29.437	Nov 2020	-		29.437	Continuing	Continuing	-
3GEN LRAS3: Tech Trade Studies	C/TBD	Various : Various	1.611	-		-		-		-		-	0.000	1.611	-
3GEN LRAS3: ECP Integration	C/TBD	Various : Various	0.313	-		-		-		-		-	0.000	0.313	-
PSS P3I: CE COE	C/FP	Various : Various	19.162	-		-		-		-		-	0.000	19.162	-
<b>Subtotal</b>			141.379	52.456		33.763		29.437		-		29.437	Continuing	Continuing	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>			<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L70 / <i>Night Vision Dev Ed</i>	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
3GEN FLIR B-Kit Development, Test, and Integration	[Redacted]																											
3GEN FLIR Incremental Product Improvements																												
3GEN FLIR B-Kit MS C														▲ 1														
3GEN LRAS3 ECP to Integrate 3GEN FLIR B-Kit: Spec Developm	[Redacted]																											
Common Operating Environment, Development	[Redacted]																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L70 / <i>Night Vision Dev Ed</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
3GEN FLIR Materiel Development Decision (MDD)	1	2015	1	2015
3GEN FLIR Development Request For Proposal Release Review (DRFPRR)	3	2015	3	2015
3GEN FLIR B-Kit MS B	2	2016	2	2016
3GEN FLIR B-Kit Development, Test, and Integration	2	2016	3	2022
3GEN FLIR Incremental Product Improvements	1	2022	4	2027
3GEN FLIR B-Kit MS C	3	2022	3	2022
3GEN LRAS3 ECP to Integrate 3GEN FLIR B-Kit: Spec Development & Documentation	1	2018	4	2020
Common Operating Environment, Development	2	2012	4	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604710A / Night Vision Systems - Eng Dev				<b>Project (Number/Name)</b> L76 / Dismounted Fire Support Laser Targeting Systems			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L76: Dismounted Fire Support Laser Targeting Systems	-	14.761	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	14.761
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This project matures and integrates technologies and capabilities which benefit the Joint Effects Targeting System (JETS), Lightweight Laser Designator Rangefinder (LLDR) and other Dismounted Precision Targeting capabilities systems. These precision targeting and next generation systems are used by dismounted Soldiers to locate, identify, and target enemy assets. This project focuses on reducing size, weight, power and cost, improving imaging performance, and increasing targeting accuracy. Targeting accuracy improvements will focus on developing and integrating affordable, non-magnetic, high accuracy, full-time (24/7), and all weather Precision Azimuth and Vertical Angle Measurement (PAVAM) devices, with reduced size, weight, and power characteristics into the JETS, LLDR and other Dismounted Precision Targeting capabilities systems. Long term goals include improving current celestial navigation systems to increase operational availability, developing precision targeting capabilities that will operate in a Global Positioning System (GPS) contested environment to improve situational awareness, and to integrate Military Global Positioning System (GPS) User Equipment (M-Code) (next-generation GPS) receivers into JETS, LLDR and other Dismounted Precision Targeting capabilities systems, when available. Funding in this project aligns with the Army's priorities in support of the National Defense Strategy. Due to a shift in Army priorities the LLDR 3 program was terminated.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Design, Integration, & Qualification of LLDR 3 Systems	14.761	-	-	-	-
<b>Description:</b> One contract was competitively awarded to procure LLDR 3 systems with improved imaging performance and 24/7 precision targeting capability.					
<b>Accomplishments/Planned Programs Subtotals</b>	14.761	-	-	-	-

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

<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• KA3100: Mod Of In-Svc Equip (LLDR)	24.833	6.044	0.000	-	0.000	-	-	-	-	0.000	30.877
• K32101: JOINT EFFECTS TARGETING SYSTEM (JETS)	66.574	25.330	69.641	-	69.641	67.932	69.629	69.624	69.623	0.000	438.353
• L79: Joint Effects Targeting Systems (JETS)	10.080	6.410	5.566	-	5.566	5.603	5.035	5.604	6.004	Continuing	Continuing

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L76 / <i>Dismounted Fire Support Laser Targeting Systems</i>

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

**D. Acquisition Strategy**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L76 / <i>Dismounted Fire Support Laser Targeting Systems</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Support	MIPR	PM-SMPT : Ft. Belvoir VA 22060	0.320	0.476	Feb 2019	-		-		-		-	0.000	0.796	-
<b>Subtotal</b>			0.320	0.476		-		-		-		-	0.000	0.796	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
LLDR III Termination	C/FFP	DRS : Melbourne, FL	14.000	14.135	Feb 2019	-		-		-		-	0.000	28.135	-
<b>Subtotal</b>			14.000	14.135		-		-		-		-	0.000	28.135	N/A

**Remarks**  
A competitively awarded contract to integrate and qualify LLDR 3 systems was made in September 2018 to DRS.

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	0.330	0.150	Nov 2018	-		-		-		-	0.000	0.480	-
Science and Engineering Support	MIPR	Johns Hopkins University : Laurel, MD	3.833	-		-		-		-		-	0.000	3.833	-
<b>Subtotal</b>			4.163	0.150		-		-		-		-	0.000	4.313	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			18.483	14.761	0.000	-	-	-	0.000	33.244	N/A

**Remarks**  
Due to a shift in Army priorities the program is being terminated. The FY19 funds were not awarded but are being held to cover potential closeout costs.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>			<b>Date: February 2020</b>		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>		<b>Project (Number/Name)</b> L76 / <i>Dismounted Fire Support Laser Targeting Systems</i>	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
LLDR 3 Systems (Integration & Production Contract)	██████████				██████████																							
LLDR 3 Terminated			▲		██████████																							
LLDR 3 Termination Settlement				██████████	██████████																							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L76 / <i>Dismounted Fire Support Laser Targeting Systems</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Integration & Production Award - LLDR 3	4	2018	4	2018
LLDR 3 Systems (Integration & Production Contract)	4	2018	3	2019
LLDR 3 Terminated	3	2019	3	2019
LLDR 3 Termination Settlement	3	2019	2	2020

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604710A / Night Vision Systems - Eng Dev				<b>Project (Number/Name)</b> L79 / Joint Effects Targeting Systems (JETS)			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L79: Joint Effects Targeting Systems (JETS)	-	10.080	6.410	5.566	-	5.566	5.603	5.035	5.604	6.004	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Joint Effects Targeting System (JETS) is an Army program with joint information (Air Force and Marine Corps). JETS addresses the one-man, hand-held precision targeting gap identified by the Fires Center of Excellence (FCoE). JETS is a light-weight, handheld system that will provide the single dismounted observer with a common, enhanced day and night thermal capability to rapidly acquire, accurately locate, positively identify, and precisely designate targets. JETS Target Location and Designation System (TLDS) will be able to interface with existing and future Forward Entry Systems (FESs) and operate in environments where global positioning system (GPS) capabilities are degraded or denied including the integration of military GPS user equipment (M-Code) GPS receivers, when they become available. This project will address continued development and integration of improved precision targeting components to reduce size, weight, power, and cost of systems for dismounted precision Fires mission. Funding in this project aligns with the Army's priorities in support of the National Defense Strategy.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Joint Effects Targeting System (JETS) Low-Rate Initial Production Qualification Testing	0.321	0.403	-	-	-
<b>Description:</b> This projects supports the Initial Operational Test & Evaluations ( IOT&E) for the JETS production representative test systems.					
<b>FY 2020 Plans:</b> Conduct additional reliability testing with Soldiers.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> No planned testing in FY21.					
<b>Title:</b> Precision Azimuth and Vertical Angle Measurement (PAVAM) Development	3.075	0.165	0.741	-	0.741
<b>Description:</b> Focuses on developments to improve Size, Weight, Power and Cost (SWAP-C) for inertial navigation PAVAM solutions which provide a 24/7 precision targeting capability. Develop improvements to celestial navigation PAVAM solutions to improve availability of precision measurements over a wider range of environments.					
<b>FY 2020 Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L79 / <i>Joint Effects Targeting Systems (JETS)</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<p>Continue improvements to current PAVAM technology. Continue development of reduced SWAP-C for the PAVAM.</p> <p><b>FY 2021 Base Plans:</b> Continue development of reduced SWAP-C of PAVAM architecture.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 funding reflects a slight increase in PAVAM projects from FY 2020.</p>					
<p><b>Title:</b> Joint Effects Targeting System (JETS) Threat Mitigation Development and Integration</p> <p><b>Description:</b> Focuses on developing and integrating technologies to counter battlefield threats to the system and the Soldier. This includes technologies and techniques to allow JETS to operate in GPS contested environments, incorporating counter sensor detection, and continuing to improve targeting sensors and lasers to operate in adverse conditions.</p> <p><b>FY 2020 Plans:</b> Continue development of technologies to reduce SWAP and to mitigate the impact when operating in GPS contested environments. Continue counter sensor development. Continue development of improved thermal imager and initiate integration into JETS.</p> <p><b>FY 2021 Base Plans:</b> Initiate integration of technologies and techniques into JETS to allow it to operate in GPS contested environments.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 decrease reflects a shift towards precision targeting and target acquisition development.</p>	3.315	0.820	0.562	-	0.562
<p><b>Title:</b> Precision Targeting and Target Acquisition Development</p> <p><b>Description:</b> This project develops prototype precision targeting systems incorporating improved target acquisition sensors and optics, improved targeting sensors, and updated targeting algorithms while reducing size, weight, and power requirements. Incorporate the Intra Solider Wireless (ISW) capability into JETS and the Adaptive Squad Architecture (ASA).</p> <p><b>FY 2020 Plans:</b></p>	3.369	4.730	4.263	-	4.263

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L79 / <i>Joint Effects Targeting Systems (JETS)</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Conduct trade studies and design development for improved precision targeting prototypes, and initiate component integration.  <b>FY 2021 Base Plans:</b> Continue development and component integration of improved precision targeting prototypes.  <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 decrease due to completion of trade studies.					
<b>Title:</b> FY 2020 SBIR/STTR Transfer  <b>Description:</b> Funding transferred in accordance with Title 15 USC 638  <b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC 638  <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC 638	-	0.292	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	10.080	6.410	5.566	-	5.566

<b>C. Other Program Funding Summary (\$ in Millions)</b>			FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
<ul style="list-style-type: none"> <li>• K32101: JOINT EFFECTS TARGETING SYSTEM (JETS)      66.574    25.330    69.641    -    69.641    67.932    69.629    69.624    69.623    0.000    438.353</li> <li>• L76: Dismounted Fire Support Laser Targeting Systems      14.761    -    0.000    -    0.000    -    -    -    -    0.000    14.761</li> <li>• VT8: SOLDIER PRECISION TARGETING DEVICES - ADV DEV      -    1.483    2.765    -    2.765    2.764    1.998    1.998    1.998    Continuing    Continuing</li> </ul>											

**Remarks**

**D. Acquisition Strategy**  
 This project continues to exercise competitively awarded contracts using best value source selection procedures.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)						Project (Number/Name)						
2040 / 5				PE 0604710A / Night Vision Systems - Eng Dev						L79 / Joint Effects Targeting Systems (JETS)						
<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Management Support	MIPR	PM-SMPT : Ft Belvoir, VA 22060	3.880	0.455	Feb 2019	0.562	Dec 2019	0.337	Dec 2020	-		0.337	Continuing	Continuing	Continuing	
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.292		-		-		-	0.000	0.292	-	
<b>Subtotal</b>			3.880	0.455		0.854		0.337		-		0.337	Continuing	Continuing	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
PAVAM 2 Development	C/FFP	Various : Various	10.258	2.523	May 2019	0.151	May 2020	0.621	Jan 2021	-		0.621	Continuing	Continuing	Continuing	
Threat Mitigation Development	C/FFP	Various : Various	1.415	2.672	Feb 2019	0.701	Jan 2020	0.471	Feb 2021	-		0.471	Continuing	Continuing	Continuing	
Precision Targeting & Target Acquisition Development	C/FFP	Elbit : Merrimack, NH	0.100	2.268	Jan 2019	3.989	Mar 2020	3.318	Jan 2021	-		3.318	Continuing	Continuing	Continuing	
<b>Subtotal</b>			11.773	7.463		4.841		4.410		-		4.410	Continuing	Continuing	N/A	
<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Matrix Support	MIPR	Night Vision Electronics Sensors Directorate : Ft. Belvoir, VA	12.698	0.199	Nov 2018	0.364	Dec 2019	0.219	Dec 2020	-		0.219	Continuing	Continuing	-	
Science and Engineering Support	SS/CPFF	Johns Hopkins University : Laurel, MD	5.627	1.700	Feb 2019	-		0.250	Jan 2021	-		0.250	Continuing	Continuing	-	
<b>Subtotal</b>			18.325	1.899		0.364		0.469		-		0.469	Continuing	Continuing	N/A	



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L79 / <i>Joint Effects Targeting Systems (JETS)</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Low Rate Initial Production (LRIP)	[Redacted]				[Redacted]																							
Conditional Materiel Release (CMR)	[Redacted]				1 CMR																							
Full Rate Production (FRP)	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
Initial Operational Capability (IOC)	[Redacted]				2 IOC																							
Full Materiel Release (FMR)	[Redacted]				[Redacted]				[Redacted]				4 FMR															
Reduce SWAP-C PAVAM development and integration	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
SWAP-C PAVAM cut-in	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				6 PAVAM CUT-IN							
Threat Mitigation development and integration	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
Threat Mitigation technology cut-in	[Redacted]				[Redacted]				[Redacted]				3 Threat Mitigation															
Precision Targeting and Target Acquisition Development	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
JETS ECP cut-in Decision	[Redacted]				[Redacted]				[Redacted]				[Redacted]				5 ECP Decision											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604710A / <i>Night Vision Systems - Eng Dev</i>	<b>Project (Number/Name)</b> L79 / <i>Joint Effects Targeting Systems (JETS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Low Rate Initial Production (LRIP)	1	2017	4	2020
Conditional Materiel Release (CMR)	3	2020	3	2020
Full Rate Production (FRP)	4	2020	4	2025
Initial Operational Capability (IOC)	4	2020	4	2020
Full Materiel Release (FMR)	4	2022	4	2022
Reduce SWAP-C PAVAM development and integration	3	2016	3	2024
SWAP-C PAVAM cut-in	4	2024	4	2024
Threat Mitigation development and integration	2	2017	2	2022
Threat Mitigation technology cut-in	2	2022	2	2022
Precision Targeting and Target Acquisition Development	2	2019	4	2025
JETS ECP cut-in Decision	4	2022	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / Combat Feeding, Clothing, and Equipment
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	4.393	7.393	2.814	-	2.814	1.815	1.530	1.610	1.610	0.000	21.165
548: Mil Subsistence Sys	-	1.092	7.393	2.814	-	2.814	1.815	1.530	1.610	1.610	0.000	17.864
EL2: Army Field Feeding Equipment	-	3.301	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.301

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

Projects under this Program Element support the development, demonstration and Non-Developmental Item (NDI) Commercial Off The Shelf (COTS) evaluation of combat feeding equipment to enhance soldier efficiency, improve soldier survivability, and reduce food service logistics requirements for all four services. These Projects support multi-fuel, rapidly deployable field food service equipment initiatives. Efforts also support the Engineering and Manufacturing Development (EMD) phase of programs to improve equipment, enhance safety in food service, and decrease fuel and water requirements. The Projects develop critical enablers that support the Joint Future Capabilities and Joint Expeditionary mindset, by maintaining readiness through integrating new equipment, enhancing the field soldier's well-being, and providing soldiers usable equipment. The Projects also reduce sustainment requirements, related Combat Support/Combat Service Support (CS/CSS) demands on lift, the combat zone footprint, and costs for logistical support.

This PE/Project supports Field Feeding programs for all the services.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	4.502	2.393	2.817	-	2.817
Current President's Budget	4.393	7.393	2.814	-	2.814
Total Adjustments	-0.109	5.000	-0.003	-	-0.003
• Congressional General Reductions	-	-	-	-	-
• Congressional Directed Reductions	-	-	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	5.000	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-0.109	-	-	-	-
• SBIR/STTR Transfer	-	-	-	-	-
• Adjustments to Budget Years	-	-	-0.003	-	-0.003

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

**Project:** 548: Mil Subsistence Sys

FY 2019	FY 2020

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>
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**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

Congressional Add: *Containerized Ice Making System (Congressional Add)*

Congressional Add Subtotals for Project: 548

Congressional Add Totals for all Projects

	FY 2019	FY 2020
	-	4.964
	-	4.964
	-	4.964

**Change Summary Explanation**

FY2020 Increase supports Project 548 Congressional Interest Item.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
548: <i>Mil Subsistence Sys</i>	-	1.092	7.393	2.814	-	2.814	1.815	1.530	1.610	1.610	0.000	17.864
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This Project enables system development and demonstration of Joint Service combat rations and field feeding equipment/systems designed to improve warfighter performance and reduce the logistics burden of subsistence support. Efforts funded in this Project support all four Services, the Special Operations Command, and the Defense Logistics Agency (DLA). The Army serves as the Executive Agent for this Department of Defense (DoD) program, with oversight and coordination provided by the DoD Combat Feeding Research and Engineering Board (CFREB) as required by DoD Directive (DoDD) 3235.02E. Centralized execution of the DoD Combat Feeding Research and Engineering Program (CFREP) with Joint Service review and approval eliminates unnecessary duplication of efforts across the Services and maximizes use of common materiel solutions.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<b>Title:</b> Joint Service Combat Ration System Development	0.630	1.357	1.704	-	1.704
<p><b>Description:</b> This effort integrates and demonstrates mature Joint Service combat ration systems that enable warfighter maneuver, readiness and effectiveness during highly mobile, dispersed operations. Prototypes are transitioned from PE 0603747A Project 610 to develop individual and group combat rations with improved capabilities including improved warfighter physical and cognitive performance through optimized nutrition and reduced logistics burden through weight and cube reduction. This effort completes operational test and evaluation (OT&amp;E) to confirm system level performance, and develops ration specifications for transition to Defense Logistics Agency - Troop Support (DLA - Troop Support) for procurement.</p> <p><b>FY 2020 Plans:</b> For existing ration platforms (Meal, Ready-to-Eat; First Strike Ration; Meal, Cold Weather, Modular Operational Ration Enhancement; Unitized Group Rations ? A/M/H&amp;S), will integrate prototype components/technologies into menu systems and ration assembly processes to improve quality, optimize nutritional content, decrease weight/cube/cost and/or improve modularity and field utility; will conduct OT&amp;E on ration systems to validate system level performance; present recommendations to the Joint Services Operational Ration Forum (JSORF) for Milestone C approval; will finalize procurement documents and initiate transition to DLA-Troop Support; will obtain Surgeon General approval of revised menus; will execute production testing with industry to ensure consistent ration quality, validate Performance-based Contract Requirements (PCRs), and resolve vendor/supplier issues; will conduct confirmatory sensory, chemical, physical and shelf life testing. For developmental</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army				<b>Date:</b> February 2020	
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>		<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>	
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
<p>Close Combat Assault Ration (CCAR), will conduct OT&amp;E of capabilities/systems successfully demonstrated in 6.4 that provide Warfighters with lower weight, lower volume, more calorically dense, higher quality, commercially producible ration components; will validate system level performance of prototype CCARs in the context of providing Warfighters with viable nutrition options for a 7-day period without resupply; will present recommendations to the JSORF for Milestone C approval as new components providing advanced nutrition and logistical capabilities within existing ration platforms, as CCAR system concepts mature.</p> <p><b>FY 2021 Base Plans:</b> For existing ration platforms (Meal, Ready-to-Eat; First Strike Ration; Meal, Cold Weather, Modular Operational Ration Enhancement; Unitized Group Rations - A/M/H&amp;S), will integrate prototype components/technologies into menu systems and ration assembly processes to improve quality, optimize nutritional content, decrease weight/cube/cost and/or improve modularity and field utility; will conduct OT&amp;E on ration systems to validate system level performance; will present recommendations to the JSORF for Milestone C approval; will finalize procurement documents and initiate transition to DLA-Troop Support; will obtain US Army, Surgeon General approval of revised menus; will execute production testing with industry to ensure consistent ration quality, will validate PCRs, and resolve vendor/supplier technical production issues; and conduct confirmatory sensory, chemical, physical and shelf life testing. For developmental Close Combat Assault Ration (CCAR), will complete OT&amp;E of capabilities/systems successfully demonstrated in 6.4 that provide Warfighters with lower weight, lower volume, more calorically dense, higher quality, commercially producible ration components; will complete validation of system level performance of prototype CCARs in the context of providing Warfighters with viable nutrition options for a 7-day period without resupply; will present CCAR to the JSORF for Milestone C approval and will obtain US Army, Surgeon General approval of initial CCAR menus.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Change in funding to support acceleration of Close Combat Assault Ration (CCAR).</p>					
<b>Title:</b> Joint Service Field Feeding Systems Development					
<p><b>Description:</b> This effort integrates and demonstrates field feeding equipment systems in support of the Navy (USN), Air Force (USAF), and Marine Corps (USMC) that reduce the logistics burden, improve efficiency, and decrease operation and support costs as directed by the DoD CFREB and Joint Service partners. Validated systems, specifications, and technical data packages are transitioned to the appropriate Service partner for procurement and fielding. Service partners include Product Manager Combat Support Equipment (PdM-CSE), Naval Sea Systems Command (NAVSEA), Naval Supply Systems Command (NAVSUP), Navy Expeditionary Combat Command (NECC) and USAF Basic Expeditionary Airfield Resources (BEAR) Program Office.</p>					
	0.460	0.964	1.110	-	1.110

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army			<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<p><b><i>FY 2020 Plans:</i></b> Will conduct OT&amp;E of Inflatable Refrigerated Space (IRefS) and Tray Ration Heater - Improved for USMC; will obtain aerial delivery certification for IRefS; will complete OT&amp;E on Mobile Feeding Galley and transition technical data to USN; will continue OT&amp;E of integrated mounting system for galley equipment to reduce operation and support costs in support of the USN; will develop reports, Engineering Change Proposals (ECPs) and logistical data to reduce overall fuel and water consumption in support of the USMC; will transition other validated prototype equipment and technical data to USN, USMC and USAF.</p> <p><b><i>FY 2021 Base Plans:</i></b> Will conduct OT&amp;E of Inflatable Refrigerated Space (IRefS) and complete aerial delivery certification; will complete OT&amp;E of equipment production models with embedded sense and respond technology to track reliability, maintenance, and current health of equipment assets; will develop reports, Engineering Change Proposals (ECPs) and logistical data to reduce overall fuel and water consumption in support of the USMC; and will transition validated prototype equipment and technical data to USN, USMC and USAF.</p> <p><b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> Funding increased to support OT&amp;E for Joint Services.</p>					
<p><b><i>Title:</i></b> FY 2018 NDAA SEC 825 MDAP Cost Overrun <b><i>Description:</i></b> FY 2018 NDAA SEC 825 MDAP Cost Overrun</p>					
	0.002	-	-	-	-
<p><b><i>Title:</i></b> FY 2020 SBIR/STTR Transfer <b><i>Description:</i></b> Funding transferred in accordance with Title 15 USC ?638</p>					
<p><b><i>FY 2020 Plans:</i></b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> Funding transferred in accordance with Title 15 USC ?638</p>					
	-	0.108	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>					
	1.092	2.429	2.814	-	2.814
	<b>FY 2019</b>	<b>FY 2020</b>			
<b><i>Congressional Add:</i></b> Containerized Ice Making System (Congressional Add)					
	-	4.964			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>

	<b>FY 2019</b>	<b>FY 2020</b>
<b>FY 2020 Plans:</b> Containerized Ice Making System (Congressional Add)		
<b>Congressional Adds Subtotals</b>	-	4.964

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 610: <i>Food Adv Development</i>	4.425	3.721	3.055	-	3.055	3.172	3.968	4.129	4.129	0.000	26.599

**Remarks**

**D. Acquisition Strategy**

Complete Engineering and Manufacturing Development (EMD) and Demonstration of food items and equipment for transition into competitive procurement contract. Complete advanced research efforts to support Engineering Change Proposals for previously developed equipment.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)						
2040 / 5				PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>					548 / <i>Mil Subsistence Sys</i>						
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Combat Feeding Program Management	C/FP	CCDC Soldier Center : Natick, MA	3.141	0.235	Oct 2018	0.487	Oct 2019	0.607	Oct 2020	-		0.607	Continuing	Continuing	Continuing
FY 2018 NDAA SEC 825 MDAP Cost Overrun	TBD	N/A : N/A	-	0.002		-		-		-		-	0.000	0.002	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.108		-		-		-	0.000	0.108	-
<b>Subtotal</b>			3.141	0.237		0.595		0.607		-		0.607	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Joint Service Rations and Combat Feeding Equipment	Various	Various : Various	5.958	0.696	Oct 2018	0.177	Oct 2019	0.240	Oct 2020	-		0.240	Continuing	Continuing	Continuing
<b>Subtotal</b>			5.958	0.696		0.177		0.240		-		0.240	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Joint Service Rations and Combat Feeding Equipment	Allot	CCDC Soldier Center : Natick, MA	0.291	0.159	Oct 2018	1.648	Oct 2019	1.967	Oct 2020	-		1.967	Continuing	Continuing	Continuing
Containerized Ice Making System (Congressional Add)	TBD	TBD : TBD	-	-		4.973	Mar 2020	-		-		-	0.000	4.973	-
<b>Subtotal</b>			0.291	0.159		6.621		1.967		-		1.967	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2021 Army</b>								<b>Date:</b> February 2020			
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>				<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>			
	<b>Prior Years</b>	<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	9.390	1.092		7.393		2.814	-	2.814	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Conduct operational testing of combat ration systems	[Blue bar]																											
Conduct OT&E of Close Combat Assault Ration (CCAR)	[Blue bar]																											
Obtain Joint Service and Army Surgeon General approval of first generation CCAR	[Blue bar]																											
Develop CCAR Technical Data Package and contract for Low Rate Initial Production	[Blue bar]																											
Develop and transition CCAR documents to DLA-TS for procurement	[Blue bar]																											
Conduct OT&E of Expeditionary Group Ration (EGR)	[Blue bar]																											
Develop and transition individual and group ration documents a	[Blue bar]																											
Refine heat recovery prototype for integration and conduct OT&E	[Blue bar]																											
Develop and transition TDP for the EMS, JSERCS, and heat recovery system to	[Blue bar]																											
Conduct OT&E of BEAR Type II kitchen system and transition to	[Blue bar]																											
Conduct OT&E of Energy Conversation technologies for BEAR kitchens to USAF	[Blue bar]																											
Conduct land-based user evaluation of MIKS and transition data to USN	[Blue bar]																											
Conduct OT&E and transition Mobile Feeding Galley to USN	[Blue bar]																											

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>			<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Conduct OT&E & transition labor & energy saving galley/scullery upgrades to USN																												
Conduct OT&E of expeditionary kitchen systems for shore-based Navy units																												
Conduct OT&E of Improved Tray Ration Heater and transition to USMC																												
Obtain Aerial Delivery Certification of Inflatable Refrigerated Space (IReFS)																												
Conduct OT&E of EFK upgrades and transition to USMC																												
Conduct OT&E of intuitive kitchen equipment and transition to Services																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> 548 / <i>Mil Subsistence Sys</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Conduct operational testing of combat ration systems	1	2018	4	2025
Conduct OT&E of Close Combat Assault Ration (CCAR)	1	2020	4	2021
Obtain Joint Service and Army Surgeon General approval of first generation CCAR	1	2021	4	2021
Develop CCAR Technical Data Package and contract for Low Rate Initial Production	2	2021	4	2021
Develop and transition CCAR documents to DLA-TS for procurement	1	2022	2	2022
Conduct OT&E of Expeditionary Group Ration (EGR)	1	2023	4	2023
Develop and transition individual and group ration documents annually to DLA-TS	1	2018	4	2025
Refine heat recovery prototype for integration and conduct OT&E.	1	2018	3	2019
Develop and transition TDP for the EMS, JSERCS, and heat recovery system to USAF	3	2019	4	2019
Conduct OT&E of BEAR Type II kitchen system and transition to USAF	3	2018	4	2019
Conduct OT&E of Energy Conversation technologies for BEAR kitchens to USAF	1	2023	4	2024
Conduct land-based user evaluation of MIKS and transition data to USN	2	2019	4	2019
Conduct OT&E and transition Mobile Feeding Galley to USN	1	2020	3	2020
Conduct OT&E & transition labor & energy saving galley/scullery upgrades to USN	1	2020	4	2021
Conduct OT&E of expeditionary kitchen systems for shore-based Navy units	1	2022	4	2022
Conduct OT&E of Improved Tray Ration Heater and transition to USMC	1	2020	4	2021
Obtain Aerial Delivery Certification of Inflatable Refrigerated Space (IRefS)	1	2020	4	2021
Conduct OT&E of EFK upgrades and transition to USMC	1	2024	4	2024
Conduct OT&E of intuitive kitchen equipment and transition to Services	1	2021	4	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>			<b>Project (Number/Name)</b> EL2 / <i>Army Field Feeding Equipment</i>				
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EL2: <i>Army Field Feeding Equipment</i>	-	3.301	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.301
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This Project supports the development, demonstration and Non-Developmental Item (NDI) Commercial Off The Shelf (COTS) evaluation of combat feeding equipment to enhance Soldier efficiency, improve Soldier survivability, and reduce food service logistics requirements for the Army. The Project supports multi-fuel, rapidly deployable field food service equipment initiatives. Efforts also support the Engineering and Manufacturing Development (EMD) phase of programs to improve equipment, enhance safety in food service, and decrease fuel and water requirements. The Projects develop critical enablers that support the Army's Strategic Planning Guidance by developing and integrating critical expeditionary capabilities that maintain readiness, providing effective solutions that reduce the resource and operational energy footprint, providing modernized equipment, and enhancing the field Soldier's well being. This project reduces sustainment requirements, related Combat Support/ Combat Service Support (CS/CSS) demands on lift, the combat zone footprint, and costs for logistical support.

This PE/Project supports Field Feeding programs for the Army.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Battlefield Kitchen (BK)	1.483	-	-	-	-
<b>Description:</b> Develop replacement of the obsolete Mobile Kitchen Trailer (MKT) system. The BK is designed to replace the MKT with a kitchen that provides fuel efficient, thermally controlled, closed combustion appliances within an environmentally controlled workspace. The BK shall provide rations for up to 300 Soldiers within 4 hours of setup. The BK provides refrigeration, running water and a heated serving line using the same off-road prime mover as the MKT as well as transportability by rail, sea, fixed and rotary wing aircraft.					
<b>Title:</b> Expeditionary Solid Waste Disposal System (ESWDS)	0.789	-	-	-	-
<b>Description:</b> Provides an integrated waste disposal capability providing substantial improvement over open air burn pits that pose health risks to Soldiers and/or the logistics burden of backhauling trash. Will safely process 1,000 pounds per day of mixed solid waste. Two systems can be used together to double capacity.					
<b>Title:</b> Containerized Kitchen, Modular	1.029	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> EL2 / <i>Army Field Feeding Equipment</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Description:</b> Integrate the Army's new Modular Appliance Burner and modular appliances into the Containerized Kitchen Platform. Replacing the open combustion appliances on the CK eliminates a key safety issue and the modular appliances are 20-40% more fuel efficient. Sharing the modular concept across all Army Field Feeding Platforms cuts the life cycle support costs significantly.					
<b>Accomplishments/Planned Programs Subtotals</b>	3.301	-	-	-	-

<b>C. Other Program Funding Summary (\$ in Millions)</b>												
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>	
• EL1: <i>Army Field Feeding Programs</i>	1.303	-	0.000	-	0.000	-	-	-	-	-	Continuing	Continuing
• R62830: <i>Battlefield Kitchen (BK)</i>	2.024	-	0.000	-	0.000	-	-	-	-	-	Continuing	Continuing
• M65801: <i>REFRIGERATED CONTAINER SYSTEMS</i>	9.140	14.300	0.000	2.279	2.279	-	-	-	-	-	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**  
Complete Engineering Manufacturing Decisions (EMD) of food service items and equipment for transition into competitive procurement contract. Complete advanced research efforts to support Engineer Change Proposals for previously developed equipment.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> EL2 / <i>Army Field Feeding Equipment</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Project Management Support	Various	PMFSS : Natick, MA	0.490	1.425	Jul 2019	-		-		-		-	0.000	1.915	-
<b>Subtotal</b>			0.490	1.425		-		-		-		-	0.000	1.915	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Battlefield Kitchen	Various	PMFSS : Natick, MA	2.201	0.752	Jul 2019	-		-		-		-	0.000	2.953	-
Containerized Kitchen, Modular	Various	PMFSS : Natick, MA	-	0.350	Jul 2019	-		-		-		-	0.000	0.350	-
Eexpeditionary Solid Waste Disposal System	Various	Various : Various	-	0.424	Feb 2019	-		-		-		-	0.000	0.424	-
<b>Subtotal</b>			2.201	1.526		-		-		-		-	0.000	3.727	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Ice Making System	Various	ATC/Ft Lee : Virginia	0.205	-		-		-		-		-	0.000	0.205	-
Battlefield Kitchen	Various	ATC/FT Lee : Virginia	6.552	0.350	Jul 2019	-		-		-		-	0.000	6.902	-
<b>Subtotal</b>			6.757	0.350		-		-		-		-	0.000	7.107	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		9.448	3.301	0.000	-	-	0.000	12.749	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> EL2 / <i>Army Field Feeding Equipment</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Conduct Limited User Testing on the Battlefield Kitchen			▲ 1																									
Prepare procurement package for use CCKK development	■																											
Award development contract for CCKK development			▲ 5																									
Develop testable system prototypes for CCKK					■																							
Conduct ESWDS user test and Log Demo			▲ 2																									
Award delivery order for ESWDS required improvements			▲ 3																									
Complete ESWDS hardware improvements					■																							
Draft production contract documentation for ESWDS					■																							
Award delivery order for BK improvements			▲ 4																									
Complete modified BK prototypes					■																							
Complete drafted technical manual for BK	■																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604713A / <i>Combat Feeding, Clothing, and Equipment</i>	<b>Project (Number/Name)</b> EL2 / <i>Army Field Feeding Equipment</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Conduct Limited User Testing on the Battlefield Kitchen	3	2019	3	2019
Prepare procurement package for use CCKK development	1	2019	2	2019
Award development contract for CCKK development	4	2019	4	2019
Develop testable system prototypes for CCKK	4	2019	3	2020
Conduct ESWDS user test and Log Demo	3	2019	3	2019
Award delivery order for ESWDS required improvements	3	2019	3	2019
Complete ESWDS hardware improvements	3	2019	4	2019
Draft production contract documentation for ESWDS	3	2019	2	2020
Award delivery order for BK improvements	3	2019	3	2019
Complete modified BK prototypes	3	2019	1	2020
Complete drafted technical manual for BK	1	2019	4	2020

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	42.604	30.912	28.036	-	28.036	26.753	18.724	14.894	18.615	Continuing	Continuing
241: <i>Nstd Combined Arms</i>	-	42.604	30.912	28.036	-	28.036	26.753	18.724	14.894	18.615	Continuing	Continuing

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

Program Element funds development of Non-System Training Devices to support force-on-force training at the Combat Training Centers (CTC), general military training, and training on more than one item/system, as compared with system devices which are developed in support of a specific item/weapon system. Army training devices and training simulations contribute to the modernization of the forces by enabling readiness and strengthening combat effectiveness through realistic training solutions for the Warfighter. Training devices maximize the transfer of knowledge, skills, and experience from the training situation to a combat situation. Force-on-force training at the National Training Center (NTC), Ft. Irwin, CA; Joint Readiness Training Center (JRTC), Ft. Polk, LA, and Joint Multinational Readiness Center (JMRC), formerly the Combat Maneuver Training Center (CMTC), Hohenfels, Germany; and battle staff training in Battle Command Training Program (BCTP) provide increased combat readiness through realistic collective training in low, mid, and high intensity scenarios. Project 241, Non-System Training Devices-Combined Arms, develops simulation training devices for Army-wide use, including the CTCs.

FY 2021 Project 241 funds significant development efforts in support of U.S. Army Training and Readiness on the Combat Training Center Instrumentation Systems (CTC-IS), Instrumentable-Multiple Integrated Laser Engagement System (I-MILES), Home Station Instrumentation Training System (HITS), Common Training Instrumentation Architecture (CTIA), OPFOR Integrated Air Defense System (IADS), Digital Range Training System (DRTS), Target Modernization, Medical Simulation Training Center (MSTC), Basic Electronics Maintenance Trainer (BEMT), Live, Virtual, Constructive Integrating Architecture (LVC-IA), Combat Training Center Live Fire Modernization (CTC Live Fire Mod) new start, and OPFOR Attack Aircraft Shoot-back Capability (OA2SBC) new start. FY 2020 funding for Suicide Prevention is realigned to PE 0605013A project FL9.

FY 2020 funding for Soldier/Squad Virtual Trainer Program (S/SVT) is realigned to PE 0604121A, Project SV1.

On 21 April 2019, the Future Army System of Integrated Targets (FASIT) Capability Production Document was approved. After the FASIT program is formally established, it will subsume the following programs: Combat Training Center Live Fire Modernization (CTC Live Fire Mod), Target Modernization, and Army Targetry Systems (ATS).

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	44.381	27.412	26.349	-	26.349
Current President's Budget	42.604	30.912	28.036	-	28.036
Total Adjustments	-1.777	3.500	1.687	-	1.687
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	3.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.777	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	1.687	-	1.687

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

**Project:** 241: *Nstd Combined Arms*

Congressional Add: *Radio Frequency Emitters*

	<b>FY 2019</b>	<b>FY 2020</b>
	-	3.411
Congressional Add Subtotals for Project: 241	-	3.411
Congressional Add Totals for all Projects	-	3.411

**Change Summary Explanation**

FY 2021 Project 241 funds increased due to the following:

- \$2.500 Million for Combat Training Center Live Fire Modernization new start
- \$.201 Million for OPFOR Attack Aircraft Shoot-back Capability new start
- (\$1.014) Million for minor decreases to the remaining programs

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>				<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
241: <i>Nstd Combined Arms</i>	-	42.604	30.912	28.036	-	28.036	26.753	18.724	14.894	18.615	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Common Training Instrumentation Architecture (CTIA) program is the foundation architecture of the Live Training Transformation Family of Training Systems (LT2-FTS). The program contains critical core product-line architecture which provides commonality across training instrumentation systems and interoperability across Live, Virtual, Constructive Integrated Training Environment (LVC-ITE) and joint training systems. CTIA includes Army owned software components, architecture services, standards, protocols and governance used by domain-specific Live Training Transformation (LT2) and Live Training Systems (LTS) to include instrumented Force-On-Force (FOF) and Force-On-Target (FOT) training requirements. The CTIA also provides Post Deployment Software Support (PDSS) and technology refresh for the LT2 family of LTS supporting over 22 live instrumented training products which are fielded at over 200 CONUS and OCONUS sites across the Army.

Combat Training Center Instrumentation System (CTC-IS) funds the continued development of the existing Instrumentation Systems (IS) at the National Training Center (NTC), Joint Readiness Training Center (JRTC) and Joint Multinational Readiness Center (JMRC). CTC-IS funds the continued development of the Range Communication System at the NTC and JRTC, to provide high-fidelity live, virtual, and constructive brigade training rotations which prepare Brigade Combat Teams (BCTs), Joint partners, and supporting units to deploy in support of the Army Sustainable Readiness Model (SRM). The CTCs primary goal is to develop agile and adaptive leaders at the tactical, operational and strategic levels while providing BCTs the core training necessary to conduct decisive action in a dynamic operating environment.

The Instrumentable-Multiple Integrated Laser Engagement System (I-MILES) program provides realistic, real-time casualty effects for force-on-force tactical engagement training scenarios. Its ability to integrate into training instrumentation systems provides for high fidelity combined arms combat exercises supporting the 39th Chief of the Staff of the Army's #1 priority of "Readiness" and the closely aligns with the Modernization priority of Soldier Lethality. I-MILES is required for use at Home Stations, the Combat Training Centers (CTCs) and in theater of operations to meet force-on-force training requirements. I-MILES program funding provides for the Development and Integration of new vehicle and dismount weapon systems meeting the Common Operating Environment (COE) requirements, as well as embedded Tactical Engagement Simulation (TES) development. This includes development efforts of the Live Training Engagement Composition (LTEC), increasing simulation by updating the Probability of Kill (Pk) tables for increased training realism and improved integration on new weapon platforms (i.e. Joint Light Tactical Vehicle (JLTV), Armored Multi-Purpose Vehicle (AMPV), Next Generation Combat vehicle, M4A2 plus Rifle and Stryker Engineering Change Proposal (ECP) with 30mm Gun).

The Home Station Instrumentation Training System (HITS) currently provides a high-fidelity deployable instrumented training capability to support platoon thru battalion ground based Soldiers and vehicles in Force-on-Force Training. HITS tracks location of soldiers and vehicles and simulates weapons' effects and engagements, allowing units to "Train as they Fight" against live opponents. HITS provides accurate feedback to training units. HITS consists of light deployable components that can be rapidly assembled/disassembled and transported to support deployed training. HITS is a member of the Live Training Transformation (LT2) product line of training systems implementing hardware and software reuse with other Instrumentation Systems (IS). HITS provides the only Live training component for the large scale Live-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>
<p>Virtual-Constructive (LVC) military training exercises. HITS begins US Army aviation vehicle integration with Home Station instrumentation to cover comprehensive training engagements between ground and air forces.</p> <p>The Medical Simulation Training Center (MSTC) provides realistic medical training to both medical and non-medical Soldiers in the Active, Reserve, and National Guard. MSTCs provide hands-on instruction on the latest battlefield trauma and critical care techniques based on Army Medical Department (AMEDD) approved performance oriented Program of Instruction (POI). Medical treatment validation exercises simulate the high stress of performing medical interventions in combat. MSTC supports Unit Medical Readiness by validating Combat Medic (68W) Emergency Medical Technician (EMT) biennial recertification requirements and provides Combat Lifesaver (CLS) training to non-medical Soldiers.</p> <p>The Basic Electronics Maintenance Trainer (BEMT) provides the essential modernized electronic system maintenance training capability for the Army, Army National Guard, and the Army Reserve to achieve Military Occupational Specialty-Qualification (MOS-Q) for 40 Military Occupational Specialties (MOS) at 24 Active, National Guard, and Army Reserve camps, posts, and stations. Soldiers utilizing the BEMT system receive highly realistic training using scenarios which require performing basic electronic tasks in a virtual environment including tests, diagnosis, and repair while saving institutions significant expenses over live training alternatives. The BEMT consists of an Instructor Operator Station (IOS), Student Training Station(s) (STS), associated test equipment, COTS computer, electronics console(s), supporting experiment cards, soldering station, and content server as applicable.</p> <p>The Live, Virtual, Constructive Integrating Architecture (LVC-IA) provides a net-centric linkage that collects, retrieves and exchanges data among LVC Training Aids, Devices, Simulations, and Simulators (TADSS) to include: Aviation Combined Arms Tactical Trainer (AVCATT), Close Combat Tactical Trainer (CCTT), Games For Training (GFT), Home Station Instrumentation Training System (HITS), Joint Land Component Constructive Training Capability (JLCCTC) and Synthetic Environment Core (SE Core) and Mission Command Systems. The LVC-IA defines "how" information is exchanged among the different LVC domains and the Mission Command Systems. The LVC-IA provides enterprise level tools for exercise control, after action review, and system information assurance. It develops hardware and software to interface the different Live, Virtual, Constructive and Gaming communication protocols and to provide a correlated common operating picture for the training audience on their organic Mission Command equipment. The integration of the LVC TADSS with the Mission Command equipment will enable larger and more robust training events, to better prepare U.S. Soldiers for their missions at an overall reduced cost. The end-state goal is to enable an LVC Integrated Training Environment that can replicate Operational Environments in a cost effective manner to provide a high level of value-added training and mission rehearsal opportunities to Army Commanders and their Soldiers. In FY 2019, the LVC-IA program continued design and developmental activities for Version 4 which allowed for Web-based optimization; inclusion of new simulations to the architecture; and concurrency with core system TADSS and Army Mission Command Systems and will continue in FY 2020 through FY 2021. FY 2021 request will continue Version 4 developmental and integration activities (Web-based optimization and Synthetic Training Environment (STE) compatibility), and will continue concurrency with mission command systems.</p> <p>The Target Modernization program provides a single standard/solution in support of all non-digital live fire ranges throughout the Army. Target Modernization provides live fire target systems on U.S. Army training ranges, by enhancing training realism, improve Soldiers, Leader, and Team Performance, and developing agile and adaptive leaders. The Target Modernization program provides a common open architectural framework, standards, specifications, and interfaces for live fire target devices, a common target control system for all range types, and innovative technologies to enhance training realism and reduce life cycle costs on the ranges.</p>		

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>
<p>Combat Training Center Live Fire Modernization (CTC Live Fire Mod) provides Future Army System of Integrated Targets (FASIT) qualified live-fire capable targets which includes Stationary Armor Targets (SAT) with accompanying Battlefield Effects Simulators (BES), Stationary Infantry Targets (SIT), Human Urban Targets (HUT), Double-Arm SITs, Moving Infantry Targets (MIT), and non-FASIT qualified Aviation 3-D and Unattended Aerial Systems (UAS) targets. These provide a capability for the CTCs to support the transition from Mission Rehearsal Exercise/Situational Training Exercise (MRE/ST) rotations to Unified Land Operations (ULO) against a hybrid threat.</p> <p>The Army identified an operational gap in the training strategy for the OPFOR Integrated Air Defense System (IADS). It is a collection of enemy weapons systems that engages Army aviation assets. Training Aircraft Survivability Equipment (ASE) Simulation Suite (TASS) is a live training system consisting of aircraft components and ground emitters that replicates current and emerging enemy Air Defense systems. Its fidelity supports individual pilot training as well as the collective training requirements of the Brigade Combat Team to fully plan, prepare, execute and react against an enemy air defense weapons at the Combat Training Centers (CTC).</p> <p>The Digital Range Training System (DRTS) provides modern digital technology ranges capable of training, evaluating and stressing today's Soldiers and their equipment. DRTS systems score various weapons and records data and video for utilization in an After Action Review (AAR). DRTS supports qualification gunnery tables for Armor (Abrams), Infantry (Bradley &amp; Stryker mounted &amp; dismounted) and Aviation platforms. The four standard training ranges identified utilize all available combat systems capabilities and digitally integrate them to manage all forces undergoing individual and collective live-fire training and qualification: Digital Multi-Purpose Range Complex (DMPRC) supports all gunnery tables and Combined Arms Live fire Exercise (CALFEX) for Abrams, Bradley, and limited Aviation; Digital Multi-Purpose Training Range (DMPTR) supports crew and section qualification for Armor and Infantry; Battle Area Complex (BAX) supports Stryker gunnery tables plus infantry-centric Platoon / Company CALFEX; Digital Air Ground Integration Range (DAGIR) supports all gunnery tables and CALFEX for Abrams, Bradley, and Aviation platforms (including diving fire).</p> <p>OPFOR Attack Aircraft Shoot-back Capability (OA2SBC) provides the CTC OPFOR Light Utility Helicopter (LUH) synthetic shoot-back kits with capability for missiles, rockets, and cannon that allows OPFOR aircraft to engage other air and ground TESS-equipped targets, and display engagement pairings on CTC-IS workstations. The OPFOR LUH offensive capability creates a simulated weapons capability for the OPFOR using day and thermal cameras for target detection and MILES laser to "shoot" BLUFOR players at the CTCs.</p> <p>OPFOR Surrogate Wheeled Vehicles (OSWV) provides a collection of wheeled vehicles, used as training aids to portray threat vehicles including tactical vehicles, technical vehicles, and Civilian on the Battlefield vehicles (COB-V). The program supports the CTC OPFOR/COE Pillar capability through technical vehicles, unique VISMODs, and COB-Vs. This capability provides for an accurate replication of OPFOR and COB-Vs environment that rotational units must train against.</p> <p>FY 2021 Project 241 funds significant development efforts in support of U.S. Army Training and Readiness on the Combat Training Center Instrumentation Systems (CTC-IS), Instrumentable-Multiple Integrated Laser Engagement System (I-MILES), Home Station Instrumentation Training System (HITS), Common Training Instrumentation Architecture (CTIA), OPFOR Integrated Air Defense System (IADS), Digital Range Training System (DRTS), Target Modernization, Medical Simulation Training Center (MSTC), Basic Electronics Maintenance Trainer (BEMT), Live, Virtual, Constructive Integrating Architecture (LVC-IA), Combat Training Center Live Fire Modernization (CTC Live Fire Mod) new start, and OPFOR Attack Aircraft Shoot-back Capability (OA2SBC) new start.</p> <p>FY 2020 funding for Suicide Prevention is realigned to PE 0605013A project FL9.</p>		

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>

FY 2020 funding for Soldier/Squad Virtual Trainer Program (S/SVT) is realigned to PE 0604121A, Project SV1.

On 21 April 2019, the Future Army System of Integrated Targets (FASIT) Capability Production Document was approved. After the FASIT program is formally established, it will subsume the following programs: Combat Training Center Live Fire Modernization (CTC Live Fire Mod), Target Modernization, and Army Targetry Systems (ATS).

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Common Training Instrumentation Architecture (CTIA) program.</p> <p><b>Description:</b> Continue EMD phase contract activities for the CTIA program to provide common architecture capabilities.</p> <p><b>FY 2020 Plans:</b> Continued development of CTIA to provide the common architecture capabilities that are essential for development, fielding, technology and capability insertion for 22 live training systems at 200+ training locations worldwide, to include the Combat Training Centers-Instrumentation System utilized at the National Training Center, the Joint Readiness Training Center, and at the Joint Multinational Readiness Center; the Home Station Instrumentation System; the Digital Ranges Training System, and the Live, Virtual, Constructive-Integrated Training Environment interoperability initiatives.</p> <p><b>FY 2021 Plans:</b> FY 2021 Base RDTE dollars in the amount of \$2.508 million will fund the continued development of CTIA to provide the common architecture capabilities that are essential for development, fielding, technology and capability insertion for 22 live training systems at 200+ training locations worldwide, to include the Combat Training Centers-Instrumentation System utilized at the National Training Center, the Joint Readiness Training Center, and at the Joint Multinational Readiness Center; the Home Station Instrumentation System; the Digital Ranges Training System, and the Live, Virtual, Constructive-Integrated Training Environment interoperability initiatives.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Decrease due to estimated cost for development.</p>	1.876	2.438	2.508
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Combat Training Center Instrumentation System (CTC-IS).</p> <p><b>Description:</b> Continue EMD phase contract activities for the CTC-IS.</p> <p><b>FY 2020 Plans:</b> FY 2020 Base RDTE dollars in the amount of \$.427 million will fund post deployment software support to reintegrate CBRNE (Chemical, Biological, Radiological, Nuclear and Explosives) training at the CTCs. The effort will integrate the Joint Effects Model</p>	3.516	4.182	3.514

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p>into the CTC-IS. The effort will use the Army's Integrated Sensor Architecture that will stimulate CBRNE sensors. The results will be available in the CTC-IS for After Action Review (AAR).</p> <p>FY 2020 Base RDTE dollars in the amount of \$1.677 million will fund the Life Cycle Management (LCM) of Live Training Family of Systems, developing the architecture framework for future Life Cycle Efforts for the Hardware Product Line Framework.</p> <p>FY 2020 Base RDTE dollars in the amount of \$.666 million will fund an analysis of NTC Western Training Area (WTA) to provide information to determine path forward to expanded coverage area.</p> <p>FY 2020 Base RDTE dollars in the amount of \$1.500 million will fund the SINGARS replacement study; identify alternate means to collect tactical voice communications at the Combat Training Centers, utilized for ARR purposes, study is intended to identify alternate solutions which are cheaper to purchase and easier to maintain providing life-cycle cost saving across the CTC.</p> <p><b>FY 2021 Plans:</b></p> <p>FY 2021 Base RDTE dollars in the amount of \$.329 million will fund post deployment software support to integrate sensor, GPS and radar jamming and UAS counter measures into the training at the CTCs. The effort will stimulate and simulate GPS and radar jamming and UAS counter measures in Brigade Combat Team Force-on-Force training. The results will be available in the CTC-IS for After Action Review (AAR).</p> <p>FY 2021 Base RDTE dollars in the amount of \$.750 million will fund the development of a Digital Tactical Monitoring (DTM) solution for the CTCs. The DTM capability will allow Combat Training Center Observers Controllers Trainers(OCTs) to monitor, collect, and record Rotational Training Unit (RTU) C4ISR communications and provide performance feedback during Combat Training Center Brigade Combat Team(BCT)FoF/FoT training events, this is valuable feedback in the AAR process increasing BCT readiness.</p> <p>FY 2021 Base RDTE dollars in the amount of \$1.941 million will fund the Life Cycle Management (LCM) of Live Training Family of Systems, developing the architecture framework for future Life Cycle Efforts for the Hardware Product Line Framework.</p> <p>FY 2021 Base RDTE dollars in the amount of \$.494 million will fund the JOC DESIGN ANALYSIS study to determine the layout of the JRTC-IS systems/subsystem within the new JOC. The study will also look at current and future technologies for implementing the installation of the JRTC-IS systems/subsystems in the new JOC to ensure the architecture remains current with the latest technology improvements and effectiveness and to improve the life cycle footprint.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Decrease due to estimated cost for development.</p>				
<b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Instrumentable-Multiple Integrated Laser Engagement System (I-MILES).		1.751	2.542	2.802

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p><b>Description:</b> EMD phase contract activities for the I-MILES program.</p> <p><b>FY 2020 Plans:</b> RDTE funding will analyze, develop, test and implement the Live Training Engagement Composition (LTEC) through Post Deployment Software Support efforts. Funding will ensure that baseline relevancy is maintained. Funding will also ensure that there is development and integration of new functionality to maintain concurrency.</p> <p><b>FY 2021 Plans:</b> RDTE funding will analyze, develop, test and implement the Live Training Engagement Composition (LTEC) through Post Deployment Software Support efforts. Funding will ensure that baseline relevancy is maintained. Funding will also ensure that there is development and integration of new functionality to maintain concurrency.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 increase is due to the additional requirement for Electronic Proving Ground testing.</p>				
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Home Station Instrumentation Training System (HITS) program.</p> <p><b>Description:</b> EMD phase contract activities for the HITS program.</p> <p><b>FY 2020 Plans:</b> HITS will begin US Army aviation vehicle integration with Home Station instrumentation to provide comprehensive training engagements between ground and air forces. Efforts will add aviation specific interfaces, visual indicators, and required messaging for HITS and Live, Virtual and Constructive Integrating Architecture (LVC-IA) interoperability. LVC-IA and HITS encompass simulated combined arms, collective training. This will create a cloud based HITS After Action Review capability so that distributed unit leaders can readily have on demand and point-of-need access. The cloud based access will allow the unit leader to reinforce training of over 1,000 Soldiers after training with HITS.</p> <p><b>FY 2021 Plans:</b> HITS will continue US Army aviation vehicle integration with Home Station instrumentation to provide comprehensive training engagements between ground and air forces. Efforts will add aviation specific interfaces, visual indicators, and required messaging for HITS and Live, Virtual and Constructive Integrating Architecture (LVC-IA) interoperability. LVC-IA and HITS encompass simulated combined arms, collective training. This will create a cloud based HITS After Action Review capability so that distributed unit leaders can readily have on demand and point-of-need access. The cloud based access will allow the unit leader to reinforce training of over 1,000 Soldiers after training with HITS.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b></p>		0.725	3.551	1.879

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
Estimated cost for development.				
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Medical Simulation Training Center (MSTC).</p> <p><b>Description:</b> EMD phase contract activities for the MSTC program.</p> <p><b>FY 2020 Plans:</b> Complete enhancement of the Instructor Support System (ISS) by improving the combat training environments to enhance the Soldier's training experience through more realistic training scenarios.</p> <p><b>FY 2021 Plans:</b> Instructor Support System (ISS) combat training scenarios will be improved in a Synthetic Training Environment (STE) via Virtual Reality and Reconfigurable Virtual Trainers.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Decrease due to estimated cost of development.</p>		-	0.593	0.448
<p><b>Title:</b> Soldier/Squad Virtual Trainer Program (S/SVT) Engineering, Support, Test &amp; Evaluation</p> <p><b>Description:</b> Engineering, support, and any related test and evaluation for the development of the S/SVT Program.</p>		5.534	-	-
<p><b>Title:</b> Live, Virtual, Constructive Integrating Architecture (LVC-IA) Engineering and Manufacturing Development (EMD) phase contract activity.</p> <p><b>Description:</b> Continue EMD phase contract activities for the LVC-IA program.</p> <p><b>FY 2020 Plans:</b> Live, Virtual, and Constructive-Integrating Architecture (LVC-IA) program will continue system development, integration and demonstration of the LVC-IA Version 4 capability which includes the developmental activities for Web-based optimization, Synthetic Training Environment (STE) compatibility, and concurrency with core system TADSS and Army Mission Command Systems.</p> <p><b>FY 2021 Plans:</b> Live, Virtual, and Constructive-Integrating Architecture (LVC-IA) program will continue system development, integration and demonstration of the LVC-IA Version 4 capability which includes the developmental activities for Web-based optimization, Synthetic Training Environment (STE) compatibility, and concurrency with core system TADSS and Army Mission Command Systems.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b></p>		2.775	3.527	4.345

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
Increase is due to connectivity to Synthetic Training Environment (STE) and External System STE Integration requirements.				
<p><b>Title:</b> Live, Virtual, Constructive Integrating Architecture (LVC-IA) Program Government System Test and Evaluation.</p> <p><b>Description:</b> Government System Test and Evaluation for the LVC-IA Program.</p> <p><b>FY 2020 Plans:</b> LVC-IA will continue Federation Integration and System Measurement of Performance (SMP) events, and commence Functional Verification, Test Readiness Review (TRR) and Government Acceptance Testing for Version 4. Additionally, LVC-IA will continue integration testing and evaluation activities in support of LVC-IA interoperability with TADSS and other Mission Command Systems.</p> <p><b>FY 2021 Plans:</b> LVC-IA will continue Integration and System Measurement of Performance (SMP) events, and continue Functional Verification, Test Readiness Review (TRR) and Government Acceptance Testing for Version 4. Additionally, LVC-IA will continue integration testing and evaluation activities in support of LVC-IA interoperability with TADSS and other Mission Command Systems.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase is due to additional systems test and evaluation requirement for STE.</p>		1.619	1.130	1.497
<p><b>Title:</b> Government Program Management for the Live, Virtual, Constructive Integrating Architecture (LVC-IA) Program.</p> <p><b>Description:</b> Government Program Management for the LVC-IA Program.</p> <p><b>FY 2020 Plans:</b> Will provide program management, engineering and technical oversight, contract support, and travel for the LVC-IA Program.</p> <p><b>FY 2021 Plans:</b> Will provide program management, engineering and technical oversight, contract support, and travel for the LVC-IA Program.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Decrease is due to completing final verification efforts.</p>		0.399	0.162	0.153
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Combat Training Center Live Fire Modernization (CTC Live Fire Mod)</p> <p><b>Description:</b> Combat Training Center Live Fire Modernization (CTC Live Fire Mod) provides Future Army System of Integrated Targets (FASIT) qualified live-fire capable targets which includes Stationary Armor Targets (SAT) with accompanying Battlefield Effects Simulators (BES), Stationary Infantry Targets (SIT), Human Urban Targets (HUT), Double-Arm SITs, Moving Infantry Targets (MIT), and non-FASIT qualified Aviation 3-D and Unattended Aerial Systems (UAS) targets. These provide a capability for</p>		-	-	2.500

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p>the CTCs to support the transition from Mission Rehearsal Exercise/Situational Training Exercise (MRE/ST) rotations to Unified Land Operations (ULO) against a hybrid threat.</p> <p><b>FY 2021 Plans:</b> RDTE of \$2.500 million provides for development of the new Battlefield Effects Devices. These devices will focus on enhancing and simulating a hostile tank's main gun fire signature from a target device, tracer round shootback signature, and small arms hostile fire via pyrotechnic solutions. The pyrotechnic battlefield effect device effort will provide for inexpensive and ruggedized systems that can be used to create a more realistic training environment for Soldiers to train with in a live fire environment. The pyrotechnic solutions will align with the defined OPTEMPO in the FASIT CPD.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> This is a new start in FY 2021.</p>				
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Target Modernization program.</p> <p><b>Description:</b> The Target Modernization program's primary innovation goals are the development of trackless moving target systems, advanced non-contact ballistic hit detection and recognition system, high fidelity dynamic infrared threat representations, advanced human type targets, non-pyrotechnic battlefield effects replication systems, and augmented reality on live fire ranges; all aimed at increasing training realism, enhancing Soldier resiliency, and lowering life cycle costs.</p> <p><b>FY 2020 Plans:</b> RDTE of \$2.077 million provides for the incremental funding of the Non-Contact Hit Sensor (NCHS) research and development. FY2020 should see the development and field testing of the NCHS prototype system. Funding will also initiate the Phase III SBIR contract for the Dynamic Infrared Projection (DIRP) Systems. The DIRP system will provide for an inexpensive and ruggedized infrared projection system that can be utilized to create accurate real-time dynamic thermal representations on target silhouettes or other mediums based on training doctrine within the various live and virtual training applications to enhance realism and feedback for the trainee. The DIRP system technology would support the creation of a high fidelity, time and posture based, thermal replication system for live fire target systems. Current solutions are heating pads adhered to the target silhouette. The shapes are not accurate, get damaged with live fire engagements, and create thermal bleeding; the shapes are static with respect to time, and do not support changes in thermal intensity over time, movement or posture changes. The DIRP solution will remove the threat signature thermal generation from the line of fire (damage), and support the recognition of combat vehicles with high resolution imaging. The thermal images will support time or movement based increases in temperature, and enhanced thermal representation (muzzle flash, burning vehicle), resulting in enhanced training realism.</p> <p><b>FY 2021 Plans:</b></p>		1.657	1.988	3.788

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p>RDTE of \$3.788 million provides for the incremental funding of the Non-Contact Hit Sensor (NCHS) research and development aimed at the completion and obtainment of TRL 7/8 for the advanced non-contact ballistic hit detection and recognition system, to include environmental verification and performance testing. Funding will also initiate the Phase III SBIR contract for the non-pyrotechnic battlefield effects replication technologies. The Non-pyrotechnic battle field effects effort will focus on hostile shot replication, machine gun fire replication, black smoke generation, and sound effects simulators via non-pyrotechnic solutions. The Non-pyrotechnic battle field effects effort will provide for an inexpensive and ruggedized system that can be utilized to create accurate training environment realism enhancement. Current pyrotechnic solutions require specialized training, handling, and procurement of effects, and can effect training throughput by requiring the ranges to shut down during reloading. The non-pryo solutions will align with the defined OPTEMPO in the FASIT CPD. Funding will also support the 14 year old TRACR software baseline from a CORBA based CTIA v3.x based solution to a fully realized Service orchestrated HTML5.0 based CTIA v4.x compliant solution to ensure supportability, cybersecurity protections, and viability for the next ten years.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding has increased from FY 2020 due to the additional requirement of the Phase III SBIR contract for the non-pyrotechnic battlefield effects replication technologies.</p>			
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the Digital Range Training System (DRTS)</p> <p><b>Description:</b> Conduct development of a government-owned Technical Data Package (TDP) for the DRTS program to enable competitive acquisitions for targets.</p> <p><b>FY 2020 Plans:</b> RDTE of \$1.600 million begins investigating the cybersecurity aspects of utilizing an Army Data Center to centrally manage the DRTS software by examining current DoD policy, exploring commercial applications of cybersecurity, and developing the Risk Management Framework implementation plan. DRTS will also investigate the implementation approach for migrating software capabilities from each of the ranges into the cloud while still providing uninterrupted training capability locally on the range should the cloud linkage be interrupted. This will allow for prototyping the DRTS software utilizing a "local" cloud environment at the Fort Benning Digital Multipurpose Range Complex (DMPRC) as the initial step in the overall DRTS migration strategy. This includes an investigation of OT requirements to operate DRTS and other training systems software on a consolidated set of IT hardware.</p> <p><b>FY 2021 Plans:</b> RDTE of \$1.500 million will continue the development of a government-owned and managed Technical Data Package (TDP) for the target lifter devices utilized on the DRTS and other home station ranges. The funding will be used to complete the design efforts, build prototype units, and perform the developmental testing to validate that the TDP works as required and can be used for the future production of the target lifters.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b></p>	-	1.511	1.500

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
Estimated cost for development.				
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for Integrated Military Operations in Urban Terrain (MOUT) Training System (IMTS)</p> <p><b>Description:</b> Conduct research into the development of an Army Data Center "cloud" migration strategy to assist in understanding the risks and technical challenges associated with taking software that is run at numerous (70+) IMTS standalone sites, connecting them to communications infrastructure, and managing the software and cybersecurity aspects through shared Information Technology (IT).</p> <p><b>FY 2020 Plans:</b> RDTE of \$1.000 million will prototype the Integrated Military Operations in Urban Terrain (MOUT) Training System (IMTS) software utilizing a "local" cloud environment at the Fort Benning CACTF as the initial step in the overall IMTS migration strategy. This includes an investigation of OT requirements to operate IMTS and other training systems software on a consolidated set of IT hardware.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2020 is the last year of funding for this requirement.</p>		-	0.911	-
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for OPFOR Surrogate Wheeled Vehicles (OSWV)</p> <p><b>Description:</b> EMD phase contract activities for the OSWV program.</p> <p><b>FY 2020 Plans:</b> RDTE Funding will continue to assist in the first article of testing for tactical vehicles, tactical vehicle engineering design and visual modification. Funding will also allow for the modification and testing of technical vehicles.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> OSWV program RDTE initiatives will be complete in FY 2020; therefore, no RDTE funding is required in FY 2021.</p>		2.783	3.629	-
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for the OPFOR Integrated Air Defense System (IADS)</p> <p><b>Description:</b> EMD phase contract activities for the IADS Program</p> <p><b>FY 2021 Plans:</b> FY 2021 RDT&amp;E funding for \$2.663 million is to integrate the Tactical Engagement Simulation System (TESS) hardware onto the CH-47 platform, and integrate the Aircraft Survivability Equipment (ASE) training simulation into the CH-47F operational flight</p>		8.275	-	2.663

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p>program. Integration is followed by validation through analysis, demonstration, and testing in the CH-47F system integration laboratory, and ground and flight testing for airworthiness qualification conducted at Redstone Test Center.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> IADS had no RDTE funding in FY 2020. FY 2021 represents the actual cost of development.</p>				
<p><b>Title:</b> Radar Signal Emulator Development for Integrated Air Defense Systems (IADS)</p> <p><b>Description:</b> Radar Signal Emulator Development for Integrated Air Defense Systems (IADS)</p>		9.520	-	-
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for Basic Electronics Maintenance Trainer (BEMT)</p> <p><b>Description:</b> BEMT provides the essential modernized electronic system maintenance training capability for the Army, Army National Guard, and the Army Reserve to achieve Military Occupational Specialty-Qualification (MOS-Q) for 40 MOS at 24 Active, National Guard, and Army Reserve camps, posts, and stations. BEMT will be modernizing the electronics maintenance training. BEMT provides training in basic electronics, while saving institutions significant administrative expenses over live training alternatives.</p> <p><b>FY 2020 Plans:</b> Enhancement of the Learning Management System courseware and Army Enterprise server capability.</p> <p><b>FY 2021 Plans:</b> Enhancement of the Learning Management System courseware. Developing solutions to improve Army Enterprise server capability.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase due to estimated cost for development.</p>		-	0.092	0.238
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for OPFOR Attack Aircraft Shoot-back Capability (OA2SBC) program</p> <p><b>Description:</b> EMD phase contract activities for the OPFOR Attack Aircraft Shoot-back Capability (OA2SBC) program.</p> <p><b>FY 2021 Plans:</b> FY 2021 Base RDTE dollars in the amount of \$.201 million will be used to develop weapon processor software, integrate with the training instrumentation systems at the Combat Training Centers (CTCs), then validate the solution through testing.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b></p>		-	-	0.201

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021
This is a new start in FY 2021.			
<b>Title:</b> Suicide Prevention Program <b>Description:</b> Suicide Prevention Program  FY 2020 funding for Suicide Prevention is realigned to PE 0605013A project FL9.	2.174	-	-
<b>Title:</b> FY 2020 SBIR/STTR Transfer <b>Description:</b> Funding transferred in accordance with Title 15 USC ?638  <b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638  <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638	-	1.245	-
<b>Accomplishments/Planned Programs Subtotals</b>	42.604	27.501	28.036

	FY 2019	FY 2020
<b>Congressional Add:</b> Radio Frequency Emitters <b>FY 2020 Plans:</b> Radio Frequency Emitters	-	3.411
<b>Congressional Adds Subtotals</b>	-	3.411

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• MA6600: <i>Combat Training Centers Support</i>	117.584	123.411	90.580	-	90.580	78.424	75.501	72.046	80.319	Continuing	Continuing
• NA0100: <i>Training Devices, Nonsystem</i>	217.597	215.453	161.814	-	161.814	172.346	188.148	189.306	201.457	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**  
Competitive development efforts based on performance specifications.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>
<p>1. In FY 2019 - 2021, Combat Training Center Instrumentation Systems (CTC-IS) RDTE will be used to fund a Life Cycle Product-line Management (LCPM) contract structured as a 5 year Single Award Indefinite-Delivery/Indefinite-Quantity (IDIQ) for the implementation of a Hardware Product Line (HPL), the contractor was selected. The strategy is to establish a deliberate approach to Life Cycle Management (LCM) of Live Training Family of Systems, providing the framework for future Life Cycle Efforts for the Hardware Product Line Framework.</p> <p>2. In FY 2015, an Indefinite-Delivery/Indefinite-Quantity (IDIQ) contract with a 1-year base and 4 single-year option periods was awarded to General Dynamics Mission Systems - CTIA is executed under this contract. In FY 2020, a new competitive IDIQ contract with a 1-year base and 7 single-year option periods will be awarded - CTIA will be executed under this contract.</p> <p>3. In FY 2020, Target Modernization will award the first year of a projected three-year Phase III SBIR for the maturation and product development of the Non-Contact Hit Sensor. In FY 2021, it will initiate the award of a projected three-year the Phase III SBIR contract for the maturation and product development of the non-pyrotechnic battlefield effects replication technologies.</p> <p>4. The LVC-IA Enhanced Capability contract is the competitively awarded follow-on effort awarded in 3rd Quarter FY 2016. This contract has a two-year base and four single-year option periods to provide the additional capabilities for Versions 3, 4 and beyond. The contract was awarded to Cole Engineering and Science, Inc. (CESI) to provide for the development, fielding and training of each version capability for the designated Basis of Issue Plan (BOIP) sites and provide Post-Deployment Software Support (PDSS) for all currently fielded versions.</p> <p>5. In FY 2021, the Digital Range Training System (DRTS) will incrementally fund established efforts under the Life Cycle Product-line Management (LCPM) IDIQ contract which will be for the development of the target Technical Data Package (TDP).</p> <p>6. In FY 2021, the Combat Training Center Live Fire Modernization (CTC Live Fire Mod) will award a new, multi-year delivery order under the Life Cycle Product-line Management (LCPM) IDIQ contract.</p> <p>7. In FY 2017, OPFOR Integrated Air Defense System (IADS) awarded a new standalone contract with a base, plus 4 option year periods.</p> <p>8. In FY 2019, OPFOR Surrogate Wheeled Vehicles (OSWV) pursued an organic solution to develop, integrate and test Visual Modifications for Tactical and Technical Vehicles.</p> <p>9. In FY 2021, BEMT will exercise the second option year of Indefinite Delivery/Indefinite Quantity (IDIQ) contract which was awarded in May 2019.</p> <p>10. In FY 2021, Instrumentable-Multiple Integrated Laser Engagement System (I-MILES) will leverage the General Dynamics contract vehicle and competitive OTA approaches to address EUL / relevancy challenges as product lines reach those trigger points in their life cycle or changes to weapon system configurations drive those</p>		

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>

actions. This effort would enable a wide range of industry partners to integrate LTEC/LPAN into existing systems and execute SLEP/Tech Refresh activities as required until Live STE capabilities are introduced.

11. In FY 2021, Home Station Instrumentation Training System (HITS) will award a new delivery order on the General Dynamics contract.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
OneTESS Program Management	Various	PEO STRI : Orlando, FL	8.046	-		-		-		-		-	0.000	8.046	8.046
OneTESS Program Management	Various	PEO STRI, : Orlando, FL	2.040	-		-		-		-		-	0.000	2.040	2.040
HITS Program Management	Various	PEO STRI : Orlando, FL	1.348	-		-		-		-		-	0.000	1.348	1.348
CTC-IS Program Management	Various	PEO STRI : Orlando, FL	9.018	-		-		-		-		-	0.000	9.018	9.018
MSTC Program Management	Various	PEO STRI : Orlando, FL	0.952	-		-		-		-		-	0.000	0.952	0.952
I-MILES Program Management	Various	PEO STRI : Orlando, FL	0.511	-		-		-		-		-	0.000	0.511	0.511
EST Program Management	Various	PEO STRI : Orlando, FL	0.214	-		-		-		-		-	0.000	0.214	0.214
LVC-IA Program Management	Various	PEO STRI : Orlando, FL	10.466	0.399	Nov 2018	0.178	Nov 2019	0.153	Nov 2020	-		0.153	Continuing	Continuing	Continuing
Target Modernization	Various	PEO STRI : Orlando, FL	0.614	-		-		-		-		-	0.000	0.614	0.614
ETC-IS Program Management	Various	PEO STRI : Orlando, FL	0.164	-		-		-		-		-	0.000	0.164	0.164
CTIA	Various	PEO STRI : ORLANDO, FL	0.876	-		-		-		-		-	0.000	0.876	0.876
Soldier Fitness Program	TBD	Mulitple : Various	2.100	-		-		-		-		-	0.000	2.100	2.100
Suicide Prevention	TBD	Multiple : Various	2.139	2.174	Jun 2019	-		-		-		-	0.000	4.313	4.313
SVT Program Management	Various	PEO STRI : Orlando, FL	0.049	-		-		-		-		-	0.000	0.049	0.049
OPFOR Integrated Air Defense System (IADS) Program Management	Various	PEO STRI : Orlando, FL	0.742	-		-		-		-		-	0.000	0.742	0.742
Congressional Add for Combined Arms Center	Various	PEO STRI : Huntsville, AL	0.177	-		-		-		-		-	0.000	0.177	0.177

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Threat Integrated Air Defense System															
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		1.245		-		-		-	0.000	1.245	-
<b>Subtotal</b>			39.456	2.573		1.423		0.153		-		0.153	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
OneTESS	SS/CPFF	General Dynamics : Fairfax, VA	124.769	-		-		-		-		-	0.000	124.769	124.769
OneTESS	SS/CPFF	General Dynamics C4 Systems : Orlando, FL 32826	10.430	-		-		-		-		-	0.000	10.430	10.430
CTIA	Option/IDIQ	General Dynamics Mission Systems : Orlando, FL	18.932	1.876	Jan 2019	-		-		-		-	0.000	20.808	20.808
CTIA	C/CPFF	TBD : Orlando, FL	-	-		2.454	Jan 2020	2.508	Jan 2021	-		2.508	Continuing	Continuing	Continuing
I-MILES	Option/IDIQ	General Dynamics Mission Systems : Orlando, FL	1.481	-		1.270	Oct 2019	2.802	Mar 2021	-		2.802	Continuing	Continuing	Continuing
I-MILES RELEVANCY	SS/IDIQ	Lockheed Martin : Orlando, FL	2.171	1.751	May 2019	1.215	May 2020	-		-		-	Continuing	Continuing	Continuing
CTC-IS	C/IDIQ	General Dynamics Mission Systems : Orlando, FL	40.740	1.846	Mar 2019	2.519	Feb 2020	1.573	Mar 2021	-		1.573	Continuing	Continuing	Continuing
CTC-IS	C/IDIQ	GENERAL DYNAMICS ONE SOURCE : Orlando, FL	2.766	1.670	Aug 2019	1.604	Aug 2020	1.941	Aug 2021	-		1.941	Continuing	Continuing	Continuing
HITS	C/FFP	Riptide : Orlando, FL	1.379	-		-		-		-		-	0.000	1.379	1.379

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604715A / Non-System Training Devices - Eng Dev				Project (Number/Name) 241 / Nstd Combined Arms							
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
HITS	C/IDIQ	General Dynamics Mission Systems : Orlando, FL 32826	4.009	-		2.427	Jul 2020	1.249	Jul 2021	-		1.249	Continuing	Continuing	Continuing
HITS	Option/IDIQ	General Dynamics Mission Systems (GDMS) : Orlando, FL 32826	2.429	0.725	Jan 2019	1.067	Jan 2020	0.630	Jan 2021	-		0.630	Continuing	Continuing	Continuing
MSTC Development	C/FP	Multiple : Various	5.128	-		0.609	Jul 2020	0.448	Jul 2021	-		0.448	Continuing	Continuing	Continuing
EST Development	C/FP	Cubic Simulation Systems, Inc. : Orlando, FL 32809-3813	1.528	-		-		-		-		-	0.000	1.528	1.528
EST	C/FP	Nova Technologies : Panama City, FL 32404-6747	0.609	-		-		-		-		-	0.000	0.609	0.609
EST Enhanced Capabilities	C/FFP	Meggitt Training Systems, Inc. : Suwanee, GA 30024-1247	2.075	-		-		-		-		-	0.000	2.075	2.075
EST Enhanced Capabilities Adaptive Marksmanship and Intelligent Tutoring	C/FFP	Dignitas Technologies : Orlando, FL 32817	0.776	-		-		-		-		-	0.000	0.776	0.776
CFFT Enhanced Joint Fires Observer (JFO) Training and Certification Requirements	C/IDIQ	Nova Technologies : Panama City, FL 32404-6747	1.242	-		-		-		-		-	0.000	1.242	1.242
LVC-IA Development	C/CPFF	Cole Engineering Services, Inc : Orlando, FL	29.822	-		-		-		-		-	0.000	29.822	29.822
LVC-IA Enhanced Capability	C/CPFF	Cole Engineering Services, Inc (CESI) : Orlando, FL	5.706	-		-		-		-		-	0.000	5.706	5.706

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604715A / Non-System Training Devices - Eng Dev				Project (Number/Name) 241 / Nstd Combined Arms							
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
LVC-IA Enhanced Capability	Option/CPFF	Cole Engineering Services, Inc (CESI) : Orlando, FL	6.994	2.775	Dec 2018	3.542	Nov 2019	4.345	Nov 2020	-		4.345	Continuing	Continuing	Continuing
Combat Training Center Live Fire Modernization (CTC Live Fire Mod)	C/CPFF	General Dynamics One Source, LLC : Fairfax, VA	-	-		-		2.500	Feb 2021	-		2.500	Continuing	Continuing	Continuing
Target Modernization	C/IDIQ	Pratt and Miller Engineering : Orlando, FL	6.600	-		-		-		-		-	0.000	6.600	6.600
Target Modernization	Option/CPFF	Pratt and Miller Engineering (P&M) : Orlando, FL	4.206	0.508	Oct 2018	-		-		-		-	0.000	4.714	4.713
Target Modernization	C/CPFF	JRM Technologies : Orlando	-	1.149	Dec 2018	-		-		-		-	0.000	1.149	1.149
Target Modernization	SS/CPFF	SensorMetrix : San Diego, CA	-	-		2.003	Jan 2020	1.625	Jan 2021	-		1.625	Continuing	Continuing	Continuing
Target Modernization	SS/CPFF	Digital Solid State Propulsion, Inc. : Reno, NV	-	-		-		2.163	Feb 2021	-		2.163	Continuing	Continuing	Continuing
Congressional Add Center of Excellence for Military Operations in Urban Terrain and Cultural Trn	C/FP	Multiple : Various	2.996	-		-		-		-		-	0.000	2.996	2.996
ETC-IS	SS/CPFF	General Dynamics C4 Systems : Orlando, FL 32826	4.836	-		-		-		-		-	0.000	4.836	4.836
Digital Range Training System (DRTS)	C/CPFF	General Dynamics Mission Systems : Orlando, FL	1.539	-		1.527	Jan 2020	-		-		-	0.000	3.066	3.139
Digital Range Training System (DRTS)	Option/CPFF	General Dynamics One Source, LLC : Fairfax, VA	-	-		-		1.500	Jan 2021	-		1.500	Continuing	Continuing	Continuing
OPFOR Integrated Air Defense System (IADS)	MIPR	PEO IEWS, PM Aircraft Survivability	16.065	5.306	Feb 2019	-		-		-		-	0.000	21.371	21.371

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604715A / Non-System Training Devices - Eng Dev				241 / Nstd Combined Arms							
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
		Equipment (ASE) : Huntsville, AL													
OPFOR Integrated Air Defense System (IADS)	MIPR	Target Systems Management Office, PEO STRI, PEO STRI : Huntsville, AL	0.915	-		-		-		-		-	0.000	0.915	0.915
Radar Signal Emulator Development for IADS	C/TBD	To Be Determined : Orlando, FL	-	9.520	Feb 2019	-		-		-		-	0.000	9.520	9.520
Soldier/Squad Virtual Trainer (S/SVT) Program	C/CR	OTA - CUBIC and MEGGITT : Orlando, FL	-	5.534	Mar 2019	-		-		-		-	0.000	5.534	5.534
OPFOR Surrogate Wheeled Vehicles (OSWV)	IA	Tank Automotive Research Development and Engineering Center : Warren, MI	-	2.783	Mar 2019	3.644	Mar 2020	-		-		-	0.000	6.427	6.501
Basic Electronics Maintenance Trainer (BEMT)	SS/FFP	Nida Corp : Melbourne, FL	-	-		0.108	Jan 2020	0.238	Nov 2020	-		0.238	Continuing	Continuing	Continuing
Integrated Military Operations in Urban Terrain (MOUT) Training System (IMTS)	C/CPFF	General Dynamcis Mission Systems : Orlando, FL	-	-		0.927	Jan 2020	-		-		-	0.000	0.927	1.000
Congressional Add for Combined Arms Center Threat Integrated Air Defense System	C/CPFF	Scientific Research Corporation : Huntsville, AL	9.823	-		-		-		-		-	0.000	9.823	9.823
OPFOR Attack Aircraft Shoot-back Capability	C/TBD	TBS : Orlando, FL	-	-		-		0.201	Mar 2021	-		0.201	0.000	0.201	0.201
Congressional Add for Radio Frequency Emitters	C/TBD	ACC, Orlando : Orlando, Florida	-	-		3.427	Mar 2020	-		-		-	0.000	3.427	3.500
<b>Subtotal</b>			309.966	35.443		28.343		23.723		-		23.723	Continuing	Continuing	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>
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<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
OneTESS	Various	Various : Orlando, FL	6.596	-		-		-		-		-	0.000	6.596	6.596
OneTESS	Various	Various : Various	0.262	-		-		-		-		-	0.000	0.262	0.262
CTIA	Various	Various : Various	12.844	-		-		-		-		-	0.000	12.844	12.844
Target Modernization	Various	Various : Various	0.192	-		-		-		-		-	0.000	0.192	0.192
<b>Subtotal</b>			19.894	-		-		-		-		-	0.000	19.894	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
OneTESS Development & Test	Various	Multiple : Orlando, FL	4.162	-		-		-		-		-	0.000	4.162	4.162
OneTESS Test Support	Various	Multiple : Orlando, FL	1.280	-		-		-		-		-	0.000	1.280	1.280
HITS	Various	Various : Orlando, FL	0.740	-		-		-		-		-	0.000	0.740	0.740
LVC-IA Test Support	Various	Multiple : Orlando, FL	9.614	1.619	Dec 2018	1.146	Nov 2019	1.497	Nov 2020	-		1.497	Continuing	Continuing	Continuing
IEDES	Various	Multiple : Orlando, FL	0.519	-		-		-		-		-	0.000	0.519	0.519
OPFOR Integrated Air Defense System (IADS)	SS/CPFF	Inter-Coastal Electronics, Inc. : Mesa, AZ	3.151	2.969	Aug 2019	-		2.663	Mar 2021	-		2.663	Continuing	Continuing	Continuing
<b>Subtotal</b>			19.466	4.588		1.146		4.160		-		4.160	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
<b>Project Cost Totals</b>		388.782	42.604	30.912	28.036	-	28.036	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>			<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
CTIA Development and Architectural Evolution																												
CTC IS Development																												
I-MILES Development																												
I-MILES RELEVANCY																												
HITS Development																												
MSTC Trainer Developments																												
LVC-IA - Version 4 (Development, Integration, Demonstration and																												
LVC-IA - Concurrency with Mission Command Systems																												
Combat Training Center Live Fire Modernization (CTC Live Fire Mod)																												
Target Modernization Development																												
S/SVT - Development																												
Digital Range Training System (DRTS)																												
OPFOR Integrated Air Defense System (IADS)																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>			<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
OPFOR Surrogate Wheeled Vehicles (OSWV)																												
BEMT Army Enterprise Network Server Development																												
Integrated Military Operations in Urban Terrain (MOUT) Training System (IMTS)																												
OPFOR Attack Aircraft Shoot-back Capability (OA2SBC)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
OneTESS Development	1	2013	4	2014
CTIA Development and Architectural Evolution	1	2012	4	2025
CTC IS Development	1	2010	4	2025
I-MILES Development	2	2017	4	2021
I-MILES RELEVANCY	2	2018	4	2025
HITS Development	3	2012	4	2025
MSTC MT-C2 Development	2	2016	3	2018
MSTC Trainer Developments	2	2017	4	2025
EST Enhanced Capabilities Adaptive Marksmanship and Intelligent Tutoring	3	2015	2	2016
EST Enhanced Capabilities	3	2016	2	2018
CFFT Enhanced Joint Fires Observer (JFO) Training and Certification Requirements	2	2017	3	2018
LVC-IA - Version 1	1	2010	4	2012
LVC-IA - Version 2 (Development, Integration, Demonstration and Testing)	1	2014	3	2016
LVC-IA - Version 3 (Development, Integration, Demonstration and Testing)	4	2016	3	2018
LVC-IA - Version 4 (Development, Integration, Demonstration and Testing)	4	2018	4	2021
LVC-IA - Concurrency with Mission Command Systems	1	2022	4	2032
Combat Training Center Live Fire Modernization (CTC Live Fire Mod)	2	2021	2	2023
Target Modernization Development	1	2016	4	2025
CSF2	1	2015	4	2016
S/SVT - Development	3	2019	3	2020
Digital Range Training System (DRTS)	2	2018	4	2023
OPFOR Integrated Air Defense System (IADS)	4	2017	4	2022

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604715A / <i>Non-System Training Devices - Eng Dev</i>	<b>Project (Number/Name)</b> 241 / <i>Nstd Combined Arms</i>

Events	Start		End	
	Quarter	Year	Quarter	Year
OPFOR Surrogate Wheeled Vehicles (OSWV)	2	2019	4	2021
BEMT Army Enterprise Network Server Development	1	2020	1	2024
Integrated Military Operations in Urban Terrain (MOUT) Training System (IMTS)	2	2020	4	2021
OPFOR Attack Aircraft Shoot-back Capability (OA2SBC)	2	2021	2	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	208.965	33.502	43.651	27.000	70.651	49.051	39.720	24.397	16.692	Continuing	Continuing
126: <i>PEO Electronic Protect</i>	-	0.000	14.715	15.619	-	15.619	3.650	0.000	0.000	0.000	0.000	33.984
146: <i>Air &amp; Msl Defense Planning Control Sys</i>	-	23.405	12.656	8.392	-	8.392	2.912	1.227	3.402	3.197	Continuing	Continuing
149: <i>Counter-Rockets, Artillery &amp; Mortar</i>	-	14.785	6.131	0.908	-	0.908	0.000	0.000	0.000	0.000	Continuing	Continuing
FG5: <i>Counter Unmanned Aerial Systems (UAS)</i>	-	170.775	0.000	18.732	27.000	45.732	42.489	38.493	20.995	13.495	0.000	331.979

**Note**

ALPS was previously funded under PE 0603327A.

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

Army Long-Range Persistent Surveillance (ALPS) is a passive sensor that provides long range surveillance against Cruise Missile (CM), Fixed Wing (FW), Rotary Wing (RW), and Unmanned Aircraft System (UAS) threats. Prototype systems will be provided to meet EUCOM, INDOPACOM, and CENTCOM (JUON-CC-0576) identified operational needs and to conduct an assessment by the combatant commander(s). The objectives of this effort are to provide component and subsystem maturity in a system-of-systems environment and to reduce subsequent integration risk.

The Air Missile Defense Planning and Control System (AMDPCS) provides integration of air and missile defense operations at all echelons. Specifically, the Air and Missile Defense Work Station (AMDWS) provides a correlated air picture using local radars, allowing the Commander the visibility and situational understanding of the airspace; other automated defense design and staff planning tools in AMDWS affords soldiers horizontal and vertical collaborative planning with adjacent units. Air Defense System Integrator (ADSI) serves as a joint tactical data link gateway/air picture, and when correlated by Forward Area Air Defense Command and Control (FAAD C2) and displayed on AMDWS, provides a near real time, three dimensional air picture for the Commander. Joint Tactical Terminal (JTT) provides soldiers theater ballistic missile (TBM) early warning, allowing them to take appropriate actions. AMDPCS is fielded to Army air and missile defense commands (AAMDC), air defense artillery brigades (ADA BDE), air and missile defense battalions (AMD BN), and Terminal High Altitude Area Air Defense Batteries (THAAD BTRY). Air Defense Airspace Management (ADAM), a variant of AMDPCS with similar capabilities, is fielded to corps, divisions, brigade combat teams (BCTs), and multi-functional support brigades. As part of the capability and technology reuse, AMDWS and FAAD C2 are core components of the Counter-Rocket, Artillery, Mortar (C-RAM) system-of-systems currently deployed in multiple areas of operation.

The C-RAM system-of-systems is an evolutionary program that detects RAM launches, provides localized warning to the defended area, intercepts rounds in flight, and enhances response to and defeat of enemy forces. C-RAM combines multi-service fielded and non-developmental item sensors, command and control (C2) equipment, warning systems, and a modified U.S. Navy intercept system (Land-based Phalanx Weapon System [LPWS]), all connected via a wireless local area

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>
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network. The FAAD C2 system has been enhanced to integrate the sensors, weapons, and warning systems to provide C2 for the C-RAM system-of-systems. FAAD C2 software correlates the RAM sensor data, evaluates the threat, provides early warning, directs engagements, and cues counterfire systems and reaction forces. FAAD C2 employs an agile software development, maintenance, and sustainment strategy, with Urgent Materiel Releases (UMR) every six (6) months and Full Materiel Releases (FMR) every 15-18 months to keep pace with rapidly fielding integrated systems to meet operational needs. C-RAM capability in theater is supported through the Overseas Contingency Operations (OCO) process. Base RDT&E supports FAAD C2 basic Air Defense functionality as well as directed enhancements to the C-RAM system-of-systems capability, such as development and integration of C-RAM network security enhancements and development of all-digital radar technology to address emerging threats.

The Counter-Unmanned Aircraft Systems (C-UAS) effort is in response to Joint Urgent Operational Need (JUON) CC-0558 to support identification, development, testing, evaluation, and integration of technologies to provide an overall evolutionary capability to defeat small UAS threats at 89 U.S. Central Command (USCENTCOM) sites. The C-UAS effort provides warfighters the ability to comprehensively detect, track, identify, and defeat enemy Groups 1 and 2 lightweight, low altitude, commercial off-the-shelf (COTS) UAS platforms with kinetic/non-kinetic means.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	212.373	43.502	24.944	-	24.944
Current President's Budget	208.965	33.502	43.651	27.000	70.651
Total Adjustments	-3.408	-10.000	18.707	27.000	45.707
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-15.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	5.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-3.408	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	18.707	27.000	45.707

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

**Project:** 149: *Counter-Rockets, Artillery & Mortar*

Congressional Add: *All-Digital Radar Development*

Congressional Add: *C-RAM Network Security Enhancements*

Congressional Add: *Multi-Layered Tactical Protection System*

Congressional Add Subtotals for Project: 149

Congressional Add Totals for all Projects

	<b>FY 2019</b>	<b>FY 2020</b>
	8.000	-
	5.000	-
	-	5.000
Congressional Add Subtotals for Project: 149	13.000	5.000
Congressional Add Totals for all Projects	13.000	5.000

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	
<b>Change Summary Explanation</b> FY 2021 Base funding of \$18.732 million supports Counter-Unmanned Aircraft System (C-UAS) detection capability enhancements using a common command and control.  FY 2021 OCO funding increase of \$27.000 million supports technological development to keep pace with evolving threats.		

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 126 / PEO Electronic Protect
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
126: PEO Electronic Protect	-	0.000	14.715	15.619	-	15.619	3.650	0.000	0.000	0.000	0.000	33.984
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

ALPS was previously funded under PE 0603327A.

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

Army Long-Range Persistent Surveillance (ALPS) is a passive sensor that provides long range surveillance against Cruise Missile (CM), Fixed Wing (FW), Rotary Wing(RW), and Unmanned Aircraft System (UAS) threats. Prototype systems will be provided to meet EUCOM, INDOPACOM, and CENTCOM (JUON-CC-0576) identified operational needs and to conduct an assessment by the combatant commander(s). The objectives of this effort are to provide component and subsystem maturity in a system-of-systems environment and to reduce subsequent integration risk.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p><b>Title:</b> ALPS Development and Integration</p> <p><b>Description:</b> Provide ALPS systems to meet multiple Combatant Command (COCOM) operational needs and integrate ALPS into the AIAMD architecture.</p> <p>Prototype systems are being provided to meet multiple Combatant Command operational needs and to conduct an assessment. The objectives of this effort are to prove component and subsystem maturity in a system-of-systems environment and to reduce subsequent integration risk. ALPS will also be integrated into the AIAMD architecture.</p> <p><b>FY 2020 Plans:</b> Continue providing additional ALPS prototype systems to meet multiple Combatant Command identified operational needs and continue the assessment. Continue integration of ALPS to support the overall AIAMD architecture.</p> <p><b>FY 2021 Base Plans:</b> Integrate, procure, deploy, and install ALPS Prototype systems to meet the urgent operational requirements of multiple combatant commands, specifically EUCOM, INDOPACOM, and CENTCOM. Site survey and Contractor Logistics Support (CLS) activities will be supporting efforts to ensure mission success. CLS will include deployment of field service representatives to support deployed prototype systems. Purchase,</p>	-	14.046	15.619	-	15.619

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 126 / PEO Electronic Protect

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
assemble, deploy, install, support, and assess ALPS prototype systems in support of EUCOM, INDOPACOM, and CENTCOM (JUON-CC-0576) identified operational needs.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> The quantity of assets assembled, deployed, and installed are different.					
<b>Title:</b> FY 2020 SBIR/STTR Transfer	-	0.669	-	-	-
<b>Description:</b> Funding transferred in accordance with Title 15 USC ?638					
<b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638					
<b>Accomplishments/Planned Programs Subtotals</b>	-	14.715	15.619	-	15.619

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• EF9: System Integration and Test	74.295	97.746	0.166	-	0.166	0.169	-	-	-	0.000	172.376
• EX2: Lower Tier Air Missile Defense (LTAMD) Capability	84.981	379.772	376.373	-	376.373	332.007	241.235	87.419	88.298	0.000	1,590.085
• C50016: System Integration and Test Procurement	105.395	107.157	0.000	-	0.000	-	-	-	-	Continuing	Continuing
• FM3: Future Interceptor	-	2.000	7.992	-	7.992	7.993	7.993	7.993	7.993	0.000	41.964
• C53101: MSE Missile	1,131.276	702.437	603.188	176.585	779.773	765.887	1,008.835	908.799	804.295	Continuing	Continuing
• 0604319A: Indirect Fire Protection Capability Increment 2-Intercept (IFPC2)	10.324	-	0.000	-	0.000	-	-	-	-	0.000	10.324
• C62001: IFPC Inc 2-I Block 1 Missile 1	166.536	-	0.000	-	0.000	-	-	-	-	0.000	166.536
• C62002: IFPC INC 2-I BLOCK 1 SYSTEM	31.286	9.337	106.261	-	106.261	237.803	392.134	368.447	274.566	0.000	1,419.834

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 126 / PEO Electronic Protect
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**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2019	FY 2020	FY 2021	FY 2021	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Cost To	
			Base	OCO	Total					Complete	Total Cost
• 0604117A: Maneuver - Short Range Air Defense (M-SHORAD)	75.711	42.900	4.995	-	4.995	39.863	271.946	308.415	446.026	0.000	1,189.856
• C14300: M-SHORAD - Procurement	-	233.300	378.654	158.300	536.954	330.738	80.412	436.129	728.215	Continuing	Continuing
• 0604820A: Radar Development	37.847	95.720	109.259	-	109.259	116.381	65.512	69.343	30.849	0.000	524.911
• S40: Army Integrated Air and Missile Defense	318.850	208.638	193.929	-	193.929	63.678	33.162	94.758	74.936	0.000	987.951
• BZ5075: IAMD Battle Command System	-	29.629	201.587	-	201.587	353.561	416.995	413.356	417.415	Continuing	Continuing
• 0604741A: Air Defense Command, Control and Intelligence - Eng Dev	208.965	33.502	43.651	27.000	70.651	49.051	39.720	24.397	16.692	0.000	442.978
• AD5070: AIR & MSL Defense Planning & Control Sys	29.913	39.061	47.374	15.143	62.517	68.778	102.399	-	-	0.000	302.668
• 0605052A: Indirect Fire Protection Capability Inc 2 - Block 1	92.674	194.366	235.770	-	235.770	341.077	181.830	98.210	13.639	0.000	1,157.566
• 149: Counter-Rockets, Artillery & Mortar	14.785	6.131	0.908	-	0.908	-	-	-	-	0.000	21.824
• 146: Air & Msl Defense Planning Control Sys	23.405	12.656	8.392	-	8.392	2.912	1.227	3.402	3.197	0.000	55.191

**Remarks**

ALPS was previously funded under PE 0603327A.

**D. Acquisition Strategy**

ALPS utilizes an existing Defense Ordnance Technology Consortium (DOTC) Other Transaction Authority (OTA) to develop and integrate prototype systems to meet multiple Combatant Command operational needs. An assessment of the prototype systems, provided in response to Combatant Command operational needs, will be used to refine requirements and assess the Army's longer-term strategy.

ALPS is executing an acquisition strategy to rapidly deliver COTS-based prototypes to COCOMs based on urgent, operational requirements. ASA(ALT) designated PEO MS as the OPR for ALPS (19 Jan 2018 memo).

The ALPS Acquisition Strategy consists of rapid integration and deployment activities. Site survey, procurement of prototype systems, deployment of those systems, and contractor logistics support are the primary subordinate tasks within the ALPS efforts to rapidly integrate and deploy systems. These tasks will end by 4QFY22 due

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b>	<b>R-1 Program Element (Number/Name)</b>	<b>Project (Number/Name)</b>
2040 / 5	PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	126 / <i>PEO Electronic Protect</i>

to the conclusion of Urgent Need. ALPS will seek OMA OCO for contractor logistics support of the systems after the end of funding, assuming COCOMs continued need for ALPS capability. ALPS will participate yearly in an integration event at the PEO MS level to integrate with current C2 and Air and Missile Defense (AMD) systems.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 126 / PEO Electronic Protect
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Other Government Agencies & Government Program Management	Various	Various : Various	-	-		1.097		1.461		-		1.461	Continuing	Continuing	Continuing
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.669		-		-		-	0.000	0.669	-
<b>Subtotal</b>			-	-		1.766		1.461		-		1.461	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
ALPS Development and Integration	Various	Various : Various	-	-		12.949	May 2020	14.158	May 2021	-		14.158	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	-		12.949		14.158		-		14.158	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	-	14.715	15.619	-	15.619	Continuing	Continuing	N/A

**Remarks**  
ALPS was previously funded under PE 0603327A.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>			<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	<b>Project (Number/Name)</b> 126 / <i>PEO Electronic Protect</i>	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
ALPS Prototype Development and Integration																												
ALPS Prototype Deployments																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	<b>Project (Number/Name)</b> 126 / <i>PEO Electronic Protect</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
ALPS Prototype Development and Integration	1	2017	4	2022
ALPS Prototype Deployments	3	2019	4	2022

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev				<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
146: Air & Msl Defense Planning Control Sys	-	23.405	12.656	8.392	-	8.392	2.912	1.227	3.402	3.197	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Air Missile Defense Planning and Control System (AMDPCS) provides integration of air and missile defense operations at all echelons. AMDPCS is comprised of the following major subsystems: Air Missile Defense Work Station (AMDWS) provides a correlated air picture using local radars, allowing the Commander the visibility and situational understanding of the airspace; other tools in AMDWS affords Soldiers horizontal and vertical collaborative planning with adjacent units. Air Defense System Integrator (ADSI) serves as a joint tactical datalink gateway/air picture. Forward Area Air Defense (FAAD), correlates the joint and local air picture and when displayed on AMDWS, provides a near real time, three dimensional air picture for the Commander. Joint Tactical Terminal (JTT) provides Soldiers Theater Ballistic Missile (TBM) early warning allowing them to take appropriate actions. AMDPCS are currently fielded to Army Air and Missile Defense Commands (AAMDC), Air Defense Artillery Brigades, (ADA BDE), Air Missile Defense Battalions (AMD BN) and Terminal High Altitude Area Air Defense Batteries (THAAD BTRY). Air Defense Airspace Management (ADAM), a variant of AMDPCS are fielded to Corps, Divisions, Brigade Combat Teams (BCTs) and multi-functional support brigades. As part of the capability and technology reuse, AMDWS external interfaces are being leveraged by Integrated Battle Command System (IBCS) to avoid redevelopment of existing capabilities. AMDWS and FAAD C2 are core components of the Counter Rocket Artillery Mortar (C-RAM) system-of- systems currently deployed in combat zones.

FY 2021 Base dollars in the amount of \$8.392 million fund engineering, development, testing, and certification of AMDWS software, as well as accreditation of AMDPCS family-of-systems shelters and software.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> AMDWS Software Development	13.929	10.820	7.612	-	7.612
<b>Description:</b> Supports LandWarNet, Common Operating Environments (COE), and Defense Information Systems Agency (DISA) architecture framework. AMDWS software engineering and development ensures interoperability and integration with maneuver battle command elements. AMDWS will interface with Integrated Air and Missile Defense (IAMD) and serves as a planning tool for the system-of-systems, as well as providing external interfaces.					
<b>FY 2020 Plans:</b> Continue AMDWS software engineering consistent with COE requirements. Upgrade the Windows 10 compliant version of AMDWS with BitLocker encryption features and replace all Windows 7 AMDWS. Perform COE integration activities with both RTSCE CE and CP CE. Continue software interoperability modifications with					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<p>C2BMC, C2IS, C2AOS, AOC WS, Patriot, IBCS, THAAD, C-RAM C2, TBMCS, COE, and ABCS to support warfighter functions. Build threat sets and weapon platform capabilities for Counter-Unmanned Aerial Systems (C-UAS) planning and defense design capabilities to support the C-RAM C-UAS planning requirements.</p> <p><b>FY 2021 Base Plans:</b> Maintain interoperability with COE, Integrated Tactical Network (ITN), and DISA requirements. Enhance capabilities, ensure continued interoperability with Army, Joint, and Coalition planning systems in order to support warfighter functions, and maintain cyber compliance. Support engineering and improvements to threat sets and weapon platform capabilities for C-UAS planning and defense design, and provide expanded integration with Integrated Air and Missile Defense Battle Command System (IBCS). Will also provide the ability to employ a non-tactical workstation, connected to a distant server.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 adjustment due to program progression through life cycle.</p>					
<p><b>Title:</b> Passive Identification, Friend or Foe (PIFF)</p> <p><b>Description:</b> Reduce the risk of fratricide by using position and identification data from self-reporting aircraft, to include UAS, within 250 nautical miles.</p>	6.902	-	-	-	-
<p><b>Title:</b> Engineering, Development, Test and Evaluation</p> <p><b>Description:</b> Ensure interoperability and cyber compliance through engineering, development, test, and evaluation of the AMDPCS family-of-systems shelter objective configurations; execute evaluation and finalization of the AMDPCS tactical communications, data processing, and vehicle/shelter/power generation/environmental system block upgrade program for fielded systems.</p> <p><b>FY 2020 Plans:</b> Continue evaluations of emerging technologies and hardware interoperability. Continue support and development of IBCS-ADAM COE configurations. Analyze system hardware to ensure equipment meets Army requirements IAW command post directed requirement, 14 December 17. Test and evaluate replacement equipment needed to maintain cyber and command post directed requirement compliance. This effort's funding will be executed by the AMDPCS program.</p> <p><b>FY 2021 Base Plans:</b></p>	1.825	0.947	0.529	-	0.529

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army			<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Continue evaluations and development of emerging technologies and hardware to ensure network and cyber compliance. Continue support, development, and evaluation of IBCS-ADAM COE configurations, ensuring equipment meets Army requirements IAW command post-directed requirement, 14 December 2017. <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 adjustment due to program progression through life cycle.					
<b>Title:</b> Software System Certification Testing, Accreditation, and Approval of Authority-to-Operate (ATO) <b>Description:</b> Accomplish software system certification testing, accreditation, and approval of ATOs for the various software systems; BitLocker encryption and other authorized/approved G6 software implementation; Army and joint integration and interoperability assessments. <b>FY 2020 Plans:</b> Continue software systems certification testing, accreditation, and approval of ATOs as required by the DOD risk management framework process. Continue Army and joint integration and interoperability assessments. <b>FY 2021 Base Plans:</b> Conduct one Army Interoperability Certification (AIC) for each of the AMDPCS software sub-systems (AMDWS, ADSI, and CDS3), leading to ATO re-accreditation and Full Material Release (FMR), ensuring Army, joint, and coalition integration and interoperability compliance. <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 adjustment due to program life cycle changes.	0.749	0.314	0.251	-	0.251
<b>Title:</b> FY 2020 SBIR/STTR Transfer <b>Description:</b> Funding transferred in accordance with Title 15 USC ?638 <b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638 <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638	-	0.575	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	23.405	12.656	8.392	-	8.392

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys

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

Line Item	FY 2019	FY 2020	FY 2021	FY 2021	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Cost To	
			Base	OCO	Total					Complete	Total Cost
• AD5070: AIR & MSL Defense Planning & Control Sys	29.913	39.061	47.374	15.143	62.517	68.778	102.399	-	-	0.000	302.668
• 149: Counter-Rockets, Artillery & Mortar	14.785	6.131	0.908	-	0.908	-	-	-	-	Continuing	Continuing
• H30503: Rocket, Artillery, Mortar (RAM) Warn	34.393	-	0.000	-	0.000	-	-	-	-	0.000	34.393
• H30504: C-RAM Enhancements	6.304	9.127	10.069	-	10.069	6.817	-	-	-	0.000	32.317
• DU3: IFPC2	10.324	-	0.000	-	0.000	-	-	-	-	Continuing	Continuing
• 0605457A: Army Integrated Air and Missile Defense (AIAMD)	318.850	208.638	193.929	-	193.929	63.678	33.162	94.758	74.936	0.000	987.951
• BZ5075: IAMD Battle Command System	-	29.629	201.587	-	201.587	353.561	416.995	413.356	417.415	Continuing	Continuing
• E10: Sentinel	37.847	95.720	109.259	-	109.259	116.381	65.512	69.343	30.849	Continuing	Continuing
• FG5: Counter Unmanned Aerial Systems (UAS)	170.775	-	18.732	27.000	45.732	42.489	38.493	20.995	13.495	0.000	331.979
• H30505: Counter Unmanned Aerial Systems (C-UAS) Efforts	250.800	20.000	0.000	37.000	37.000	-	-	-	-	0.000	307.800
• 0604117A: Maneuver - Short Range Air Defense (M-SHORAD)	75.711	42.900	4.995	-	4.995	39.863	271.946	308.415	446.026	0.000	1,189.856

**Remarks**

This program is an integral part of the Army Integrated Air and Missile Defense (IAMD) architecture.

**D. Acquisition Strategy**

The acquisition strategy relies on non-development items (NDI) and evolutionary software development to rapidly meet the demands of air defense battle management command, control, communications, computers, and intelligence (BM/C4I) requirements and to keep pace with automated information technologies. The concept of evolutionary software development will be accomplished in a series of AMDWS block releases and upgrades. AMDPCS is being developed for both the Army's Active and Reserve components.

The existing AMDWS software development contract is sole source (SS)/cost plus fixed fee (CPFF) to Northrop Grumman. Follow-on contracts will be fixed priced competitive efforts.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys
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<b>Management Services (\$ in Millions)</b>				<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>		<b>FY 2021 OCO</b>		<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Program Management Administration	Various	Various : Various	32.099	1.170	Dec 2018	0.757	Dec 2019	0.839	Dec 2020	-		0.839	Continuing	Continuing	Continuing
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.575		-		-		-	0.000	0.575	-
<b>Subtotal</b>			32.099	1.170		1.332		0.839		-		0.839	Continuing	Continuing	N/A

**Remarks**  
Not Applicable

<b>Product Development (\$ in Millions)</b>				<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>		<b>FY 2021 OCO</b>		<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
AMDWS Software Development and Engineering	SS/CPFF	Northrop Grumman : Huntsville AL	154.859	13.462	Oct 2018	10.319	Oct 2019	6.739	Oct 2020	-		6.739	Continuing	Continuing	Continuing
PIFF Development Engineering	C/FFP	Telephonics : Farmingdale NY	7.913	6.427	Apr 2019	-		-		-		-	0.000	14.340	-
ADSI Software Development and Engineering	SS/T&M	Ultra Electronics : Austin, TX	6.859	-		-		-		-		-	0.000	6.859	-
Developmental Engineering	Various	Various : Various	44.350	2.104	Dec 2018	0.885	Dec 2019	0.755	Dec 2020	-		0.755	Continuing	Continuing	Continuing
<b>Subtotal</b>			213.981	21.993		11.204		7.494		-		7.494	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>		<b>FY 2021 OCO</b>		<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Certification/Testing	Various	JITC : Ft Huachuca, AZ	1.322	0.111	Feb 2019	0.051	Feb 2020	0.025	Feb 2021	-		0.025	Continuing	Continuing	Continuing

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2021 Army</b>												<b>Date:</b> February 2020			
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev				<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys							
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>		<b>FY 2021 OCO</b>		<b>FY 2021 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Interoperability Assessment	Various	CTSF : Ft Hood, TX	1.730	0.131	May 2019	0.069	May 2020	0.034	May 2021	-		0.034	Continuing	Continuing	Continuing
<b>Subtotal</b>			3.052	0.242		0.120		0.059		-		0.059	Continuing	Continuing	N/A
			<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>				
<b>Project Cost Totals</b>			249.132	23.405	12.656	8.392	-	8.392	Continuing	Continuing	N/A				
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 146 / Air & Msl Defense Planning Control Sys

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
AMDWS Block V Contract	[Redacted]																											
AMDWS Block VI Contract													[Redacted]															
AMDWS AMD Interfaces: C2BMC, Kessel Run, AOC WS, etc	[Redacted]																											
Passive Identification, Friend or Foe (PIFF) Eng./Integration	[Redacted]																											
AMDWS Software Certification Test (SCT) 7.0.2																												
AMDWS Army Interoperability Certification (AIC) 7.0.2																												
AMDWS AIC 7.0.3																												
AMDWS AIC 7.0.4																												
AMDWS AIC 8.0																												
AMDWS AIC 8.0.1																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	<b>Project (Number/Name)</b> 146 / <i>Air &amp; Msl Defense Planning Control Sys</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
AMDWS Block V Contract	2	2011	4	2021
AMDWS Block VI Contract	1	2022	2	2026
AMDWS AMD Interfaces: C2BMC, Kessel Run, AOC WS, etc	4	2012	4	2030
Passive Identification, Friend or Foe (PIFF) Eng./Integration	4	2018	1	2022
ADSI Software Engineering Development and Test	1	2006	4	2017
AWA 16.1 (COE ADAM) DOTMLPF Eval / NIE 16.2	4	2015	4	2017
Army Warfighting Assessment (AWA) 17.1 / NIE 17.2	4	2016	3	2017
Army Warfighting Assess. 18.1 / Network Integration Eval. 18.2	4	2017	3	2018
AMDWS Software Certification Test (SCT) 7.0.2	3	2019	4	2019
AMDWS Army Interoperability Certification (AIC) 7.0.2	1	2020	3	2020
AMDWS AIC 7.0.3	1	2021	3	2021
AMDWS AIC 7.0.4	1	2022	3	2022
AMDWS AIC 8.0	1	2024	3	2024
AMDWS AIC 8.0.1	1	2025	3	2025

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev					<b>Project (Number/Name)</b> 149 / Counter-Rockets, Artillery & Mortar		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
149: Counter-Rockets, Artillery & Mortar	-	14.785	6.131	0.908	-	0.908	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Counter-Rocket, Artillery, Mortar (C-RAM) system-of-systems detects RAM launches, provides localized warning to the defended area, intercepts rounds in flight, and enhances response to and defeat of enemy forces. C-RAM combines multi-service fielded and non-developmental item sensors, command and control (C2) equipment, warning systems, and a modified U.S. Navy intercept system (Land-based Phalanx Weapon System [LPWS]), all connected via a wireless local area network. The Forward Area Air Defense Command and Control (FAAD C2) system integrates the sensors, weapons, and warning systems to provide C2 for the C-RAM system-of-systems. FAAD C2 software correlates the RAM sensor data, evaluates the threat, provides early warning, directs engagements, and cues counterfire systems and reaction forces. FAAD C2 employs an agile software development strategy, with Urgent Materiel Releases (UMR) every six months and Full Materiel Releases (FMR) every 15-18 months. Base RDT&E supports FAAD C2 basic Air Defense functionality and incorporation of new Link-16 messaging.

FY 2021 Base RDT&E dollars in the amount of \$0.908 million support FAAD C2 development and enhancements based on changes in threat (e.g., air track algorithm and battle manager improvements) and incorporate Link-16 Military Standard updates.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> FAAD C2 Software Development and Enhancements	1.785	1.080	0.908	-	0.908
<b>Description:</b> Funds system-of-systems development and upgrades based on the bi-annual release of the Integrated Air and Missile Defense (IAMD) Validated Online Lifecycle Threat (VOLT) and changes in threat, integration of emerging requirements from external PMs (Mission Command) and other services/agencies, technology insertions (Internet Protocol-based communications), and interoperability requirements (joint interoperability, military standard, information assurance compliance, external interface updates). Provides development and regression testing to ensure C-RAM C2 enhancements do not negatively impact the performance of the C-RAM system-of-systems. Includes continued development of electronic warfare capabilities to counter evolving threats. Includes product assurance and further incorporation of new Link-16 messaging.					
<b>FY 2020 Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	<b>Project (Number/Name)</b> 149 / <i>Counter-Rockets, Artillery &amp; Mortar</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Support role-based user interface, initiate development of advanced battle manager and data link manager with external link forwarding and on-the-move command and control. This effort's funding will be executed by the FAAD/C-RAM program.  <b>FY 2021 Base Plans:</b> Support FAAD C2 development and enhancements based on changes in threat (e.g., air track algorithm and battle manager improvements) and incorporate Link-16 Military Standard updates.  <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 adjustment due to Army requirements.					
<b>Title:</b> FY 2020 SBIR/STTR Transfer  <b>Description:</b> Funding transferred in accordance with Title 15 USC ?638  <b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638  <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638	-	0.051	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	1.785	1.131	0.908	-	0.908

	<b>FY 2019</b>	<b>FY 2020</b>
<b>Congressional Add:</b> All-Digital Radar Development <b>FY 2019 Accomplishments:</b> All-Digital Radar Development	8.000	-
<b>Congressional Add:</b> C-RAM Network Security Enhancements <b>FY 2019 Accomplishments:</b> C-RAM Network Security Enhancements	5.000	-
<b>Congressional Add:</b> Multi-Layered Tactical Protection System <b>FY 2020 Plans:</b> Multi-Layered Tactical Protection System	-	5.000
<b>Congressional Adds Subtotals</b>	13.000	5.000

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> 149 / Counter-Rockets, Artillery & Mortar
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**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2019	FY 2020	FY 2021	FY 2021	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Cost To	
			Base	OCO	Total					Complete	Total Cost
• H30503: Rocket, Artillery, Mortar (RAM) Warn	34.393	-	0.000	-	0.000	-	-	-	-	0.000	34.393
• H30504: C-RAM Enhancements	6.304	9.127	10.069	-	10.069	6.817	-	-	-	0.000	32.317
• 146: Air & Msl Defense Planning Control Sys	23.405	12.656	8.392	-	8.392	2.912	1.227	3.402	3.197	Continuing	Continuing
• AD5070: AIR & MSL Defense Planning & Control Sys	29.913	39.061	47.374	15.143	62.517	68.778	102.399	-	-	0.000	302.668
• DU3: IFPC2	10.324	-	0.000	-	0.000	-	-	-	-	Continuing	Continuing
• S40: Army Integrated Air and Missile Defense	318.850	208.638	193.929	-	193.929	63.678	33.162	94.758	74.936	Continuing	Continuing
• BZ5075: IAMD Battle Command System	-	29.629	201.587	-	201.587	353.561	416.995	413.356	417.415	Continuing	Continuing
• E10: Sentinel	37.847	95.720	109.259	-	109.259	116.381	65.512	69.343	30.849	Continuing	Continuing
• L86: LIGHTWEIGHT COUNTER MORTAR RADAR (LCMR)	4.036	4.913	5.375	-	5.375	2.764	3.427	4.553	4.844	Continuing	Continuing
• L88: Enhanced AN/TPQ 36	5.447	12.381	14.633	-	14.633	8.953	9.440	10.031	8.512	Continuing	Continuing
• B05201: Lightweight Counter Mortar Radar	6.107	5.400	5.332	-	5.332	6.520	5.762	9.888	12.788	Continuing	Continuing
• B05310: AN/TPQ-53 Counterfire Target Acquisition Radar	324.150	16.416	72.421	-	72.421	11.829	29.868	41.921	53.408	Continuing	Continuing
• FG5: Counter Unmanned Aerial Systems (UAS)	170.775	-	18.732	27.000	45.732	42.489	38.493	20.995	13.495	Continuing	Continuing
• H30505: Counter Unmanned Aerial Systems (C-UAS) Efforts	250.800	20.000	0.000	37.000	37.000	-	-	-	-	Continuing	Continuing
• 0604117A: Maneuver - Short Range Air Defense (M-SHORAD)	75.711	42.900	4.995	-	4.995	39.863	271.946	308.415	446.026	0.000	1,189.856

**Remarks**

This program is an integral part of the Army Integrated Air and Missile Defense (IAMD) architecture.

**D. Acquisition Strategy**

The C-RAM program is following an evolutionary acquisition strategy for rapid fielding of mature technology to the user. The objective of the strategy is to balance needs, available technology, and resources to quickly provide a robust capability to engage RAM threats. Multiple C-RAM systems have transitioned to acquisition programs,

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b>	<b>R-1 Program Element (Number/Name)</b>	<b>Project (Number/Name)</b>
2040 / 5	PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	149 / <i>Counter-Rockets, Artillery &amp; Mortar</i>

including C-RAM Intercept, which fields existing LPWS guns to two Indirect Fire Protection Capability/Avenger battalions, and RAM Warn, which provides early, localized warning to all maneuver brigade combat teams. Development and upgrade of FAAD/C-RAM C2 software, to include enhanced capability to support emerging mission command requirements, technology insertion, and interoperability, is accomplished through a five-year CPIF contract awarded to Northrop Grumman Mission Systems.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)						Project (Number/Name)					
2040 / 5				PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev						149 / Counter-Rockets, Artillery & Mortar					
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration	Various	Various : Various	26.602	0.149	Nov 2018	0.085	Nov 2019	0.073	Nov 2019	-		0.073	Continuing	Continuing	Continuing
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.051		-		-		-	0.000	0.051	-
<b>Subtotal</b>			26.602	0.149		0.136		0.073		-		0.073	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
C-RAM C2 Development and Enhancements	C/CPIF	Northrop Grumman : Redondo Beach, CA	106.589	0.900	Apr 2019	1.012	Apr 2020	0.835	Apr 2021	-		0.835	Continuing	Continuing	Continuing
Secure Communications	SS/CPFF	Northrop Grumman : Huntsville, AL	9.578	-		-		-		-		-	0.000	9.578	-
Secure Communications (Next Gen)	C/CPFF	Northrop Grumman : Huntsville, AL	10.000	5.000	Sep 2019	-		-		-		-	0.000	15.000	-
All-Digital Radar Development	C/FFP	Raytheon Company : Andover, MA	8.000	8.000	Aug 2019	-		-		-		-	Continuing	Continuing	Continuing
LPWS Enhancements	C/CPIF	Raytheon Company : Tucson, AZ	10.307	-		-		-		-		-	0.000	10.307	-
Multi-Layered Tactical Protection System	C/FFP	TBD : TBD	-	-		4.983	Sep 2020	-		-		-	0.000	4.983	-
<b>Subtotal</b>			144.474	13.900		5.995		0.835		-		0.835	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Miscellaneous Test Support	Various	Various : Various	23.968	0.242	Jan 2019	-		-		-		-	Continuing	Continuing	Continuing





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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	<b>Project (Number/Name)</b> 149 / <i>Counter-Rockets, Artillery &amp; Mortar</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
C-RAM C2 v5.5C-2.0 Full Materiel Release (FMR)	2	2016	2	2016
FAAD C2 Development	1	2013	4	2021
C-RAM Directed Enhancements - Integration & Test	1	2012	4	2017
C-RAM Enhancements - Development, Integration & Test	1	2016	4	2021
LPWS Sp. 6.4.1 Urgent Materiel Release (UMR)	4	2017	4	2017
C-RAM C2 v5.5C-2.2p3 Full Software Release	3	2018	3	2018
C-RAM C2 v5.6A-1.0p1.1 and v5.6A-1.0p3 Urgent Materiel Release (UMR)	4	2018	4	2018
LPWS Sp. 6.4.3.1 and FAAD C2 v5.6A-2.2 UMR	2	2019	2	2019
FAAD C2 v5.6A-2.4 UMR	3	2019	3	2019
FAAD C2 v5.6B System Certification Test (SCT)	3	2019	3	2019
Army Interoperability Certification (AIC) T11.24 (v5.6B)	4	2019	4	2019
Joint Interoperability Test (JIT) 20-02 (V5.6C)	1	2020	2	2020
FAAD C2 v5.6A Full Materiel Release (FMR)	1	2020	1	2020
C-RAM C2 v5.5C-2.0 Full Materiel Release (FMR)	2	2016	2	2016
C-RAM Intercept Operational Assessment (OA)	2	2015	2	2015
C-RAM Intercept (LPWS Spiral 6.0) Materiel Release	3	2016	3	2016
FAAD C2 v5.6A-2.4p2 Rapid Acquisition Authority (OFS/OIR)	1	2020	1	2020
AIC 20.2 (v5.6C)	2	2020	2	2020
FAAD C2 v5.6C SCT	4	2020	4	2020
FAAD C2 v5.6B FMR	1	2021	1	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev					<b>Project (Number/Name)</b> FG5 / Counter Unmanned Aerial Systems (UAS)		
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
FG5: Counter Unmanned Aerial Systems (UAS)	-	170.775	0.000	18.732	27.000	45.732	42.489	38.493	20.995	13.495	0.000	331.979
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Counter-Unmanned Aircraft Systems (C-UAS) effort is in response to Joint Urgent Operational Need (JUON) CC-0558 to support identification, development, testing, evaluation, and integration of technologies to provide an overall evolutionary capability to defeat small UAS threats at 89 U.S. Central Command (USCENTCOM) sites. The C-UAS effort provides warfighters the ability to comprehensively detect, track, identify, and defeat enemy Groups 1 and 2 lightweight, low altitude, commercial off-the-shelf (COTS) UAS platforms with kinetic/non-kinetic means.

FY 2021 Base dollars in the amount of \$18.732 million will support detection capability enhancements using a common command and control.

FY 2021 OCO dollars in the amount of \$27.000 million support technological development to keep pace with evolving threats.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Counter-UAS Capability Development	170.775	-	18.732	27.000	45.732
<b>Description:</b> Development, integration, and test of electronic warfare and kinetic kill defeat options for the Low-slow-small UAS Integrated Defeat System (LIDS).					
<b>FY 2021 Base Plans:</b> FY 2021 Base funding will support detection capability enhancements using a common command and control.					
<b>FY 2021 OCO Plans:</b> Develop new electronic warfare mitigation techniques for LIDS, to keep pace with evolving UAS threats.					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 OCO funds increase due to continuing C-UAS mission requirements.					
<b>Accomplishments/Planned Programs Subtotals</b>	170.775	-	18.732	27.000	45.732

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> FG5 / Counter Unmanned Aerial Systems (UAS)
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• H30505: Counter Unmanned Aerial Systems (C-UAS) Efforts	250.800	20.000	0.000	37.000	37.000	-	-	-	-	0.000	307.800

**Remarks**

**D. Acquisition Strategy**

The Acquisition Strategy for the C-UAS JOUN CC-0558 includes deploying interim capabilities followed by spiral enhancements. The interim capability seeks to leverage, modify and/or integrate existing technologies into a System of System (SoS) solution capable of identifying, tracking, and defeating current known threats. Spiral development efforts will increase capabilities using mature technologies developed by industry partners to augment and/or replace the interim solution. All systems fielded will be tested to identify capabilities and limitations, which will be used to deliver training and support solutions for deploying hardware. In order to keep the solutions abreast of rapidly emerging adversarial UAS threats, this effort will continuously seek industry technology advances which could result in technology upgrades making these systems capable against emerging threats.

During the period FY 2018 - 2020, a baseline System of System will be fielded to fulfill JOUN CC-0558 needs. Beginning in FY21, RDTE effort will focus on technical refreshes which will keep pace with emerging threats.

The C-UAS effort utilizes multiple contract vehicles, types, and vendors.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev				FG5 / Counter Unmanned Aerial Systems (UAS)							
<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	Various : Various	21.870	9.930	Dec 2018	-		1.686		2.374	Nov 2020	4.060	Continuing	Continuing	-
<b>Subtotal</b>			21.870	9.930		-		1.686		2.374		4.060	Continuing	Continuing	N/A
<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
Fixed/Mobile System Development	Various	Various : Various	47.529	37.620	Jan 2019	-		0.000		21.144	Jan 2021	21.144	Continuing	Continuing	-
Kinetic Defeat Development	Various	Various : Various	110.703	28.250	May 2019	-		-		-		-	Continuing	Continuing	-
Sensor Development	Various	Various : Various	36.955	57.484	Jun 2019	-		-		-		-	Continuing	Continuing	-
C-UAS C2 Software Development	C/CPIF	Northrop Grumman : Redondo Beach, CA	22.611	7.879	Apr 2019	-		14.611	Apr 2021	-		14.611	Continuing	Continuing	-
Dismounted/Handheld Systems Development	Various	Various : Various	15.899	3.123		-		-		-		-	Continuing	Continuing	-
<b>Subtotal</b>			233.697	134.356		-		14.611		21.144		35.755	Continuing	Continuing	N/A
<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	Various	Various : Various	38.133	26.489	Aug 2019	-		2.435		3.482	Jan 2021	5.917	0.000	70.539	-
<b>Subtotal</b>			38.133	26.489		-		2.435		3.482		5.917	0.000	70.539	N/A
<b>Project Cost Totals</b>			293.700	170.775		0.000		18.732		27.000		45.732	Continuing	Continuing	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / Air Defense Command, Control and Intelligence - Eng Dev	<b>Project (Number/Name)</b> FG5 / Counter Unmanned Aerial Systems (UAS)

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C-UAS Emerging Threat Development																												
LIDS System-of-Systems (SoS) Record Test																												
E-LIDS/M-LIDS Inc 1 Engineering Test																												
LIDS Advanced Position, Navigation & Timing (PNT) Test																												
E-LIDS/M-LIDS Inc 1 Record Test																												
Inc 1 SoS Record Test																												
FY20 Summer Test																												
Bi-Annual Test Events (Winter & Summer)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604741A / <i>Air Defense Command, Control and Intelligence - Eng Dev</i>	<b>Project (Number/Name)</b> FG5 / <i>Counter Unmanned Aerial Systems (UAS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
C-UAS Emerging Threat Development	1	2017	4	2025
Mobile LIDS (M-LIDS) Inc 1 Testing and Downselect	1	2018	1	2018
Expeditionary LIDS (E-LIDS) Engineering and Record Test	2	2018	2	2018
M-LIDS Inc 1 Engineering and Record Test	3	2018	4	2018
LIDS System-of-Systems (SoS) Record Test	4	2018	1	2019
E-LIDS/M-LIDS Inc 1 Engineering Test	3	2019	3	2019
LIDS Advanced Position, Navigation & Timing (PNT) Test	4	2019	4	2019
E-LIDS/M-LIDS Inc 1 Record Test	1	2020	1	2020
Inc 1 SoS Record Test	1	2020	1	2020
FY20 Summer Test	3	2020	3	2020
Bi-Annual Test Events (Winter & Summer)	1	2021	4	2025

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	21.354	11.636	10.150	-	10.150	11.758	16.798	18.270	17.787	0.000	107.753
361: <i>Intelligence Simulation Systems</i>	-	4.936	3.026	2.024	-	2.024	0.000	0.000	0.000	0.000	0.000	9.986
362: <i>Jnt Land Component Constructive Trng</i>	-	16.418	8.610	8.126	-	8.126	11.758	16.798	18.270	17.787	0.000	97.767

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

This program element funds the development of constructive and wargame simulations used to realistically train commanders and their battle staffs on today's complex battlefield conditions.

Project 361 funds the development of the Intelligence Electronic Warfare Tactical Proficiency Trainer (IEWTPT). IEWTPT is a Non-System Training Device (NSTD) which supports home station training by simulating and stimulating Military Intelligence (MI) organic or surrogate equipment. It enables sustainment of critical individual and collective MI tasks/skills and is the core of the US Army Intelligence Center of Excellence (USAICoE) Military Intelligence (MI) holistic training strategy supporting mission command, targeting, and MI soldier readiness. IEWTPT provides a realistic simulation intelligence target environment for Multi-Intelligence disciplines such as All Source Analysis, Signals Intelligence (SIGINT), Imagery Intelligence (IMINT), Human Intelligence (HUMINT), Geospatial Intelligence (GEOINT) and must stimulate and emulate multiple Intelligence, Surveillance, Reconnaissance (ISR) platform systems such as: Prophet, Distributed Common Ground Station-Army (DCGS-A); Tactical Ground Station (TGS); and Aerial Intelligence assets such as Enhanced Medium Altitude Reconnaissance and Surveillance System (EMARSS) and Guardrail Common Sensor (GRCS). IEWTPT provides training capabilities supporting detailed ISR individual, crew, and collective level mission rehearsals/exercises. IEWTPT can utilize a constructive simulation feed or operate in a stand-alone mode. IEWTPT provides the "Digital Range" for Warfighting Commanders at all echelons to train intelligence tasks based on accurately portraying the operational environment and simulating and stimulating MI equipment where system operators and analysts are able to synchronize their Intelligence, Surveillance, and Reconnaissance (ISR) assets to exploit exercise intelligence data and provide the commander with required, executable, intelligence information in support of decision making. IEWTPT provides training for analyst and system operators to exploit intelligence data during training, just as they would in "Real World" operations. The IEWTPT Technical Control Cell (TCC) is composed of two components: The Lower Enclave (LE) which supports exercise planning and development and drives the All Source and GEOINT training tasks and the Upper Enclave (UE) which supports all SIGINT related training and operates at the Top Secret / Sensitive Compartmented Information (TS/SCI) classification level.

FY 2021 funding in the amount of \$2.024 million supports MI soldier readiness and mission command by developing interface capabilities with Intelligence, Surveillance, Reconnaissance (ISR) platform programs/systems of record to train detailed military intelligence mission essential tasks in a simulation environment. The funds provide the development of web-enabled, cloud ready capabilities and emerging Electronic Warfare (EW) and intelligence support to Cyber operations for inclusion into the Technical Control Cell (TCC) software baseline. Additionally, funding will provide for transition to IEWTPT Increment 2 in FY 2022 by leveraging the existing mature program baseline. Increment 2 will be a software only environment and will provide training capabilities that are synchronized with emerging Intelligence Corps system modernization priorities supporting multi-domain operations.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>
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Project 362, Joint Land Component Constructive Training Capability (JLCCTC) supports Army Title X training worldwide for Army Commanders and their staff at Mission Training Complexes (MTCs), Training and Doctrine Command (TRADOC) facilities, and other customer locations. JLCCTC trains Commanders and their staff in Decisive Actions to include offensive, defensive, stability, civil support operations, and is in the process to satisfy Multi-Domain Operations (MDO) requirements moving forward. JLCCTC is a software modeling and simulation capability that contributes to Army Training Mission Area by providing appropriate levels of model and simulation resolution and fidelity to support unit collective and combined arms training. The JLCCTC provides a composable federation configurable to any combination of models and simulations, as required by training exercise intent/design. The JLCCTC provides accurate representations of tactically and operationally relevant land warfare operations executed in a contemporary Joint operating environment/context in support of Army Training and Readiness.

FY 2021 base funding in the amount of \$8.134 million will complete Version 9.0 and will commence development, integration and test, and verification and validation activities for JLCCTC Version 10.0 to train Commanders and their Staff. JLCCTC will continue to support emerging Common Operating Environment / Computing Environment (COE/CE), Mission Command (MC), Cyber Security/Risk Management Framework (RMF), and Concurrency warfighter requirements. In addition, JLCCTC will continue to support the integration activities with Live, Virtual, Constructive-Integrated Architecture (LVC-IA), Combat Training Center Instrumentation System (CTC-IS), IEWTPT, and conduct Army ground model Analysis of Alternative (AoA) to interface with the Joint simulation capability.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	22.600	11.636	8.096	-	8.096
Current President's Budget	21.354	11.636	10.150	-	10.150
Total Adjustments	-1.246	0.000	2.054	-	2.054
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.246	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	2.054	-	2.054

**Change Summary Explanation**

Project 361 had no funding changes between Current President's Budget and Previous President's Budget.  
 Project 362 has a funding decrease from FY 2020 to FY 2021 in support of the Army's modernization priorities.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>				<b>Project (Number/Name)</b> 361 / <i>Intelligence Simulation Systems</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
361: <i>Intelligence Simulation Systems</i>	-	4.936	3.026	2.024	-	2.024	0.000	0.000	0.000	0.000	0.000	9.986
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This program element funds the Intelligence & Electronic Warfare Tactical Proficiency Trainer (IEWTPT) supporting home station training by simulating and stimulating Military Intelligence (MI) organic or surrogate equipment. It enables sustainment of critical individual and collective Military Intelligence (MI) tasks/skills and is the core of the US Army Intelligence Center of Excellence (USAICoE) Military Intelligence holistic training strategy supporting mission command, targeting, and MI soldier readiness. IEWTPT provides a realistic simulation intelligence target environment for Multi-Intelligence disciplines such as All Source Analysis, Signals Intelligence (SIGINT), Imagery Intelligence (IMINT), Human Intelligence (HUMINT), Geospatial Intelligence (GEOINT) and must stimulate and emulate multiple Intelligence, Surveillance, Reconnaissance (ISR) platform systems such as: Prophet, Distributed Common Ground Station-Army (DCGS-A); Tactical Ground Station (TGS); and Aerial Intelligence assets such as Enhanced Medium Altitude Reconnaissance and Surveillance System (EMARSS) and Guardrail Common Sensor (GRCS). IEWTPT provides training capabilities supporting detailed ISR individual, crew, and collective level mission rehearsals/exercises. IEWTPT can utilize a constructive simulation feed or operate in a stand-alone mode. IEWTPT provides the "Digital Range" for Warfighting Commanders at all echelons to train intelligence tasks based on accurately portraying the operational environment and simulating and stimulating MI equipment where system operators and analysts are able to synchronize their Intelligence, Surveillance, and Reconnaissance (ISR) assets to exploit exercise intelligence data and provide the commander with required, executable, intelligence information in support of decision making. IEWTPT provides training for analyst and system operators to exploit intelligence data during training, just as they would in "Real World" operations. The IEWTPT Technical Control Cell (TCC) is composed of two components: The Lower Enclave (LE) which supports exercise planning and development and drives the All Source and GEOINT training tasks and the Upper Enclave (UE) which supports all SIGINT related training and operates at the Top Secret / Sensitive Compartmented Information (TS/SCI) classification level.

FY 2021 funding in the amount of \$2.024 million supports MI soldier readiness by developing interface capabilities with Intelligence, Surveillance, Reconnaissance (ISR) platform programs/systems of records to train detailed military intelligence mission essential tasks in a simulation environment in support of Mission Command and Targeting. The funds provide the development of web-enabled and cloud ready capabilities and emerging Electronic Warfare (EW) and intelligence support to Cyber operations for inclusion into the Technical Control Cell (TCC) software baseline. Additionally, funding will provide for transition to IEWTPT Increment 2 in FY 2022 by leveraging the existing mature program baseline. Increment 2 will be a software only environment and will provide training capabilities that are synchronized with emerging Intelligence Corps system modernization priorities supporting multi-domain operations.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> IEWTPT development, integration and support.	4.936	2.888	2.024
<b>Description:</b> Continue IEWTPT development, integration and support to the user community.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 361 / <i>Intelligence Simulation Systems</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p><b>FY 2020 Plans:</b> Will support V10.0 release and baseline improvements/concurrency in development of detailed simulation interface capabilities for Intelligence, Surveillance, Reconnaissance (ISR) platform systems in the PEO Intelligence Electronic Warfare &amp; Sensors (PEO IEW&amp;S) portfolio to support home-station intelligence training. Finalize a prototype cloud enabled training portal for the TCC and multi-intelligence training in a distributed/federated environment. Expand All Source, SIGINT baselines and begin task analysis of Electronic Warfare Open Source (OSINT) intelligence initial capabilities. Expand HUMINT, point of need, web-based, training capabilities, SIGINT scenario development tools, capabilities and evolve sensor emulation effects modeling as well as electronic intelligence replication for the simulation /user environment. Will execute technology development and integration supporting product deliverables needed to meet Ft. Huachuca and Army G2 training strategy requirements. Develop linkages to migrate to designated Core Data Center/Common Operating Environment/Computing and Synthetic Training Environments.</p> <p><b>FY 2021 Plans:</b> Supports V11.0 Security Accreditation, Version 11.01 release and incremental baseline improvements of detailed simulation interface capabilities for Intelligence, Surveillance, Reconnaissance (ISR) platform systems in the PEO Intelligence Electronic Warfare &amp; Sensors (PEO IEW&amp;S) portfolio to support home-station intelligence training. Develop prototype cloud ready baseline for the TCC transition to Increment 2, multi-intelligence training improvements that includes but not limited to: distributed/federated construct simulation environment, expand All Source, SIGINT baselines and begin detailed electronic warfare and cyber support task analysis in support of the Army's Multi Domain Operation strategy.</p> <p>Expand EW/SIGINT integration and cloud ready, point of need training capabilities. Expand SIGINT scenario development tools for cloud employment; sensor emulation effects modeling as well as theater and national level intelligence replication for the simulation /user environment. Will execute technology development and integration supporting product deliverables needed to meet Intelligence Center of Excellence (ICoE) and Army G2 training and modernization strategies. Develop and maintain appropriate linkages to ISR platform programs/systems to meet the Army's multi-domain intelligence training requirements.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Decrease in FY 2020 to FY 2021 funding is in support of the Army's modernization priorities.</p>				
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b></p>		-	0.138	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 361 / <i>Intelligence Simulation Systems</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
Funding transferred in accordance with Title 15 USC ?638			
<b>Accomplishments/Planned Programs Subtotals</b>	4.936	3.026	2.024

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

<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• NA0102: <i>NSTD INTELLIGENCE</i>	4.658	6.081	1.607	-	1.607	-	-	-	-	0.000	12.346

**Remarks**

NA0102= Other Procurement Army (OPA)

**D. Acquisition Strategy**

A full and open competitive five (5) year, cost plus fixed fee (CPFF) type contract, was awarded to General Dynamics Mission Systems, Orlando, FL on 16 February 2017. This IEWTPT Increment I/Block II contract has a two (2) year base with three (3) one (1) year options. The contract continues the incremental development, integration, test and evaluation, production and fielding and exercise/technical/training support for the US Army Military Intelligence Corps. The FY 2020 funds will provide continued version 10.0 development, testing, production, and integration of the IEWTPT system and software version releases and will set the conditions for Increment 2 in FY 2022 and intelligence modernization lines of effort. FY2021 funding will provide for continued Increment 2 transition planning and a full and open competitive re-procurement of the IEWTPT contract. An eight year IDIQ (Indefinite Delivery/Indefinite Quantity) contract is planned for IEWTPT Increment 2 beginning 4th QTR FY 2021. This competitive procurement will ensure future training capabilities are nested with the Intelligence Corps modernization priorities for multifunctional intelligence support to maneuver commanders.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604742A / Constructive Simulation Systems Development				361 / Intelligence Simulation Systems							
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	PEO STRI : Orlando, FL	11.018	-		-		-		-		-	Continuing	Continuing	Continuing
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.138		-		-		-	0.000	0.138	-
<b>Subtotal</b>			11.018	-		0.138		-		-		-	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
TCC Technology	C/CPFF	General Dynamics C4 Systems : Orlando, Florida	7.900	-		-		-		-		-	Continuing	Continuing	Continuing
TCC Technology	C/CPFF	General Dynamics Mission Systems : Orlando, Florida	4.809	4.936	Feb 2019	1.928	Feb 2020	1.969	Nov 2020	-		1.969	Continuing	Continuing	Continuing
Eng & Manufacturing Dev. (Cloud Environment)	Option/CPFF	General Dynamics C4 Systems : Orlando, FL	63.825	-		0.960	Feb 2020	0.055	Jul 2021	-		0.055	Continuing	Continuing	Continuing
<b>Subtotal</b>			76.534	4.936		2.888		2.024		-		2.024	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering & Technical Support	Various	Various : Various	2.743	-		-		-		-		-	0.000	2.743	2.743
<b>Subtotal</b>			2.743	-		-		-		-		-	0.000	2.743	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 361 / <i>Intelligence Simulation Systems</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
TCC Development/Integration/Test																																
Version 9.0 Security Accred.		▲1																														
Version 9.0 Release			▲2																													
Version 10.0 Security Accred.					▲3																											
Version 10.0 Release						▲4																										
Version 11.0 Security Accred.									▲6																							
Version 11.0 Release										▲7																						
FOC								▲5																								
TCC Development/Integration/Test (Increment 2 EMD)																																
Capability Drop 1													▲8																			
Capability Drop 2																	▲9															
Capability Drop 3																						▲10										
Capability Drop 4																										▲11						

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 361 / <i>Intelligence Simulation Systems</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
TCC Development/Integration/Test	4	2007	4	2021
Version 4.0 Security Accred.	3	2014	3	2014
Version 4.0 Release	4	2014	4	2014
Version 5.0 Security Accred.	3	2015	3	2015
Version 5.0 Release	4	2015	4	2015
Version 6.0 Security Accred.	3	2016	3	2016
Version 6.0 Release	4	2016	4	2016
Version 7.0 Security Accred.	2	2017	2	2017
Version 7.0 Release	3	2017	3	2017
Version 8.0 Security Accred.	3	2018	3	2018
Version 8.0 Release	4	2018	4	2018
Version 9.0 Security Accred.	3	2019	3	2019
Version 9.0 Release	4	2019	4	2019
Version 10.0 Security Accred.	3	2020	3	2020
Version 10.0 Release	4	2020	4	2020
Version 11.0 Security Accred.	3	2021	3	2021
Version 11.0 Release	4	2021	4	2021
FOC	4	2020	4	2020
TCC Development/Integration/Test (Increment 2 EMD)	4	2021	2	2028
Capability Drop 1	4	2022	4	2022
Capability Drop 2	4	2023	4	2023
Capability Drop 3	4	2024	4	2024

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army			<b>Date:</b> February 2020	
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 361 / <i>Intelligence Simulation Systems</i>		

Events	Start		End	
	Quarter	Year	Quarter	Year
Capability Drop 4	4	2025	4	2025
Capability Drop 5	4	2026	4	2026
Capability Drop 6	4	2027	4	2027
Capability Drop 7	4	2028	4	2028

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>				<b>Project (Number/Name)</b> 362 / <i>Jnt Land Component Constructive Trng</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
362: <i>Jnt Land Component Constructive Trng</i>	-	16.418	8.610	8.126	-	8.126	11.758	16.798	18.270	17.787	0.000	97.767
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Joint Land Component Constructive Training Capability (JLCCTC) supports Army Title X training worldwide for Army Commanders and their staff at Mission Training Complexes (MTCs), Training and Doctrine Command (TRADOC) facilities, and other customer locations. JLCCTC trains Commanders and their staff in Decisive Actions to include offensive, defensive, stability, and civil support operations. JLCCTC is a software modeling and simulation capability that contributes to Army Training Mission Area by providing appropriate levels of modeling and simulation resolution and fidelity to support unit collective and combined arms training. JLCCTC provides a composable federation configurable to any combination of models and simulations, as required by training exercise intent/design. JLCCTC provides accurate representations of tactically and operationally relevant land warfare operations executed in a contemporary Joint operating environment/context and in support of Army Training and Readiness.

FY 2021 base funding in the amount of \$8.126 million will complete Version 9.0 and will commence development, integration and test, and verification and validation activities for JLCCTC Version 10.0 to train Commanders and their Staff. JLCCTC will continue to support emerging Common Operating Environment / Computing Environment (COE/CE), Mission Command (MC), Cyber Security/Risk Management Framework (RMF), and Concurrency warfighter requirements. In addition, JLCCTC will continue to support the integration activities with Live, Virtual, Constructive-Integrated Architecture (LVC-IA), Combat Training Center Instrumentation System (CTC-IS), IEWTPT, and conduct Army ground model Analysis of Alternative (AoA) to interface with the Joint simulation capability.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> Improve JLCCTC software models to comply with emerging Common Operating Environment (COE)/Computing Environment (CE) requirements.	0.978	0.672	0.650
<b>Description:</b> Improve JLCCTC software models to comply with emerging COE/CE requirements.			
<b>FY 2020 Plans:</b> Will continue improvements of JLCCTC software models to include common overlay development/modifications in support of COE compliance/standards.			
<b>FY 2021 Plans:</b> Will continue improvements of JLCCTC software models to include common overlay development/modifications in support of COE compliance/standards.			
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 362 / <i>Jnt Land Component Constructive Trng</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
Funding decrease from FY 2020 to FY 2021 is in support of the Army's modernization priorities.				
<p><b>Title:</b> Improve JLCCTC software models to meet emerging Mission Command (MC) stimulation and Cyber Security requirements.</p> <p><b>Description:</b> Improve JLCCTC software models to meet emerging Mission Command (MC) stimulation and Cyber Security requirements.</p> <p><b>FY 2020 Plans:</b> Continue to evolve JLCCTC to support emerging Mission Command requirements and fully comply with the Cyber Security/Risk Management Framework (RMF) requirement.</p> <p><b>FY 2021 Plans:</b> Continue to evolve JLCCTC to support emerging Mission Command requirements and fully comply with the Cyber Security/Risk Management Framework (RMF) requirement.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decrease from FY 2020 to FY 2021 is in support of the Army's modernization priorities.</p>		1.030	0.772	0.800
<p><b>Title:</b> Improve JLCCTC software models to meet emerging warfighter requirements for Concurrency of Commander and staff training (Battalion thru Theater Level).</p> <p><b>Description:</b> Improve JLCCTC software models to meet emerging warfighter requirements for Concurrency of Commander and staff training (Battalion thru Theater Level).</p> <p><b>FY 2020 Plans:</b> Continue to evolve JLCCTC software models to support additional emerging requirements in support of Commander and staff warfighter training exercises through Theater level.</p> <p><b>FY 2021 Plans:</b> Continue to evolve JLCCTC software models to support additional emerging requirements in support of Commander and staff warfighter training exercises through Theater level.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decrease from FY 2020 to FY 2021 is in support of the Army's modernization priorities.</p>		1.064	4.531	2.933
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activity for Constructive Strategy Implementation.</p> <p><b>Description:</b> Constructive Strategy Implementation</p>		2.164	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 362 / <i>Jnt Land Component Constructive Trng</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p><b>Title:</b> Government System Test and Evaluation for the Joint Land Component Constructive Training Capability (JLCCTC) Program.</p> <p><b>Description:</b> Government System Test and Evaluation for the Joint Land Component Constructive Training Capability (JLCCTC).</p> <p><b>FY 2020 Plans:</b> Continue conducting system test events (Integration and Testing) in support of the JLCCTC v9.0 validation event.</p> <p><b>FY 2021 Plans:</b> Conduct the v9.0 validation event (VE) and conduct system test events (Integration and Testing) in support of the JLCCTC v10.0 validation event (VE).</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decrease from FY 2020 to FY 2021 as efficiencies are gained with the JLCCTC Single Federation Solution.</p>		1.372	1.722	1.750
<p><b>Title:</b> Government Program Management for the Joint Land Component Constructive Training Capability (JLCCTC) Program.</p> <p><b>Description:</b> Supports Government program management, engineering, logistics, contracting support and continues operational evaluation support for JLCCTC.</p> <p><b>FY 2020 Plans:</b> Includes costs for program management, which includes technical engineering and logistics to continue operational evaluation for JLCCTC. No civilian labor is included.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decrease due to Program Management expenses moving to OMA.</p>		1.570	0.522	-
<p><b>Title:</b> JLCCTC mission command training program simulation upgrades.</p> <p><b>Description:</b> JLCCTC mission command training program simulation upgrades.</p>		8.240	-	-
<p><b>Title:</b> Conduct Army Ground Model Analysis of Alternative</p> <p><b>FY 2021 Plans:</b> Start conducting Army ground model Analysis of Alternative (AoA) to interface with Joint simulation capability.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase in funding to support emerging requirement to conduct Army ground model Analysis of Alternative (AoA) so it can interface with Joint simulation capability.</p>		-	-	1.993
<b>Title:</b> FY 2020 SBIR/STTR Transfer		-	0.391	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 362 / <i>Jnt Land Component Constructive Trng</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Description:</b> Funding transferred in accordance with Title 15 USC ?638			
<b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638			
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638			
<b>Accomplishments/Planned Programs Subtotals</b>	16.418	8.610	8.126

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• NAO103: <i>NSTD COMMAND &amp; CONTROL</i>	38.112	35.313	35.038	-	35.038	36.666	34.206	32.319	31.532	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

JLCCTC Indefinite Delivery/Indefinite Quantity (ID/IQ) contract was awarded to Lockheed Martin on 27 March 2013. This contract was extended through 30 Sep 2018. The last Delivery Order, DO 0008 ended on 22 Mar 2019. A Bridge Contract was awarded to the current contractor (13 Dec 2018) in order to provide continuing support of the JLCCTC program until the new competitive JLCCTC contract award process is completed. The Bridge Contract consists of a Base contract for 12 months thru Dec 2019 with two options, six months each. Re-compete activities began during FY 2018 with a planned award of a new contract by 1st Quarter FY 2021. The Final RFP for the Re-compete was posted to Fed Biz Ops on 25 June 2019 with proposals due on 14 August 2019.

Activities under the current and follow-on contracts include System Engineering, Software Development, Integration & Test, support to validation events and PDSS/P3I support.

JLCCTC produces a major software release/version every 18 to 24 months, which is then distributed/fielded to over 40 MTCs worldwide in support of Army Command and Staff Training.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 362 / <i>Jnt Land Component Constructive Trng</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	Various	Various : Various	66.762	1.570	Oct 2018	0.522	Oct 2019	-		-		-	Continuing	Continuing	Continuing
SBIR/STTR Transfer	TBD	PEO STRI : Orlando, FL	-	0.843	Oct 2018	-		-		-		-	0.000	0.843	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.391		-		-		-	0.000	0.391	-
<b>Subtotal</b>			66.762	2.413		0.913		-		-		-	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Constructive Strategy Implementation	C/CPFF	Lockheed Martin : Orlando, FL	7.705	2.164	Jan 2019	-		-		-		-	Continuing	Continuing	Continuing
Improve JLCCTC to meet emerging warfighter requirements.	C/CPFF	Lockheed Martin : Orlando, FL	5.823	1.064	Jan 2019	4.531	Jan 2020	2.933	Dec 2020	-		2.933	Continuing	Continuing	Continuing
MC Systems Stimulation and Cyber Security	C/CPFF	Lockheed Martin : Orlando, FL	6.502	1.030	Jan 2019	0.772	Jan 2020	0.800	Dec 2020	-		0.800	Continuing	Continuing	Continuing
COE Compliance	C/CPFF	Lockheed Martin : Orlando, FL	4.090	0.978	Jan 2019	0.672	Jan 2020	0.650	Dec 2020	-		0.650	Continuing	Continuing	Continuing
JLCCTC mission command training program simulation upgrades	C/CPFF	Lockheed Martin : Orlando, FL	-	7.397	Jan 2019	-		-		-		-	Continuing	Continuing	Continuing
Conduct Army ground Model AoA	C/CPFF	TBD : Orlando, FL	-	-		-		1.993	Dec 2020	-		1.993	0.000	1.993	-
<b>Subtotal</b>			24.120	12.633		5.975		6.376		-		6.376	Continuing	Continuing	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 362 / <i>Jnt Land Component Constructive Trng</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025												
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4									
JLCCTC Version 9.0 System Engr / Develop / I&T / Validation	[Redacted]																																				
	Version 9.0/9x																																				
JLCCTC Version 9.0 Release									▲ 1																												
									JLCCTC V9.0/9x Release																												
JLCCTC Version 10.0 System Engr / Develop / I&T / Validation	[Redacted]																																				
JLCCTC Version 10.0 Release																	▲ 2																				
																	JLCCTC V10.0 Release																				
JLCCTC Integration into LVC-IA / CTC-IS	[Redacted]																																				
	LVC-IA and CTC-IS Integration																																				
JLCCTC Constructive Strategy Implementation (Single Federati	[Redacted]				[Redacted]																																
	JLCCTC Constructive Strategy Implementation (Single Federation)				[Redacted]																																
JLCCTC Version 11.0 Sys Engr/Develop/I&T/Validation	[Redacted]																																				
JLCCTC Version 11.0 Release																													▲ 3								
																													JLCCTC V11.0 Release								

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604742A / <i>Constructive Simulation Systems Development</i>	<b>Project (Number/Name)</b> 362 / <i>Jnt Land Component Constructive Trng</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
JLCCTC Version 9.0 System Engr / Develop / I&T / Validation	1	2018	1	2021
JLCCTC Version 9.0 Release	1	2021	1	2021
JLCCTC Version 10.0 System Engr / Develop / I&T / Validation	1	2021	4	2022
JLCCTC Version 10.0 Release	1	2023	1	2023
JLCCTC Integration into LVC-IA / CTC-IS	1	2014	4	2024
JLCCTC Constructive Strategy Implementation (Single Federation)	2	2016	4	2019
JLCCTC Version 11.0 Sys Engr/ Develop/ I&T/ Validation	1	2023	4	2024
JLCCTC Version 11.0 Release	1	2025	1	2025

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	10.104	10.915	5.578	-	5.578	4.051	4.131	3.616	3.616	Continuing	Continuing
L59: <i>Diagnost/Expert Sys</i>	-	4.795	6.369	4.032	-	4.032	0.000	0.000	0.000	0.000	0.000	15.196
L65: <i>Test Equipment Development</i>	-	5.309	4.546	1.546	-	1.546	4.051	4.131	3.616	3.616	Continuing	Continuing

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

This program element (PE) provides for development and testing of general-purpose test equipment, state-of-the-art diagnostics and prognostics technologies, and software and systems to support the increasingly complex electronic components of the Army's new and upgraded weapon systems. It focuses on implementation of commercial test and diagnostic technologies across multiple weapon platforms to minimize the cost of troubleshooting and maintenance of Army equipment in the field. Funding supports modernization of the test equipment fleets by investigating technology insertions including, but not limited to, condition-based maintenance, instrument reduction/miniaturization, electro-optics (EO), radio frequency (RF), and other emerging technologies. Funding also supports development of initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and testing capabilities required for emerging weapons platforms.

Modular, reconfigurable automatic and semi-automatic systems are being developed under this program to satisfy weapon system test and diagnostics requirements. The Next Generation Automatic Test System (NGATS) provides state-of-the-art test and diagnostic capabilities to support current and future weapon systems. It is the platform for transitioning Agile Rapid Global Combat Support System (ARGCS) technologies into the Army weapon system support structure, and it will replace several aging automatic test systems (ATS) that are becoming prohibitively expensive to operate and maintain.

This PE also provides for continued development and improvement of general-purpose test equipment and calibration standards with emphasis on the incorporation of digital electronics and tailoring of configurations to improve deployability, mobility and survivability of the support equipment. It includes development, demonstration and testing of calibration standards and techniques to support new Army test equipment requirements; and, it provides for feasibility studies, market research, inventory analyses, bid sample testing and prototyping to support acquisition of calibration systems and general-purpose test and diagnostics equipment.

FY 2021 Base funding for this PE continues incremental development of the Army's standard NGATS which will improve deployability and mobility of test and diagnostic equipment. The NGATS provides state-of-the-art test and diagnostic capabilities and a means for reducing the Army's test equipment operating and support costs and the costs for supporting a number of the Army's vital warfighting systems. The FY 2021 funding will develop or significantly modify test equipment to satisfy modular force and homeland security support requirements that cannot be accommodated with test equipment currently available in the commercial marketplace such as RF and EO testing capability. It will also provide for technology insertions to modernize the Army's standard at-system tester to meet test and diagnostic requirements of the supported weapon systems, develop/redesign test program sets and hardware for support of legacy and emerging weapon systems, develop a network centric software framework for NGATS, and develop and test general-purpose test equipment and calibration standards to meet Army weapon system support requirements.

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	11.782	10.915	9.880	-	9.880
Current President's Budget	10.104	10.915	5.578	-	5.578
Total Adjustments	-1.678	0.000	-4.302	-	-4.302
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.678	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-4.302	-	-4.302

**Change Summary Explanation**

FY 2019 - Reprogramming of \$1.678 million to cover urgent unresourced requirement.  
 FY 2021 - Reduction of \$4.302 million to accommodate a higher priority requirement.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L59 / <i>Diagnost/Expert Sys</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
L59: <i>Diagnost/Expert Sys</i>	-	4.795	6.369	4.032	-	4.032	0.000	0.000	0.000	0.000	0.000	15.196
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

This Project funds development of and system enhancements for the Next Generation Automatic Test System (NGATS) and the Maintenance Support Device (MSD). The NGATS is a general-purpose automatic test system (ATS) that provides test and diagnostic capabilities required to support current and future weapons and combat support systems and will facilitate retirement of aging and obsolete test equipment that is imposing increasing logistics and operations and support cost burdens. It is the platform for transitioning Agile Rapid Global Combat Support System (ARGCS) Advanced Concept Technology Demonstration (ACTD) technologies into the Army weapon system support structure. The ARGCS ACTD initiative was sponsored by the Department of Defense, and all Services are expected to transition demonstrated technologies into their ATS programs. The MSD is the Army's standard at-system tester and requires continuing technology insertions to support modernization of the supported weapon systems. This Project funds development efforts to insert the most current relevant technology into the next generation MSD, supports capability enhancement of wireless at-platform test set (WATS) connectivity, develops capabilities to minimize or eliminate Army dependency on expensive proprietary software to support tactical vehicles, and maintains compatibility with emerging platform hardware bus technology and software interface requirements. This Project also provides for continuing efforts in the development and testing of common procedures utilizing existing test program sets and software applications, and market surveys of commercially available test equipment, methods and procedures to determine applicability to Army requirements. The test and diagnostic systems and procedures developed under this Project are essential for ensuring the operational readiness, accuracy and effectiveness of the Army's warfighting systems.

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

	FY 2019	FY 2020	FY 2021
<b>Title:</b> Next Generation Automatic Test System (NGATS) Radio Frequency (RF) Test Capability	-	0.221	0.050
<b>Description:</b> Develop and integrate NGATS RF test capability			
<b>FY 2020 Plans:</b> Continue to develop RF software libraries to support communication, mapping and radar applications in fielded ground systems. Initiate redesign of RF interface to include new requirements and expanded mission capabilities. Evaluate and incorporate new state-of-the-art sources for more accurate measurements.			
<b>FY 2021 Plans:</b> Continue to develop RF software libraries to support communication, mapping and radar applications in fielded ground systems. Continue redesign of RF interface to include new requirements and expanded mission capabilities. Evaluate and incorporate new state-of-the-art sources for more accurate measurements.			
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L59 / <i>Diagnost/Expert Sys</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
Planned effort reduced because of loss of FY 2021 funding.				
<p><b>Title:</b> NGATS Increment 2</p> <p><b>Description:</b> Develop and test hardware and software for NGATS Increment 2 support capability</p> <p><b>FY 2020 Plans:</b> Continue development and testing of state-of-the-art hardware and software for support of emerging required capabilities to support the Armored Brigade Combat Teams (ABCT). New ABCT requirements include high-speed digital, fiber channel, high-speed Ethernet and serial busses, and high power test (600V). Develop new software libraries to utilize instrument functions. Develop and implement dynamic switching capability.</p> <p><b>FY 2021 Plans:</b> Continue development and testing of state-of-the-art hardware and software for support of emerging required capabilities to support the ABCTs. New ABCT requirements include high-speed digital, fiber channel, high-speed Ethernet and serial busses, and high power test (600V). Develop new software libraries to utilize instrument functions.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Planned effort reduced because of loss of FY 2021 funding.</p>		0.050	0.371	0.200
<p><b>Title:</b> NGATS Electro-Optics (EO) Subsystem</p> <p><b>Description:</b> Develop and test hardware and software for NGATS electro-optics (EO) subsystem (to include the capability to support new ground and aerial sensors for unmanned air and ground vehicles)</p> <p><b>FY 2020 Plans:</b> Continue integration/testing of EO subsystem.</p> <p><b>FY 2021 Plans:</b> Develop model production EO subsystem to achieve cost savings of production.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 increase is required to develop model production EO subsystem to achieve cost savings of production.</p>		0.050	0.021	0.050
<p><b>Title:</b> Additional Software Capabilities for Use with NGATS</p> <p><b>Description:</b> Develop software capabilities to incorporate common logistics operating environment/netcentric and embedded diagnostics data collection and analysis for closed loop diagnostic maintenance in support of condition-based maintenance</p> <p><b>FY 2020 Plans:</b></p>		0.386	0.171	0.200

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L59 / <i>Diagnost/Expert Sys</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p>Continue development of new and emerging netcentric architecture. Continue development of software architecture that will define the transport protocol to interface to DoD common logistics environments and Logistics Modernization Program (LMP). Continue development and improvement of data packages to include health management information. Develop software to support condition-based maintenance (CBM)+.</p> <p><b>FY 2021 Plans:</b> Develop software to enhance performance of health monitoring of NGATS system.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 funds required to enhance performance of health monitoring of NGATS system.</p>				
<p><b>Title:</b> NGATS Performance Enhancement</p> <p><b>Description:</b> NGATS core instrument/software modifications to increase NGATS performance</p> <p><b>FY 2020 Plans:</b> Continue obsolescence identification and mitigation; continue analysis of system reliability and performance; identify bad actors and propose and integrate upgrades to increase readiness. Analyze new requirements from emerging weapons systems and implement system upgrades through hardware and software to meet platform testing requirements. Evaluate Peripheral Component Interconnect (PCI) Extensions for Instrumentation (PXI) technology incorporation to increase performance and reduce station life cycle cost. Develop programmable ethernet technology. Develop high speed 1553 bus technology to support line replaceable units.</p> <p><b>FY 2021 Plans:</b> Develop and test NGATS shelter modification to allow addition of electro-optics and radio frequency subsystems.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 effort in this area is less costly than previous initiatives.</p>		0.250	0.621	0.250
<p><b>Title:</b> Abrams/Bradley Test Program Set (TPS) Design</p> <p><b>Description:</b> Design, test and evaluate Abrams/Bradley TPSs to utilize modern core NGATS instrumentation vice continuing to execute on single-purpose instrumentation specifically developed to emulate Abrams/Bradley legacy test equipment (i.e., Direct Support Electrical System Test Set (DSESTS))</p> <p><b>FY 2020 Plans:</b></p>		1.926	2.372	1.300

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L59 / <i>Diagnost/Expert Sys</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p>Continue redesign of Abrams/Bradley TPSs to execute on core commercial NGATS instrumentation versus continuing to execute on single-purpose instrumentation specifically developed for testing Abrams/Bradley line replaceable units (LRU). Redesign interconnect devices (ICD) to incorporate printed circuit boards and ribbon cables to reduce cost and maintenance.</p> <p><b>FY 2021 Plans:</b> Continue redesign of Abrams/Bradley TPSs to execute on core commercial NGATS instrumentation versus continuing to execute on single-purpose instrumentation specifically developed for testing Abrams/Bradley LRUs. Continue redesign of ICDs to incorporate printed circuit boards and ribbon cables to reduce cost and maintenance.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Level of effort required for Abrams/Bradley TPS redesign has decreased for FY 2021.</p>				
<p><b>Title:</b> Electro-Optic (EO) TPS Development</p> <p><b>Description:</b> Develop Increment 2 and 3 EO TPSs for use with NGATS EO asset to utilize (Army standard) core NGATS instrumentation vice legacy automatic test systems such as DSESTS and Base Shop Test Facility (BSTF)(V)5</p> <p><b>FY 2020 Plans:</b> Develop and rehost EO TPSs in support of the Armored Brigade Combat Teams (ABCT) to include Common Remotely Operated Weapons Station (CROWS) low profile in improved gunners primary site, laser range finding and forward looking infrared (FLIR).</p> <p><b>FY 2021 Plans:</b> Continue development and rehost of EO TPSs in support of the ABCT to include CROWS low profile in improved gunners primary site, laser range finding and FLIR.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Planned effort reduced because of loss of FY 2021 funding.</p>		-	0.271	0.100
<p><b>Title:</b> NGATS Logistics Support Products</p> <p><b>Description:</b> Develop NGATS initial logistics support products (including provisioning, technical manuals and calibration)</p> <p><b>FY 2020 Plans:</b> Continue development of NGATS EO and RF logistics products for use with the full-rate production NGATS.</p> <p><b>FY 2021 Plans:</b> Develop updates to technical manuals and technical bulletins to support organic calibration of NGATS.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b></p>		1.250	1.221	0.636

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L59 / <i>Diagnost/Expert Sys</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
Part of the effort previously planned for FY 2021 was funded in FY 2020 because of accelerated requirement for update of technical manuals and bulletins.				
<p><b>Title:</b> Maintenance Support Device (MSD) Technology Enhancements</p> <p><b>Description:</b> Modernizes the current MSD fleet by investigating and Incorporating relevant technology into the next-generation MSD and supporting capability enhancement of the wireless at-platform test set (WATS). Develops capabilities to minimize or eliminate Army dependency on proprietary software to support tactical vehicles and maintain compatibility with emerging platform hardware bus technology and software interface requirements.</p> <p><b>FY 2020 Plans:</b> Initiate next generation MSD market research. Incorporate greater range of supported weapons system diagnostic code fault detection into diagnostic software to support tactical vehicle sustainment concepts and ensure data bus compatibility and readability. Investigate emerging interactive electronic technical manual (IETM) viewer environments for use with future generation MSD.</p> <p><b>FY 2021 Plans:</b> Complete next-generation MSD market research. Incorporate greater range of supported weapons system diagnostic code fault detection into diagnostic software to support tactical vehicle sustainment concepts and ensure data bus compatibility and readability. Develop software to complete transition to the Army's emerging single IETM viewer/authoring environment for use with future generation MSD and diagnostic software.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2021 funds required to develop software to complete transition to the Army's emerging single IETM viewer/authoring environment.</p>		0.633	0.604	0.633
<p><b>Title:</b> NGATS Simulation Environment</p> <p><b>Description:</b> Develop a simulation environment that will allow development and testing of TPSs on a desktop environment</p> <p><b>FY 2021 Plans:</b> Develop an NGATS simulation environment to allow TPS developers and contractors to develop and test TPSs on a desktop environment. Environment will allow for a cost-effective way to develop, maintain and troubleshoot TPSs off station. Develop desktop training environment for TPS developers and maintainers.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Effort planned for FY 2020 was delayed until FY 2021 because of higher priority requirements.</p>		-	-	0.163
<p><b>Title:</b> TPS Development Environment</p>		-	-	0.250

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L59 / <i>Diagnost/Expert Sys</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p><b>Description:</b> Develop a standardized TPS development environment for NGATS</p> <p><b>FY 2021 Plans:</b> Develop the C-Oriented Test Executive (COTE) TPS development software for NGATS. Develop test executive that is standard and compliant with DoD initiatives, framework working group and the Automatic Test Equipment Management Board (AMB). Standardized test executive will promote long-term maintainability of TPSs.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Effort planned for FY 2020 was delayed until FY 2021 because of higher priority requirements..</p>				
<p><b>Title:</b> Anti-Tamper/Cyber Security</p> <p><b>Description:</b> Develop an Anti-Tamper/Cyber Security (AT/CS) software capability for NGATS</p> <p><b>FY 2020 Plans:</b> Continue development of AT/CS software capability for NGATS. Continue to upgrade existing hardware and software with constantly changing security and information assurance requirements.</p> <p><b>FY 2021 Plans:</b> Develop and perform anti-tamper documentation and testing.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Effort previously planned for FY 2021 funded in FY 2020 to complete this action as scheduled.</p>		0.250	0.207	0.200
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638</p>		-	0.289	-
<b>Accomplishments/Planned Programs Subtotals</b>		4.795	6.369	4.032

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / Automatic Test Equipment Development	<b>Project (Number/Name)</b> L59 / Diagnost/Expert Sys

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2021</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u>	<u>Total Cost</u>
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	
• MB4000: <i>Integrated Family Of Test Equipment (IFTE)</i>	82.037	78.375	78.578	-	78.578	78.146	-	-	-	0.000	317.136

**Remarks**

**D. Acquisition Strategy**

This developmental Project consists of organic and contractual actions. When the necessary expertise and capability are available within the Department of Defense, services required for the individual development projects are ordered from the government source; otherwise, commercial contracts are used. Equipment required for developmental projects is obtained by contract from the commercial supplier. Developmental efforts for the Next Generation Automatic Test System (NGATS) are being completed under a number of contracts awarded to the prime contractor for the Integrated Family of Test Equipment off-platform testers and other contractors with automatic test equipment (ATE) and test program set development capabilities. NGATS is following an evolutionary acquisition strategy using incremental development to satisfy Army depot and field testing requirements for new and existing systems. It will replace existing legacy Army ATE (i.e., Base Shop Test Facility (BSTF)(V)3, BSTF(V)5, and Direct Support Electrical System Test Set) as well as Army depot system-specific ATE.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / Automatic Test Equipment Development	<b>Project (Number/Name)</b> L59 / Diagnost/Expert Sys
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	Various	Various : Various	0.596	0.253	Jan 2019	-		-		-		-	0.000	0.849	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.289		-		-		-	0.000	0.289	-
<b>Subtotal</b>			0.596	0.253		0.289		-		-		-	0.000	1.138	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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/ Verification/Validation	Various	Various, : Various	40.398	1.019	Feb 2019	3.347	Feb 2020	1.715	Feb 2021	-		1.715	0.000	46.479	-
Hardware/Support Items Development	Various	Various, : Various	71.458	1.573	Jan 2019	2.247	Jan 2020	1.917	Jan 2021	-		1.917	0.000	77.195	-
<b>Subtotal</b>			111.856	2.592		5.594		3.632		-		3.632	0.000	123.674	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Technical Support	Various	Various, : Various	51.025	0.450	Jan 2019	0.388	Jan 2020	0.300	Dec 2020	-		0.300	0.000	52.163	-
Other Direct	Various	Various, : Various	4.630	1.500	Jan 2019	0.098	Jan 2020	0.100	Dec 2020	-		0.100	0.000	6.328	-
<b>Subtotal</b>			55.655	1.950		0.486		0.400		-		0.400	0.000	58.491	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Developmental/ Operational Testing	Various	Various, : Various	3.096	-		-		-		-		-	0.000	3.096	-
<b>Subtotal</b>			3.096	-		-		-		-		-	0.000	3.096	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / Automatic Test Equipment Development	<b>Project (Number/Name)</b> L59 / Diagnost/Expert Sys
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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**  
Test program set (TPS) and contractor developmental test and evaluation are included in the product development cost.

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	171.203	4.795	6.369	4.032	-	4.032	0.000	186.399	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / Automatic Test Equipment Development	<b>Project (Number/Name)</b> L59 / Diagnost/Expert Sys

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Training Materiel Release	1 TMR								2 FMR																			
Full Materiel Release																												
First Unit Equipped																												
Full Rate Production Decision Review																												
NGATS Full-Rate Production (Increment 1)																												
NGATS System Development and Demonstration (SDD) (Increment 1)																												
NGATS Testing (Increment 2)																												
NGATS Development (RF Subsystem)																												
NGATS EO Integration																												
NGATS RF Integration																												
NGATS Testing (EO & RF Subsystems)																												
NGATS Product Improvements - Netcentric																												
New Systems Test Capability																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L59 / <i>Diagnost/Expert Sys</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
NGATS Testing (Increment 1)	1	2011	1	2012
Production for First Article	1	2015	2	2017
Training Materiel Release	4	2019	4	2019
Full Materiel Release	1	2021	1	2021
First Unit Equipped	1	2021	1	2021
Full Rate Production Decision Review	1	2021	1	2021
NGATS Testing (Increment 1 Follow-On DT/OT)	1	2016	3	2016
NGATS Full-Rate Production (Increment 1)	2	2019	4	2023
NGATS System Development and Demonstration (SDD) (Increment 2)	1	2016	4	2020
NGATS Testing (Increment 2)	1	2016	4	2021
FOT&E Completed (DT)	3	2018	3	2018
NGATS Development (EO Subsystem)	4	2010	4	2015
NGATS Development (RF Subsystem)	1	2016	4	2021
NGATS EO Integration	3	2016	4	2021
NGATS RF Integration	3	2017	1	2022
NGATS Testing (EO & RF Subsystems)	1	2016	2	2022
NGATS Product Improvements - Netcentric	1	2016	3	2022
New Systems Test Capability	1	2016	3	2022
MSD Technology Enhancements	1	2016	4	2022

**Note**

Test program set (TPS) compatibility testing runs continually throughout the product development process.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>				<b>Project (Number/Name)</b> L65 / <i>Test Equipment Development</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
L65: <i>Test Equipment Development</i>	-	5.309	4.546	1.546	-	1.546	4.051	4.131	3.616	3.616	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This Project supports modernization of calibration instruments, techniques, and existing Army calibration systems by investigating technology insertions including automated and autonomous operations and other emerging technologies. Funding also supports development of initial prototypes to enable refinement of Operational Requirements and early user feedback to support future calibration systems and general-purpose test, measurement and diagnostic equipment (TMDE) acquisitions. This Project develops calibration software and calibration capability for electro-optical, chemical, biological agent, radiation sourcing and detection systems, signal measurement from direct current to microwave ranges, physical and mechanical measurements such as torque, pressure, and temperature, and improvements in test and measurement performance envelopes. It provides for product improvements and development/evaluation of advanced technologies to increase reliability of calibration systems and general-purpose TMDE. The product improvements eliminate gaps in existing organic capabilities and ensure operational readiness and safety of Army weapons and combat support systems. These improvements employ reconfigurable open-electronics architecture and computer-based instrumentation where feasible and focus on reduced test equipment footprints to improve deployability and mobility in areas of operation.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> Calibration Sets (CALSETS) Software Environment and Calibration Procedures	1.032	0.250	0.463
<b>Description:</b> Develop and test Version 3.0 of an Army automated calibration environment and develop calibration procedures. Test and evaluate automated calibration equipment software efforts in support of the Army risk management framework (RMF).			
<b>FY 2020 Plans:</b> Develop Army calibration enterprise data collection and analysis for obsolescence planning gaps and TMDE readiness.			
<b>FY 2021 Plans:</b> Test and evaluate Army calibration enterprise data collection and benchmark leading indicators for obsolescence planning gaps and TMDE readiness.			
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Software development, test and evaluation costs increase due to additional resources needed to develop and test a large number of calibration procedures.			
<b>Title:</b> Physical Instruments	1.676	0.724	0.414

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L65 / <i>Test Equipment Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p><b>Description:</b> Research, develop, and test physical parameter calibration instrumentation to support areas such as force, torque, radiological, chemical/biological agent detection systems, night vision testers, small arms gages, pneumatic pressure systems, and temperature related to target detection in the infrared spectrum.</p> <p><b>FY 2020 Plans:</b> Perform air speed correlation study; develop infrared emissivity corrections for infrared systems calibration; develop radiation sources for NexGen radiation detector calibration; test and evaluate high torque multipliers for ground and aviation platforms.</p> <p><b>FY 2021 Plans:</b> Test infrared emissivity corrections for infrared systems calibration; develop neutron radiation sources for NexGen radiation detector calibration; test and evaluate Army's flow transfer system.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Level of effort planned for FY 2021 reduced because of loss of funding.</p>			
<p><b>Title:</b> Electrical Instruments</p> <p><b>Description:</b> Research, develop, and test electrical parameter calibration instrumentation to support areas such as intrinsic electrical standards, electrical transport standards and electro-optic standards.</p> <p><b>FY 2020 Plans:</b> Develop precision direct current (DC) volt standards; develop test equipment for 5G communications networks; test and evaluate TMDE prototypes for ultraviolet irradiance, high energy laser and fiber-optic networks.</p> <p><b>FY 2021 Plans:</b> Test precision DC volt standards; test and evaluate TMDE prototypes for ultraviolet irradiance and fiber-optic source stabilization.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Level of effort planned for FY 2021 reduced because of loss of funding.</p>	0.679	0.994	0.284
<p><b>Title:</b> Test Equipment Modernization (TEMOD)</p> <p><b>Description:</b> Perform market research, bid sample testing and evaluation of commercial general-purpose electronic test equipment (GPETE), and develop performance specifications for TEMOD acquisitions.</p> <p><b>FY 2020 Plans:</b></p>	1.922	2.372	0.385

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L65 / <i>Test Equipment Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p>Perform market research and evaluation of commercial GPETE and validate performance specifications for improved test equipment. The market research will be expanded to cover emerging synthetic instrumentation to potentially replace multiple pieces of GPETE within one platform. Conduct bid sample testing to support acquisition program.</p> <p><b>FY 2021 Plans:</b> Perform market research and evaluation of commercial GPETE and validate performance specifications for improved test equipment. The market research will be expanded to cover emerging synthetic instrumentation to potentially replace multiple pieces of GPETE within one platform. Conduct bid sample testing to support acquisition program.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Progress on evaluation of six Other Transaction Authority (OTA) prototype TS-4549 Radio Test Sets will reduce funding requirement in FY 2021.</p>			
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638</p>	-	0.206	-
<b>Accomplishments/Planned Programs Subtotals</b>	5.309	4.546	1.546

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• N10000: <i>Calibration Sets Equipment</i>	4.270	3.030	2.511	-	2.511	3.878	2.647	2.324	2.324	Continuing	Continuing
• N11000: <i>Test Equipment Modernization (TEMOD)</i>	9.316	13.415	14.941	-	14.941	17.398	14.459	13.697	13.691	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**  
Projects focus on commercial and nondevelopmental item technologies. Department of Defense services provide programmatic, engineering expertise and capability for individual development projects; otherwise, commercial service contracts are used to obtain required capabilities. Equipment required for development projects

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L65 / <i>Test Equipment Development</i>

is obtained from commercial suppliers. Candidate commercial equipment and nondevelopmental items are identified and evaluated through market research and government test and evaluation.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / Automatic Test Equipment Development	<b>Project (Number/Name)</b> L65 / Test Equipment Development
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
In-house Engineering	SS/ Various	Various : Various	6.505	0.162	Dec 2018	-		-		-		-	0.000	6.667	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.206		-		-		-	0.000	0.206	-
<b>Subtotal</b>			6.505	0.162		0.206		-		-		-	0.000	6.873	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
CALSETS Software Environment and Calibration	Various	Various : Various	7.126	0.548	Jan 2019	0.097	Feb 2020	0.215	Feb 2021	-		0.215	Continuing	Continuing	-
Physical Instruments	Various	Various : Various	8.182	0.934	Feb 2019	0.380	Feb 2020	0.185	Apr 2021	-		0.185	Continuing	Continuing	-
Electrical Instruments	Various	Various : Various	10.524	0.336	Feb 2019	0.541	Mar 2020	0.107	Feb 2021	-		0.107	Continuing	Continuing	-
Test Equipment Modernization	Various	Various : Various	1.102	1.154	Jan 2019	1.432	Feb 2020	0.231	Feb 2021	-		0.231	Continuing	Continuing	-
<b>Subtotal</b>			26.934	2.972		2.450		0.738		-		0.738	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Contract Engineering	C/FFP	Various : Various	2.638	0.195	Feb 2019	0.288	Feb 2020	0.319	Feb 2021	-		0.319	Continuing	Continuing	-
<b>Subtotal</b>			2.638	0.195		0.288		0.319		-		0.319	Continuing	Continuing	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>			<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L65 / <i>Test Equipment Development</i>	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Physical Instruments																												
CALSETS Software Environment and Calibration																												
Electrical Instruments																												
Test Equipment Modernization																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604746A / <i>Automatic Test Equipment Development</i>	<b>Project (Number/Name)</b> L65 / <i>Test Equipment Development</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
AN/GSM-421(V2) User Testing	2	2007	4	2012
Physical Instruments	1	2016	4	2025
CALSETS Software Environment and Calibration	1	2016	4	2025
Electrical Instruments	1	2016	4	2025
Test Equipment Modernization	1	2016	4	2025

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / Distributive Interactive Simulations (DIS) - Eng Dev
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	8.423	7.801	7.892	-	7.892	7.888	8.032	8.019	8.099	0.000	56.154
C74: Devel Simulation Tech	-	1.241	1.000	0.999	-	0.999	0.999	0.999	0.999	1.009	0.000	7.246
C77: Army Geospatial Data Master Plan	-	0.785	0.767	0.729	-	0.729	0.576	0.584	0.590	0.596	0.000	4.627
C78: One Semi-Automated Forces	-	6.397	6.034	6.164	-	6.164	6.313	6.449	6.430	6.494	0.000	44.281

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

The program element "Distributive Interactive Simulations - Engineering Development" applies to the Army's Advanced Simulation Program, which enables operational readiness and the development of concepts and systems for the Future Force through the application of new simulation technology and techniques. The development and application of simulation technology will provide the means to link electronically a range of various simulation tools in a manner that is transparent to the user. The amalgam of simulations and tools is linked together to enable execution of an event; to verify the scenarios, tactics/techniques and procedures; to train testers on new hardware/software; and to conduct trial test runs before costly live field tests. The tools developed are available for reuse by developers and users of simulations throughout the Army.

Project C74 funds the HQDA-chartered mission of the Simulation-to-Mission Command Interoperability (SIMCI) Overarching Integrated Product Team (OIPT) in support of Army Training and Readiness. The SIMCI OIPT mission is to provide policy recommendations to Army senior leadership to improve organizations by allowing Soldiers to fight in the same manner in which they train. This is accomplished by interoperability between Mission Command (MC) systems and the Modeling and Simulation (M&S) systems the Army uses to stimulate MC systems for training Soldiers and their Leaders. SIMCI also invests in targeted solutions to critical problem areas that exist between MC and Simulations. The SIMCI OIPT, led by Program Executive Office (PEO) Simulation, Training, and Instrumentation (STRI) and PEO Command Control Communications-Tactical (C3T), uses focused collaborative processes among its 30+ Army organizations to identify key/critical interoperability shortfalls and the required materiel solutions.

Project C77, Army Geospatial Data Master Plan, focuses on activities that start with data acquisition from multiple sources and culminate in (1) accurate, robust and timely geospatial data and data management and (2) integration and conversion tools that support multiple battle command, training and mission-rehearsal applications. Project C77 continues development efforts associated with the Ground-Warfighter Geospatial Data Model (GGDM) and Geospatial Data Standards.

One Semi-Automated Forces (OneSAF) Project C78 develops and delivers a software application that represents activities of units and forces in simulation to support Army Training and Readiness. The application is used by Army agencies to support the concept evaluation, experimentation, materiel acquisition and training throughout the communities. The focus of this project is systems/software engineering and design for development and evolution of the architecture and software tools for a universal system of Army computer-generated forces -- OneSAF. OneSAF is a high fidelity brigade-and-below SAF that represents a full range of operations, systems and control processes in support of stand-alone and embedded training and Research, Development and Acquisition (RDA) simulation applications. OneSAF is fully

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2021 Army	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>
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interoperable with the Army's emerging virtual, live, and division-and-above constructive simulations and provides next-generation simulation products. OneSAF replaces a variety of legacy simulations used within the Army to support analytic and training simulation activities.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	9.134	7.801	7.900	-	7.900
Current President's Budget	8.423	7.801	7.892	-	7.892
Total Adjustments	-0.711	0.000	-0.008	-	-0.008
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.711	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-0.008	-	-0.008

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>				<b>Project (Number/Name)</b> C74 / <i>Devel Simulation Tech</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
<i>C74: Devel Simulation Tech</i>	-	1.241	1.000	0.999	-	0.999	0.999	0.999	0.999	1.009	0.000	7.246
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project C74 funds the HQDA-chartered mission of the Simulation-to-Mission Command Interoperability (SIMCI) Overarching Integrated Product Team (OIPT) in support of Army Training and Readiness. The SIMCI OIPT mission is to provide policy recommendations to Army senior leadership to improve organizations by allowing Soldiers to fight in the same manner in which they train. This is accomplished by interoperability between Mission Command (MC) systems and the Modeling and Simulation (M&S) systems the Army uses to stimulate MC systems for training Soldiers and their Leaders. SIMCI also invests in targeted solutions to critical problem areas that exist between MC and Simulations. The SIMCI OIPT, led by Program Executive Office (PEO) Simulation, Training, and Instrumentation (STRI) and PEO Command Control Communications-Tactical (C3T), uses focused collaborative processes among its 30+ Army organizations to identify key/critical interoperability shortfalls and the required materiel solutions.

The SIMCI OIPT provides the following: (1) Advisor to Army Leadership--improve MC and M&S interoperability programs, policies, directives, resourcing, and procedures; (2) Technical Investment--sponsor/support initiatives that seek common solutions to critical interoperability issues surrounding MC and M&S systems; (3) Outreach--conduct & participate in interoperability outreach activities. SIMCI investments consist primarily of cost-sharing initiatives, leveraging initial system solutions of acquisition programs to enhance the interoperability of multiple systems in the Joint Operational Environment. SIMCI investments accelerate implementation within MC and M&S systems, of common data models and information exchanges that are used by other Services and coalition nations, thus enhancing the inherent ability of Army systems to interoperate seamlessly in a Joint, Interagency, Intergovernmental, and Multinational (JIIM) environment.

FY 2021 base funding in the amount of \$0.999 million continues progress with embedding simulation into Mission Command Systems via the Ozone Widget Framework, continues management of the SIMCI OIPT's Army-wide collaborative, interoperability enhancement activities, including architecture alignment, data model alignment, common standards, components, and products. It is focused first on reducing costs and improving capabilities in the areas of automating Operational Plans, Orders, and Reports in support of Army, Joint, and Coalition operations. Objectives are: identify and articulate to HQDA senior leadership specific standards that require Army-wide implementation; co-develop data standards, architecture standards, implementation specifications and Joint/Coalition products; continue transition of SIMCI knowledge and proof-of-principle products to Army and Joint acquisition programs.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> Program Management for the SIMCI Overarching Integrated Product Team (OIPT) Projects.	1.241	0.959	0.999
<b>Description:</b> Program Management of the SIMCI OIPT's Army-wide collaborative, interoperability enhancement activities, including architecture alignment, data model alignment, common standards, components, and products. The OIPT consists of a Product Director, engineers, and finance personnel.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C74 / <i>Devel Simulation Tech</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p><b>FY 2020 Plans:</b> Will continue management and support of the SIMCI OIPT'S Army-wide collaborative, interoperability enhancement activities, including architecture alignment, data model alignment, common standards, components, and products. Will continue focus on gap-analysis of the current model and simulation programs and capabilities in the areas of Live, Virtual, and Constructive (LVC) simulations. This will support the Vice Chief of Staff of the Army's request to find redundancy within the Modeling and Simulation (M&amp;S) community and reduce it. Objectives are to compare the current M&amp;S capabilities with what will be required in the upcoming LVC-Information Assurance (LVC-IA) and Integrated Training Environment (ITE) environments, which will eventually become the Simulated Training Environment (STE) in 2021. This will be Army-wide, as well as, Joint combined interagency products. Focus on ITE with the creation of the blueprint for STE, which is slated to be implemented in 2021.</p> <p><b>FY 2021 Plans:</b> Will continue management and support of the SIMCI OIPT'S Army-wide collaborative, interoperability enhancement activities, including architecture alignment, data model alignment, common standards, components, and products. Will continue focus on gap-analysis of the current model and simulation programs and capabilities in the areas of Live, Virtual, and Constructive (LVC) simulations. This will support the Vice Chief of Staff of the Army's request to find redundancy within the Modeling and Simulation (M&amp;S) community and reduce it. Objectives are to compare the current M&amp;S capabilities with what will be required in the upcoming LVC-Information Assurance (LVC-IA) and Integrated Training Environment (ITE) environments, which will eventually become the Simulated Training Environment (STE) in 2021. This will be Army-wide, as well as, Joint combined interagency products. Focus on ITE with the creation of the blueprint for STE, which is slated to be implemented in FY 2021.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> FY 2020 to FY 2021 increase due to economic adjustments.</p>				
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638</p>		-	0.041	-
<b>Accomplishments/Planned Programs Subtotals</b>		1.241	1.000	0.999
<b>C. Other Program Funding Summary (\$ in Millions)</b>				
N/A				

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C74 / <i>Devel Simulation Tech</i>

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

**Remarks**  
SIMCI uses other contract vehicles (internal/external) and awards money to work on specific technical projects. This provides the opportunity to leverage technical expertise from different agencies. SIMCI chooses projects that enhance current capabilities, closes the gaps of existing capabilities, and makes the determination for future projects that affect both the Mission Command and Live, Virtual, Constructive simulations environment. SIMCI only chooses those projects that meet specific requirements and criteria as stated above. It is one of SIMCI's missions to locate, utilize, or upgrade those projects or specific products that do just that.

**D. Acquisition Strategy**

SIMCI Overarching Integrated Product Team (OIPT) resources are allocated to multiple organizations in both the Mission Command (MC) and Modeling and Simulation (M&S) Communities. The funds are contracted to execute approved functions and to projects that advance the efforts of SIMCI and components-based architecture alignment. Products developed transition to the lead or sponsor's program which then maintains the product for the cost savings of itself and other programs in both Communities. The primary focus for these projects are the following: Embedded simulations with current Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems, gap-analysis for current simulations, and the proper implementation of Next-Generation modeling and simulation capabilities in regards to the Synthetic Training Environment (STE).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604760A / Distributive Interactive Simulations (DIS) - Eng Dev				Project (Number/Name) C74 / Devel Simulation Tech							
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	PEO STRI : Orlando, FL	10.273	0.150	Jan 2019	0.135	Jan 2020	0.150	Jan 2021	-		0.150	Continuing	Continuing	Continuing
SBIR/STTR	TBD	PEO STRI : Orlando, FL	0.086	0.240	Oct 2018	-		-		-		-	0.000	0.326	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.046		-		-		-	0.000	0.046	-
<b>Subtotal</b>			10.359	0.390		0.181		0.150		-		0.150	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
Transition of simulation initialization capability	Various	TBD : TBD	3.134	-		-		-		-		-	Continuing	Continuing	Continuing
Geospatial Initiative	Various	TBD : TBD	1.388	-		-		-		-		-	Continuing	Continuing	Continuing
Data Model applications and reference implementations	Various	TBD : TBD	2.363	-		-		-		-		-	Continuing	Continuing	Continuing
Implementation of Initialization Products	Various	TBD : TBD	2.255	-		-		-		-		-	Continuing	Continuing	Continuing
Initialization Study Implementation	Various	TBD : TBD	1.038	-		-		-		-		-	Continuing	Continuing	Continuing
Mission Comand systems data mediation/web services	Various	TBD : TBD	2.910	-		-		-		-		-	Continuing	Continuing	Continuing
Expanding MTOE System Architecture (SA) Data	Various	TBD : TBD	1.821	-		-		-		-		-	Continuing	Continuing	Continuing
C2 Adapter Web Services and Tools	Various	TBD : TBD	2.660	-		-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			17.569	-		-		-		-		-	Continuing	Continuing	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C74 / <i>Devel Simulation Tech</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Implementation of Initialization Products																												
Transition of simulation initialization capability																												
Data Model applications and reference implementations																												
C2 Adapter Web Services and Tools																												
Quarterly SIMCI OIPT Meeting																												
Annual Project Call																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C74 / <i>Devel Simulation Tech</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Geospatial Initiative	1	2011	4	2014
Implementation of Initialization Products	1	2010	4	2025
Transition of simulation initialization capability	1	2010	4	2025
Initialization Study Implementation	1	2010	4	2017
Data Model applications and reference implementations	1	2010	4	2025
C2 Adapter Web Services and Tools	1	2010	4	2025
Expanding MTOE System Architecture (SA) Data	1	2010	4	2012
Quarterly SIMCI OIPT Meeting	1	2010	4	2025
Annual Project Call	1	2010	4	2025

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>				<b>Project (Number/Name)</b> C77 / <i>Army Geospatial Data Master Plan</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
<i>C77: Army Geospatial Data Master Plan</i>	-	0.785	0.767	0.729	-	0.729	0.576	0.584	0.590	0.596	0.000	4.627
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project C77 addresses the implementation and acceleration of objectives focused on geospatial standards that were identified in the Army Geospatial Data Integrated Master Plan (AGDIMP), approved by the Chief of Staff, Army in April 2005 and newer guidance and directives including the Army's Geospatial Information Office (GIO) GIO Charter, Army Regulation for Geospatial Information and Services updated in 2014 (AR 115-11), and Army COE (Common Operating Environment Implementation Plan's Geospatial Annex). The AGDIMP and the GIO charter, Geospatial Annex to COE IP, and AR 115-11 require the establishment of an enterprise architecture framed around geospatial standards that address geospatial/GEOINT data, services, and applications to enable the Army Geospatial Enterprise (AGE). This Army Geospatial Enterprise serves the Army's Programs/Systems, Organizations (most importantly our soldiers) to provide the geospatial foundation of accurate, robust, and timely geospatial data, robust tools and services that support mission command, intelligence, training, mission-rehearsal and other mission-applications. Project C77 addresses a geospatial/GeoINT standard-base framework that supports the ground-warfighter. This geospatial standard framework must also fit within the broader National System for Geospatial-Intelligence (NSG) and Allies Systems for GeoINT (ASG) architecture and standards. The establishment of a ground-warfighter, standards-based framework support the management, dissemination, and update of geospatial data and services from National systems and organization to tactical systems and ground-warfighter in an enterprise fashion that will minimal translation into unique and often proprietary data formats and internal application databases.

FY 2021 funding continues development efforts associated with the Ground-Warfighter Geospatial Data Model (GGDM) and integration of Geospatial Data Standards into the U.S. Army Geospatial Enterprise (AGE) and the Army M&S Enterprise.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> Ground-Warfighter Geospatial Data Model (GGDM)	0.245	0.127	0.139
<b>Description:</b> The GGDM incorporates common data elements that conform to standards mandated by the Department of Defense Information Technology Standards Registry (DISR) for the National System for Geospatial Intelligence (NSG). Incorporating common geospatial data standards into the GGDM makes the Programs of Record (POR) consistent with new DISR-mandated geospatial intelligence standards for the NSG. The implementation of GGDM across the Army increases system-interoperability at the geospatial data level.			
<b>FY 2020 Plans:</b> Initiate development of the next version of GGDM based upon new information and revisions to the National System for Geospatial-Intelligence (NSG) Application Schema (NAS) as well as new requires from the US Army, USMC, and ABCANZ Allies.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C77 / <i>Army Geospatial Data Master Plan</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p>Provide GGDM training classes to Army and USMC personnel. Ensure major Army PORs are implementing the GGDM (I.E. DCGS-A and SECORE).</p> <p><b>FY 2021 Plans:</b> Initiate development of the next version of GGDM based upon new information and revisions to the National System for Geospatial-Intelligence (NSG) Application Schema (NAS) as well as new requires from the US Army, USMC, and ABCANZ Allies. Provide GGDM training classes to Army and USMC personnel. Ensure major Army PORs are implementing the GGDM (I.E. DCGS-A and SECORE).</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding increase from FY 2020 to FY 2021 due to economic adjustments.</p>			
<p><b>Title:</b> Geospatial Data Standards</p> <p><b>Description:</b> Army Geospatial Standards including data standards and standards for services to manage, process and disseminate and utilize geospatial data. Alignment of industry and Open geospatial standards from organizations such as the Open Geospatial Consortium (OGC) and others into the Army Geospatial Enterprise (AGE).</p> <p><b>FY 2020 Plans:</b> Will initiate work in collaboration with industry and other agencies to develop new geospatial data and services standards, DOD Profiles of these standards, and technology implementations of these standards. Focus on standards to support 2D raster tiled maps, 3D globe standards, and initial assessment about vector tile maps. Additionally, cont. to develop modifications/updates elevation data formats and services. Maintain Geospatial Standards compliance matrix, Std-V1, in alignment with quarterly updated NSG standards and DoD Information Technology Standards and Profile Registry (DISR) cycle updates of GeoINT standards and coordinate results with Army CIO/G6 and ASA(ALT) Programs. Will continue to provide SME support on geospatial data and technology standards to Army PORs.</p> <p><b>FY 2021 Plans:</b> Will initiate work in collaboration with industry and other agencies to develop new geospatial data and services standards, DOD Profiles of these standards, and technology implementations of these standards. Focus on standards to support 2D raster tiled maps, 3D globe standards, and initial assessment about vector tile maps. Additionally, cont. to develop modifications/updates elevation data formats and services. Maintain Geospatial Standards compliance matrix, Std-V1, in alignment with quarterly updated NSG standards and DoD Information Technology Standards and Profile Registry (DISR) cycle updates of GeoINT standards and coordinate results with Army CIO/G6 and ASA(ALT) Programs. Will continue to provide SME support on geospatial data and technology standards to Army PORs. Utilize the AGDIMP resource to perform integration of multiple geospatial standards (both 2d and 3d). Specifically in support of extending the One World Terrain (OWT) capabilities into non-training like applications, such as mission planning, mission rehearsal, and Army operations. The integration of the geographic</p>	0.540	0.605	0.590

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C77 / <i>Army Geospatial Data Master Plan</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
2D world and the capabilities of the polygon based 3D world will provide the soldier with cutting-edge geospatial capabilities and over match moving forward. Increased support to Army Futures Command is anticipated to drive increased funding requirements starting in FY 2021 and an increase in programming starting in FY 2022.  <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding decrease from FY 2020 to FY 2021 due to economic adjustments.			
<b>Title:</b> FY 2020 SBIR/STTR Transfer  <b>Description:</b> Funding transferred in accordance with Title 15 USC ?638  <b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638  <b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638	-	0.035	-
<b>Accomplishments/Planned Programs Subtotals</b>	0.785	0.767	0.729

<b>C. Other Program Funding Summary (\$ in Millions)</b> N/A
<b>Remarks</b>
<b>D. Acquisition Strategy</b> Resources are allocated to several critical geospatial projects in support of the Army Geospatial Data Integrated Master Plan (AGDIMP) and the Army Geospatial Enterprise (AGE).



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C77 / <i>Army Geospatial Data Master Plan</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Ground Warfighter Geospatial Data Model																												
Geospatial Data Standards																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C77 / <i>Army Geospatial Data Master Plan</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Ground Warfighter Geospatial Data Model	1	2010	4	2025
Geospatial Data Standards	1	2010	4	2025

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>				<b>Project (Number/Name)</b> C78 / <i>One Semi-Automated Forces</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
<i>C78: One Semi-Automated Forces</i>	-	6.397	6.034	6.164	-	6.164	6.313	6.449	6.430	6.494	0.000	44.281
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

One Semi-Automated Forces (OneSAF) develops and delivers a software application that represents activities of units and forces in simulation to support Army Training and Readiness. The application is used by Army agencies to support the concept evaluation, experimentation, materiel acquisition and training throughout the communities. The focus of this project is systems/software engineering and design for development and evolution of the architecture and software tools for a universal system of Army computer-generated forces -- OneSAF. OneSAF is a high fidelity brigade-and-below SAF that represents a full range of operations, systems and control processes in support of stand-alone and embedded training and Research, Development and Acquisition (RDA) simulation applications. OneSAF is fully interoperable with the Army's emerging virtual, live, and division-and-above constructive simulations and provides next-generation simulation products. OneSAF replaces a variety of legacy simulations used within the Army to support Acquisition, Analysis, Experimentation, Intelligence, Test & Evaluation, and Training simulation activities.

FY 2021 base funding in the amount of \$6.164 million allows for continued development of the software product line by addressing OneSAF Pre-Planned Product Improvements (P3Is) as prioritized and approved by the Training and Doctrine Command (TRADOC). This funding also provides for the management of the infrastructure, equipment, laboratories, and processes needed to develop, test, and release the required product baseline.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> Engineering and Manufacturing Development (EMD) phase contract activities for the One Semi-Automated Forces program.	4.971	4.492	4.714
<b>Description:</b> Continue EMD phase contract activities for the OneSAF program.			
<b>FY 2020 Plans:</b> Will continue the development of software capabilities based on OneSAF P3Is as prioritized and approved by TRADOC. Will continue the software development of functionality that enhances architectural services, components, synthetic environment and infrastructure of the OneSAF Product Line and will provide for software integration, test and release of required software refreshes and Version 10.0.			
<b>FY 2021 Plans:</b> Will continue the development of software capabilities based on OneSAF P3Is as prioritized and approved by TRADOC. Will continue the software development of functionality that enhances architectural services, components, synthetic environment and infrastructure of the OneSAF Product Line and will provide for software integration, test and release of required software refreshes and Version 10.0.			
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C78 / <i>One Semi-Automated Forces</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
Increase from FY 2020 to FY 2021 funding is a result of incorporating additional P3I capabilities into OneSAF Software Baseline Version 10.0				
<p><b>Title:</b> Government System Test and Evaluation for the One Semi-Automated Forces (OneSAF) program.</p> <p><b>Description:</b> Government System Test and Evaluation for the OneSAF program.</p> <p><b>FY 2020 Plans:</b> Will provide for the conducting of software, test, integration and release for Version 10.0. Will provide support to the user community in conducting experiments, analyses, and validation events for integration into the Home Station Training Federation, Network Integration Events (NIE), Battle Lab Collaborative Simulation Environment (BLCSE), Entity Simulation Service (ESS) in support of Joint Land Component Constructive Training Capability (JLCCTC), and other LVC applications.</p> <p><b>FY 2021 Plans:</b> Will provide for the conducting of software, test, integration and release for Version 10.0. Will provide support to the user community in conducting experiments, analyses, and validation events for integration into the Home Station Training Federation, Network Integration Events (NIE), Battle Lab Collaborative Simulation Environment (BLCSE), Entity Simulation Service (ESS) in support of Joint Land Component Constructive Training Capability (JLCCTC), and other LVC applications.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase from FY2020 to FY2021 due to overall increase in program funding and lack of SBIR/STTR reduction.</p>		1.100	1.009	1.100
<p><b>Title:</b> Government Program Management for the One Semi-Automated Forces (OneSAF) program.</p> <p><b>Description:</b> Government Program Management for the One Semi-Automated Forces (OneSAF) program.</p> <p><b>FY 2020 Plans:</b> Will provide a portion of program management, engineering and technical oversight, contract support, and travel for support of site surveys and Subject Matter Experts for the development of OneSAF.</p> <p><b>FY 2021 Plans:</b> Will provide a portion of program management, engineering and technical oversight, contract support, and travel for support of site surveys and Subject Matter Experts for the development of OneSAF.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase from FY2020 to FY2021 due to overall increase in program funding and lack of SBIR/STTR reduction.</p>		0.326	0.259	0.350
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p>		-	0.274	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C78 / <i>One Semi-Automated Forces</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b><i>FY 2020 Plans:</i></b> Funding transferred in accordance with Title 15 USC ?638			
<b><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i></b> Funding transferred in accordance with Title 15 USC ?638			
<b>Accomplishments/Planned Programs Subtotals</b>	6.397	6.034	6.164

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

N/A

**Remarks**

**D. Acquisition Strategy**

OneSAF continues to manage two Task Orders for the Development, Integration, Interoperability, and Support (I2S) of capabilities products, data, and documentation that fully serves the current and evolving needs of the user community.

The enhancements will be executed within the development line as modifications to the released baseline via Engineering Change Proposals (ECPs); Change Requests (CRs): Pre-Planned Product Improvements (P3I); and correction of deficiencies identified as Problem Test Reports (PTRs) and Deficiency Reports (DRs) by the user community.

In FY 2021, the program will continue with yearly releases of the OneSAF Software versions containing performance enhancements resulting from the development and integration of Pre-Planned Product Improvements (P3I), concurrency enhancements, user feedback, corrections of deficiencies identified as Problem Test Reports (PTR) and Deficiency Reports (DR) and Co-Developers handovers. The OneSAF program will continue to manage the single award contract for the continuing development and maintenance of the software baseline as well as continue to manage the Integrated Development Environment (IDE).

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C78 / <i>One Semi-Automated Forces</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	Various	PEO STRI, Orlando, FL : Various	28.556	0.326	Oct 2018	0.304	Oct 2019	0.350	Oct 2020	-		0.350	Continuing	Continuing	Continuing
SBIR/STTR	TBD	PEO STRI : Orlando, FL	-	0.460	Oct 2018	-		-		-		-	0.000	0.460	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.274		-		-		-	0.000	0.274	-
<b>Subtotal</b>			28.556	0.786		0.578		0.350		-		0.350	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Architecture Dev & System Integration	C/CPFF	Science Applications International Corp : Orlando, FL	51.466	-		-		-		-		-	0.000	51.466	51.466
Model and Tools Development	C/CPFF	Science Applications International Corp : Orlando, FL	27.625	-		-		-		-		-	0.000	27.625	27.625
Environmental Runtime Component	C/CPFF	Science Applications : Orlando, FL	7.981	-		-		-		-		-	0.000	7.981	7.981
OneSAF Component Development	C/CPFF	Various : Various	9.648	-		-		-		-		-	0.000	9.648	9.648
Integrated Environment Dev	C/CPFF	Advanced Systems Technology, Inc : Orlando FL	11.702	-		-		-		-		-	0.000	11.702	11.702
OneSAF Bridge Contract	C/CPFF	Science Applications International Corp : Orlando, FL	3.797	-		-		-		-		-	0.000	3.797	3.797
Integration, Interoperability, and Support (I2S) & Logical Follow On (LFO)	C/CPFF	Cole Engineering Services, Inc. : Orlando, FL	7.290	-		-		-		-		-	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)						Project (Number/Name)					
2040 / 5				PE 0604760A / Distributive Interactive Simulations (DIS) - Eng Dev						C78 / One Semi-Automated Forces					
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development & Production Logical Follow On (LFO)	C/CPFF	Leidos : Orlando, FL	19.985	-		-		-		-		-	Continuing	Continuing	Continuing
Software Development	C/CPFF	Riptide : Orlando, FL	7.135	4.061	Dec 2018	4.079	Dec 2019	4.244	Dec 2020	-		4.244	Continuing	Continuing	Continuing
<b>Subtotal</b>			146.629	4.061		4.079		4.244		-		4.244	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
System Analysis	Various	Various : Various	6.597	-		-		-		-		-	Continuing	Continuing	Continuing
Domain Analysis	Various	Various : Various	6.285	0.150	Dec 2018	0.104	Dec 2019	0.150	Dec 2020	-		0.150	Continuing	Continuing	Continuing
Integrated Development Environment	Various	Various : Various	9.936	-		-		-		-		-	Continuing	Continuing	Continuing
Architecture Engr & Tech Spt	SS/FP	MITRE FFRDC : Aberdeen Proving Ground, MD	5.759	0.300	Dec 2018	0.264	Dec 2019	0.320	Dec 2020	-		0.320	Continuing	Continuing	Continuing
<b>Subtotal</b>			28.577	0.450		0.368		0.470		-		0.470	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
OneSAF integration, evaluation and test	Various	Various : Various	13.729	0.900	Dec 2018	0.855	Dec 2019	0.900	Dec 2020	-		0.900	Continuing	Continuing	Continuing
OneSAF Verification, Validation & Accreditation	Various	Various : Various	7.447	0.200	Dec 2018	0.154	Dec 2019	0.200	Dec 2020	-		0.200	Continuing	Continuing	Continuing
<b>Subtotal</b>			21.176	1.100		1.009		1.100		-		1.100	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2021 Army</b>								<b>Date:</b> February 2020					
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>				<b>Project (Number/Name)</b> C78 / <i>One Semi-Automated Forces</i>						
	<b>Prior Years</b>	<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>		<b>FY 2021 OCO</b>		<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	224.938	6.397		6.034		6.164		-		6.164	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C78 / <i>One Semi-Automated Forces</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
P3I Requirements Development																													
P3I																													
OneSAF Version Release 8.9 (Concurrency Updates)	1 V8.9																												
OneSAF Version Release 9.0 (Concurrency Updates)					2 V9.0																								
OneSAF Version Release 10.0 (Concurrency Updates)									3 V10.0																				
OneSAF Version Release 11.0 (Concurrency Updates)													4 V11.0																
OneSAF Version Release 12.0 (Concurrency Updates)																	5 V12.0												
OneSAF Version Release 13.0 (Concurrency Updates)																					6 V13.0								
OneSAF Version Release 14.0 (Concurrency Updates)																									7 V14.0				
OneSAF Support																													
Life Cycle Software Support																													

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604760A / <i>Distributive Interactive Simulations (DIS) - Eng Dev</i>	<b>Project (Number/Name)</b> C78 / <i>One Semi-Automated Forces</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
P3I Requirements Development	1	2006	4	2025
OneSAF Version Release 5.1.1 (Concurrency Updates)	1	2012	1	2012
OneSAF Version Release 5.5 (Concurrency Updates)	3	2012	3	2012
OneSAF Version Release 6.0 (Concurrency Updates)	2	2013	2	2013
OneSAF Version Release 7.0	2	2014	2	2014
OneSAF Version Release 8.0 (Concurrency Updates)	1	2015	1	2015
OneSAF Version Release 8.8 (Concurrency Updates)	4	2018	4	2018
OneSAF Version Release 8.9 (Concurrency Updates)	3	2019	3	2019
OneSAF Version Release 9.0 (Concurrency Updates)	2	2020	2	2020
OneSAF Version Release 10.0 (Concurrency Updates)	2	2021	2	2021
OneSAF Version Release 11.0 (Concurrency Updates)	2	2022	2	2022
OneSAF Version Release 12.0 (Concurrency Updates)	2	2023	2	2023
OneSAF Version Release 13.0 (Concurrency Updates)	2	2024	2	2024
OneSAF Version Release 14.0 (Concurrency Updates)	4	2024	4	2024
OneSAF Support	1	2006	4	2025

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition (BAT)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	6.568	20.000	24.975	-	24.975	32.769	38.964	9.991	0.000	0.000	133.267
688: <i>ATACMS BLK II</i>	-	1.784	20.000	24.975	-	24.975	32.769	38.964	9.991	0.000	0.000	128.483
P01: <i>MULTI - MODE SEEKER DEVELOPMENT AND TEST</i>	-	4.784	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.784

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

This program element was for Army Tactical Missile System Block II (ATACMS BLK II) missile system Brilliant Anti-Armor (BAT) sub-munition. In Fiscal Year (FY) 2018, it was re-purposed for BREAKER and in FY 2019, Cross Domain (CD) ATACMS was added. BREAKER ended in FY 2019 and CD ATACMS was moved to a different program element. In FY 2020 and beyond, Program Element (PE) 0604768A Brilliant Anti-Armor Sub-munition (BAT) funds only Palletized Field Artillery Launcher (PFAL).

Project P01. Multi-Mode Seeker began integrations of Strategic Capabilities Office (SCO) STRIKE-X program demonstrated capabilities into ATACMS. This effort focuses on providing integration of a seeker to search, detect, acquire, and engage moving maritime/land-based targets. There is no funding in FY 2021.

Project 688 is a developmental effort for the PFAL. Previously, PFAL was STRIKE-X capability 1 of the SCO Demonstration program and Cross Domain (CD) ATACMS was STRIKE-X capability 3. PFAL is a palletized erectable launcher that provides alternatives to deliver near-term innovative long-range strike capabilities to improve operational effectiveness for Combatant Commanders. The PFAL launcher consists of an erectable palletized mechanical structure, Fire Control System (FCS), and Power Management System (PMS). PFAL is capable of firing all current Multiple Launch Rocket System (MLRS) Family of Munitions (MFOM) rockets and missiles, to include the Guided Multiple Launch Rocket System (GMLRS), the ATACMS, and future munitions such as the Precision Strike Missile (PrSM) and Extended Range (ER) GMLRS. PFAL is capable of carrying two launch pods each containing either six GMLRS / MLRS rockets or one ATACMS missile. The PFAL launcher is capable of firing from a fixed ground position, Palletized Load System (PLS) trailer, or maritime vessel.

FY 2021 Base funding in the amount of \$24.975 million for Project 688 ATACMS BLK II funds the integration efforts needed to implement design improvements required to begin a user evaluation. Base year funding allows for continued design, development, and integration to ensure the safe and effective deployment of operational prototypes in a continuous user evaluation. Procure and receive hardware/materials to implement design improvements to the mechanical structure, FCS, and/or PMS subsystems of existing prototypes transitioned from SCO. Support component-level and system-level qualification and integration. Conduct flight tests of existing munitions with existing prototypes to evaluate readiness for supporting a user evaluation. Procure long lead-time hardware/materials necessary to start the fabrication of up to 7 additional prototypes.

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition (BAT)</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	6.886	25.000	36.000	-	36.000
Current President's Budget	6.568	20.000	24.975	-	24.975
Total Adjustments	-0.318	-5.000	-11.025	-	-11.025
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-5.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.318	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-11.025	-	-11.025

**Change Summary Explanation**

Funding was decreased by \$11.025 million to fund higher Army priorities.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition (BAT)</i>				<b>Project (Number/Name)</b> 688 / <i>ATACMS BLK II</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
688: <i>ATACMS BLK II</i>	-	1.784	20.000	24.975	-	24.975	32.769	38.964	9.991	0.000	0.000	128.483
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project 688 is a developmental effort for the Palletized Field Artillery Launcher (PFAL). Previously, PFAL was STRIKE-X capability 1 of the Strategic Capabilities Office (SCO) Demonstration program and Cross Domain Army Tactical Missile System (CD ATACMS) was STRIKE X capability 3. PFAL is a palletized erectable launcher that provides alternatives to deliver near-term innovative long-range strike capabilities to improve operational effectiveness for Combatant Commanders. The PFAL launcher consists of an erectable palletized mechanical structure, Fire Control System (FCS), and Power Management System (PMS). PFAL is capable of firing all current Multiple Launch Rocket System (MLRS) Family of Munitions (MFOM) rockets and missiles, to include the Guided Multiple Launch Rocket System (GMLRS), ATACMS, and future munitions such as the Precision Strike Missile (PrSM) and Extended Range (ER) GMLRS. PFAL is capable of carrying two launch pods each containing either six GMLRS / MLRS rockets or one ATACMS missile. The PFAL launcher is capable of firing from a fixed ground position, Palletized Load System (PLS) trailer, or maritime vessel.

Fiscal Year (FY) 2021 Base funding in the amount of \$24.975 million for Project 688 ATACMS BLK II funds the integration efforts needed to implement design improvements required to begin a user evaluation. Base year funding allows for continued design, development, and integration to ensure the safe and effective deployment of operational prototypes in a continuous user evaluation. Procure and receive hardware/materials to implement design improvements to the mechanical structure, FCS, and/or PMS subsystems of existing prototypes transitioned from SCO. Support component-level and system-level qualification and integration. Conduct flight tests of existing munitions with existing prototypes to evaluate readiness for supporting a user evaluation. Procure long lead-time hardware/materials necessary to start the fabrication of up to 7 additional prototypes.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> Strategic Capabilities Office (SCO) BREAKER program	1.784	-	-
<b>Description:</b> The SCO BREAKER program demonstrated capabilities to defeat armored targets and conducted warhead component requirements development, system integration analysis, and transition planning targeted at rapid qualification and fielding of the armor engagement capability. There is no funding in FY 2020 and beyond.			
<b>Title:</b> Palletized Field Artillery Launcher (PFAL)	-	19.092	24.975
<b>Description:</b> The PFAL Program provides a palletized erectable launcher capable of firing the MLRS MFOM. This effort will refine prototypes against Combatant Commanders specific requirements to support a continuous user evaluation.			
<b>FY 2020 Plans:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition (BAT)</i>	<b>Project (Number/Name)</b> 688 / <i>ATACMS BLK II</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<p>FY 2020 was the first year of funding for Palletized Field Artillery Launcher under Project 688 ATACMS BLK II. Conducted analysis and redesign to demonstrate safe and effective design, development, and deployment of prototypes with Soldiers as part of a continuous user evaluation.</p> <p><b>FY 2021 Plans:</b> Base year funding allows for continued design, development, and integration to ensure the safe and effective deployment of operational prototypes in a continuous user evaluation. Procure and receive hardware/materials to implement design improvements to the mechanical structure, FCS, and/or PMS subsystems of existing prototypes transitioned from the SCO. Support component-level and system-level qualification and integration. Conduct flight tests of existing munitions with existing prototypes to evaluate readiness for supporting a user evaluation. Procure long lead-time hardware/materials necessary to start the fabrication of up to 7 additional prototypes.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase of \$4.975 million in FY 2021 facilitates fabrication of PFAL prototypes.</p>			
<p><b>Title:</b> FY 2020 SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 Plans:</b> Funding transferred in accordance with Title 15 USC ?638</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638</p>	-	0.908	-
<b>Accomplishments/Planned Programs Subtotals</b>	1.784	20.000	24.975

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

N/A

**Remarks**

**D. Acquisition Strategy**

The PFAL transitions from a SCO managed effort to management by the Precision Fires Rocket and Missile Systems Project Office. The PFAL program performs development efforts required to refine prototypes against Combatant Commander's specific requirements to support a user evaluation. The PFAL program will conduct analysis and implement design improvements to demonstrate safe and effective design to enable deployment of prototypes as part of a continuous user evaluation.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition (BAT)</i>	<b>Project (Number/Name)</b> 688 / <i>ATACMS BLK II</i>
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<b>Management Services (\$ in Millions)</b>				<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>		<b>FY 2021 OCO</b>		<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Government Program Management	MIPR	Various : RSA	0.900	0.788	Nov 2018	-		0.872	Nov 2020	-		0.872	0.000	2.560	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.908		-		-		-	0.000	0.908	-
<b>Subtotal</b>			0.900	0.788		0.908		0.872		-		0.872	0.000	3.468	N/A

<b>Product Development (\$ in Millions)</b>				<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>		<b>FY 2021 OCO</b>		<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	-	0.159		-		-		-		-	0.000	0.159	-
BREAKER Warhead Development	C/CPFF	LMMFC : Dallas, TX	2.100	0.200	Jan 2019	-		-		-		-	0.000	2.300	-
BREAKER System Analysis, Requirement & Spec Dev	MIPR	AMRDEC : Redstone Arsenal, AL	0.840	0.637	Nov 2018	-		-		-		-	0.000	1.477	-
PFAL Development Engineering	MIPR	CCDC AvMC : Redstone Arsenal	-	-		19.092	Jan 2020	8.649	Dec 2020	-		8.649	126.000	153.741	-
PFAL Prototype Development	C/CPIF	AMTC : Redstone Arsenal, AL	-	-		-		3.259	Dec 2020	-		3.259	0.000	3.259	-
Prototype Fabrication	TBD	TBD : TBD	-	-		-		10.649	Dec 2020	-		10.649	0.000	10.649	-
<b>Subtotal</b>			2.940	0.996		19.092		22.557		-		22.557	126.000	171.585	N/A

<b>Support (\$ in Millions)</b>				<b>FY 2019</b>		<b>FY 2020</b>		<b>FY 2021 Base</b>		<b>FY 2021 OCO</b>		<b>FY 2021 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Quality, Safety, Systems Engineering, and Analysis	TBD	Various : Redstone Arsenal, AL	-	-		-		0.457	Dec 2020	-		0.457	0.000	0.457	-
<b>Subtotal</b>			-	-		-		0.457		-		0.457	0.000	0.457	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition (BAT)</i>	<b>Project (Number/Name)</b> 688 / <i>ATACMS BLK II</i>
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	Various : Various	-	-		-		1.089	Dec 2020	-		1.089	0.000	1.089	-
<b>Subtotal</b>			-	-		-		1.089		-		1.089	0.000	1.089	N/A
<b>Project Cost Totals</b>			3.840	1.784		20.000		24.975		-		24.975	126.000	176.599	N/A

**Remarks**  
 Acronyms:  
 AvMC: Aviation and Missile Center;  
 AMTC: Aviation & Missile Technology Consortium;  
 CCDC: Combat Capabilities Development Command;  
 AMRDEC: Aviation and Missile Research, Development and Engineering Command;  
 LMMFC: Lockheed Martin Missiles and Fire Control;  
 RSA: Redstone Arsenal, Alabama;  
 CD: Cross Domain

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition (BAT)</i>	<b>Project (Number/Name)</b> 688 / <i>ATACMS BLK II</i>

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
System Analysis, Requirement & Spec Development	█				█																							
Warhead Development	█				█																							
Contract Requirements Package Development	█				█																							
PFAL Development Engineering	█				█				█				█				█											
PFAL Flight Tests	█				█				█																			
PFAL Prototype Fabrication	█				█				█				█				█											
PFAL Prototype User Evaluation	█				█				█				█				█											
PFAL Program decision	█				█				█				█				█				█							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition (BAT)</i>	<b>Project (Number/Name)</b> 688 / <i>ATACMS BLK II</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
System Analysis, Requirement & Spec Development	1	2018	4	2019
Warhead Development	1	2019	4	2019
Contract Requirements Package Development	1	2018	4	2019
PFAL Development Engineering	1	2020	1	2024
PFAL Flight Tests	3	2020	3	2021
PFAL Prototype Fabrication	1	2021	4	2023
PFAL Prototype User Evaluation	1	2022	3	2024
PFAL Program decision	3	2024	3	2024

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition (BAT)</i>	<b>Project (Number/Name)</b> P01 / <i>MULTI - MODE SEEKER DEVELOPMENT AND TEST</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
<i>P01: MULTI - MODE SEEKER DEVELOPMENT AND TEST</i>	-	4.784	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.784
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

Multi-Mode Seeker will integrate Strategic Capabilities Office (SCO) STRIKE-X program demonstrated capabilities into Army Tactical Missile System (ATACMS). This effort focuses on providing integration of a seeker to search, detect, acquire, and engage moving maritime/land-based targets.

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

	FY 2019	FY 2020	FY 2021
<b>Title:</b> Transition of SCO demonstrated capabilities to defeat maritime targets	4.784	-	-
<b>Description:</b> Conduct seeker component requirements development, system integration analysis, and transition planning targeted at rapid qualification and fielding of the maritime engagement capability. There is no funding in Fiscal Year (FY) 2020 and beyond.			
<b>Accomplishments/Planned Programs Subtotals</b>	4.784	-	-

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

N/A

**Remarks**

**D. Acquisition Strategy**

Accelerate the transition of SCO STRIKE-X program demonstrated capabilities into ATACMS.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition (BAT)</i>	<b>Project (Number/Name)</b> P01 / <i>MULTI - MODE SEEKER DEVELOPMENT AND TEST</i>
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<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 : RSA	0.900	0.947	Nov 2018	-		-		-		-	0.000	1.847	-
<b>Subtotal</b>			0.900	0.947		-		-		-		-	0.000	1.847	N/A

**Remarks**  
RSA-Redstone Arsenal, Alabama

<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Seeker Development	C/CPFF	Various : Various	0.900	1.500	Jan 2019	-		-		-		-	0.000	2.400	-
System Analysis, Requirement & Spec Dev	MIPR	AMRDEC : RSA	1.123	1.337	Jan 2019	-		-		-		-	0.000	2.460	-
<b>Subtotal</b>			2.023	2.837		-		-		-		-	0.000	4.860	N/A

**Remarks**  
AMRDEC-U.S. Army Research, Development and Engineering Command; RSA-Redstone Arsenal, Alabama

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test Support Hardware	MIPR	Redstone Test Center : RSA	1.123	1.000	Nov 2018	-		-		-		-	0.000	2.123	-
<b>Subtotal</b>			1.123	1.000		-		-		-		-	0.000	2.123	N/A

**Remarks**  
RSA-Redstone Arsenal, Alabama



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Army</b>			<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition (BAT)</i>	<b>Project (Number/Name)</b> P01 / <i>MULTI - MODE SEEKER DEVELOPMENT AND TEST</i>	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
System Analysis, Requirement & Spec Development																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604768A / <i>Brilliant Anti-Armor Submunition (BAT)</i>	<b>Project (Number/Name)</b> P01 / <i>MULTI - MODE SEEKER DEVELOPMENT AND TEST</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
System Analysis, Requirement & Spec Development	1	2018	1	2019
Sensor Study & Analysis	2	2018	4	2018