Department of Defense
Fiscal Year (FY) 2025 Budget Estimates

March 2024

Army

Justification Book Volume 1c of 1

Research, Development, Test & Evaluation, Army

RDT&E − Volume I, Budget Activity 3

Volume 1c Table of Contents

Introduction and Explanation of Contents.....Volume 1c - ii

Comptroller Exhibit R-1..... Volume 1c - vi

Program Element Table of Contents (by Budget Activity then Line Item Number).....Volume 1c - xvii

Program Element Table of Contents (Alphabetically by Program Element Title).....Volume 1c - xix

Exhibit R-2s.....Volume 1c - 1

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, $14,073,308,000.00 to remain available for obligation until September 30, 2026.

The FY 2025 Overseas Operational Costs accounted for in the Base budget total $3,157 thousand.

FY 2023 includes $7,626 thousand in Overseas Operations Costs (OOC) Actuals. FY 2024 includes $3,166 thousand in OOC Requested. FY 2025 includes $3,157 thousand for the OOC Budget Estimate. OOC were financed previously with former Overseas Contingency Operations (OCO) funding.

COST STATEMENT

The following Justification Books were prepared at a cost of $277,115.51 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 5D, Budget Activity 6, Budget Activity 7, and Budget Activity 8.

FY 2025 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 2025.

2. Relationship of the FY 2025 Budget Submitted to Congress to the FY 2024 Budget Submitted to Congress. This paragraph provides a list of program elements/projects that are major new starts and terminated programs. Explanations for these changes can be found in the narrative sections of the Program Element R-2A Exhibits.

New Start Programs:

Budget Activity	***OSDPE / Project***	***Project Title***
02	0602148A / CC3	FVL Radar Technologies
02	0602183A / DK1	Air Vehicle Integrated & Alternative Tech (AVIATe)
02	0602386A / SM1	Scale-Up Microbial Products for Biomanufacturing
02	0602150A / SU1	Counter Small Unmanned Aircraft Sys (C-sUAS) Tech
03	0603464A / CE9	Armaments Advanced Technology
03	0603119A / DI9	Comprehensive Adapt Operational Energy Adv Tech
03	0603043A / DK2	Air Vehicle Improvement & Adv Tech (AVIATe)
03	0603044A / EA7	Enhanced Indirect Fire Adv Tech
03	0603466A / IB1	Integrated Beam Control Systems Demo for C-CM
03	0603116A / LR1	Long Range Sensing Adv Tech
03	0603465A / CK2	High Speed Maneuverable Missile (HSMM) Adv Tech
03	0603042A / DI6	Anti-Tamper Advanced Tech Development
04	0604386A / CQ9	Biotechnology for Materials - Dem/Val
04	0604019A / DJ5	Multi-Domain Artillery Cannon System (MDACS)
04	0305251A / FA8	Cyberspace Operations Forces and Force Support
04	0603639A / FG1	Cannon-Delivered Area Effects Munitions (C-DAEM)
04	0603639A / XT5	30mm Anti-Personnel and Counter UAS

05	0604805A / DH4	CMOSS Mounted Form Factor (CMFF) Radio Cards
05	0604710A / DI5	FALCONS
05	0605244A / DJ3	Joint Reduced Range Rocket
05	0605242A / DJ4	Theater SIGINT System (TSIGS)
05	0605247A / DJ8	Spectrum Situational Awareness System (S2AS)
05	0605054A / DJ9	Guam Defense System - Management
05	0604854A / DH7	Next Generation Howitzer
05	0604818A / DK3	Sensor Computing Environment (SCE)
05	0604713A / EL2	Army Field Feeding Equipment
05	0605038A / EQ7	NBC Reconnaissance Vehicle (NBCRV) Sensor Suite
05	0605051A / ITD	Improved Threat Detection System (ITDS)
05	0604827A / LS2	Lethal Semi-Autonomous Aerial Unmanned Sys-Eng Dev
05	0604802A / MS1	Battalion Mortar System Modernization
05	0605241A / DG5	Future Long Range Assault Aircraft
05	0604805A / DH5	CMOSS Mounted Form Factor (CMFF)Chassis
06	0605805A / 857	DoD Explosives Safety Standards
07	0607101A / DJ7	Radiological Detection System Development

Program Terminations (including transfers to Procurement and Sustainment):

-

Budget Activity	***OSDPE / Project***	***Project Title***
02	0602002A / DC5	Team Ignite
02	0602145A / BI4	Materials Application and Integration Tech
03	0603464A / AG5	Extended Range Artillery Munition Suite Adv Tech
03	0603118A / AY7	Small Arms Fire Control Advanced Technology
03	0603118A / BB8	Soldier Centric Advanced Technology
03	0603462A / BI5	Materials Application and Integration Adv Tech
03	0603462A / BK4	Next Gen Intelligent Fire Control(NG-IFC) Adv Tech

03	0603041A / CM8	Convergence Battlefield Integration
04	0603801A / CK7	FARA Ecosystem
04	0603801A / F12	Future Attack Reconnaissance Aircraft
04	0604120A / EJ2	MOUNTED
04	0604120A / BV4	Area Protection and Alt Nav Technology Development
05	0604802A / EP2	Shoulder-Launched Munitions
05	0604802A / EP4	One-Way Luminescence for Small Caliber Ammo
05	0604802A / FA6	30mm Lethality
05	0604818A / EJ6	TACTICAL ENHANCEMENT
05	0605041A / CY5	CYBER Situational Understanding
05	0605053A / BS9	Robotic Payloads
05	0604808A / CS3	Next Generation Advanced Bomb Suit (NGABS)
06	0605326A / 33B	Soldier-Centered Analyses For Future Force
07	0203735A / 280	RECOV VEH IMPROV PROG
07	0303028A / FG2	Counterintelligence & Human Intel Modernization
07	0607142A / EW9	Aviation Rocket System Product Improvement and Dev

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 the Army
FY 2025 President's Budget
Exhibit R-1 FY 2025 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Mar 2024

Appropriation: 2040A Research, Development, Test and Evaluation, Army

Line No	Program Element Number	Item	Act	Sec	FY 2023 Actuals	FY 2024 PB Request with CR Adjustments*	FY 2025 Request
1	0601102A	Defense Research Sciences	01	U	386,594	296,670	310,191
2	0601103A	University Research Initiatives	01	U	97,598	75,672	78,166
3	0601104A	University and Industry Research Centers	01	U	119,270	108,946	109,726
4	0601121A	Cyber Collaborative Research Alliance	01	U	5,355	5,459	5,525
5	0601601A	Artificial Intelligence and Machine Learning Basic Research	01	U	7,985	10,708	10,309
	Basic Research				**616,802**	**497,455**	**513,917**
6	0602002A	Army Agile Innovation and Development-Applied Research	02	U	127	5,613	8,032
7	0602134A	Counter Improvised-Threat Advanced Studies	02	U	5,966	6,242	6,163
8	0602141A	Lethality Technology	02	U	180,191	85,578	96,094
9	0602142A	Army Applied Research	02	U	27,833	34,572	
10	0602143A	Soldier Lethality Technology	02	U	266,501	104,470	102,236
11	0602144A	Ground Technology	02	U	256,916	60,005	66,707
12	0602145A	Next Generation Combat Vehicle Technology	02	U	273,166	166,500	149,108
13	0602146A	Network C3I Technology	02	U	221,293	81,618	84,576
14	0602147A	Long Range Precision Fires Technology	02	U	113,099	34,683	32,089
15	0602148A	Future Verticle Lift Technology	02	U	103,022	73,844	52,685
16	0602150A	Air and Missile Defense Technology	02	U	94,972	33,301	39,188
17	0602180A	Artificial Intelligence and Machine Learning Technologies	02	U	15,481	24,142	20,319
18	0602181A	All Domain Convergence Applied Research	02	U	26,362	14,297	12,269
19	0602182A	C3I Applied Research	02	U	26,913	30,659	25,839
20	0602183A	Air Platform Applied Research	02	U	40,372	48,163	53,206
21	0602184A	Soldier Applied Research	02	U	15,427	18,986	21,069

Department of the Army
FY 2025 President's Budget
Exhibit R-1 FY 2025 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Mar 2024

Appropriation: 2040A Research, Development, Test and Evaluation, Army

Line No	Program Element Number	Item	Act	Sec	FY 2023 Actuals	FY 2024 PB Request with CR Adjustments*	FY 2025 Request
22	0602213A	C3I Applied Cyber	02	U	13,605	22,714	28,656
23	0602386A	Biotechnology for Materials - Applied Research	02	U	21,015	16,736	11,780
25	0602785A	Manpower/Personnel/Training Technology	02	U	19,343	19,969	19,795
26	0602787A	Medical Technology	02	U	79,851	66,266	68,481
999	999999999	Classified Programs	02	U			35,766
	Applied Research				**1,801,455**	**948,358**	**934,058**
27	0603002A	Medical Advanced Technology	03	U	31,398	4,147	3,112
28	0603007A	Manpower, Personnel and Training Advanced Technology	03	U	15,146	16,316	16,716
29	0603025A	Army Agile Innovation and Demonstration	03	U	17,757	23,156	14,608
30	0603040A	Artificial Intelligence and Machine Learning Advanced Technologies	03	U	6,162	13,187	18,263
31	0603041A	All Domain Convergence Advanced Technology	03	U	40,955	33,332	23,722
32	0603042A	C3I Advanced Technology	03	U	12,252	19,225	22,814
33	0603043A	Air Platform Advanced Technology	03	U	13,062	14,165	17,076
34	0603044A	Soldier Advanced Technology	03	U	462	1,214	10,133
35	0603116A	Lethality Advanced Technology	03	U	11,460	20,582	33,969
36	0603117A	Army Advanced Technology Development	03	U	138,774	136,280	
37	0603118A	Soldier Lethality Advanced Technology	03	U	150,020	102,778	94,899
38	0603119A	Ground Advanced Technology	03	U	415,104	40,597	45,880
39	0603134A	Counter Improvised-Threat Simulation	03	U	20,782	21,672	21,398
40	0603386A	Biotechnology for Materials - Advanced Research	03	U	54,778	59,871	36,360
41	0603457A	C3I Cyber Advanced Development	03	U	41,354	28,847	19,616
42	0603461A	High Performance Computing Modernization Program	03	U	293,043	255,772	239,597
43	0603462A	Next Generation Combat Vehicle Advanced Technology	03	U	467,533	217,394	175,198

Department of the Army
FY 2025 President's Budget
Exhibit R-1 FY 2025 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Mar 2024

Appropriation: 2040A Research, Development, Test and Evaluation, Army

Line No	Program Element Number	Item	Act	Sec	FY 2023 Actuals	FY 2024 PB Request with CR Adjustments	FY 2025 Request
44	0603463A	Network C3I Advanced Technology	03	U	174,768	105,549	94,424
45	0603464A	Long Range Precision Fires Advanced Technology	03	U	225,921	153,024	164,943
46	0603465A	Future Vertical Lift Advanced Technology	03	U	265,429	158,795	140,578
47	0603466A	Air and Missile Defense Advanced Technology	03	U	108,758	21,015	28,333
49	0603920A	Humanitarian Demining	03	U	20,674	9,068	9,272
999	999999999	Classified Programs	03	U			155,526
	Advanced Technology Development				**2,525,592**	**1,455,986**	**1,386,437**
51	0603305A	Army Missle Defense Systems Integration	04	U	117,723	12,904	13,031
52	0603308A	Army Space Systems Integration	04	U	30,453	19,120	19,659
53	0603327A	Air and Missile Defense Systems Engineering	04	U	15,000		
54	0603619A	Landmine Warfare and Barrier - Adv Dev	04	U	59,911	47,537	58,617
55	0603639A	Tank and Medium Caliber Ammunition	04	U	49,609	91,323	116,027
56	0603645A	Armored System Modernization - Adv Dev	04	U	133,300	43,026	23,235
57	0603747A	Soldier Support and Survivability	04	U	4,030	3,550	4,059
58	0603766A	Tactical Electronic Surveillance System - Adv Dev	04	U	72,364	65,567	90,265
59	0603774A	Night Vision Systems Advanced Development	04	U	96,819	73,675	64,113
60	0603779A	Environmental Quality Technology - Dem/Val	04	U	75,614	31,720	34,091
61	0603790A	NATO Research and Development	04	U	3,666	4,143	4,184
62	0603801A	Aviation - Adv Dev	04	U	1,113,295	1,502,160	6,591
63	0603804A	Logistics and Engineer Equipment - Adv Dev	04	U	24,287	7,604	12,445
64	0603807A	Medical Systems - Adv Dev	04	U	5,598	1,602	582
65	0603827A	Soldier Systems - Advanced Development	04	U	20,807	27,681	24,284
66	0604017A	Robotics Development	04	U	27,444	3,024	3,039
67	0604019A	Expanded Mission Area Missile (EMAM)	04	U	250,351	97,018	102,589

Department of the Army
FY 2025 President's Budget
Exhibit R-1 FY 2025 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Mar 2024

Appropriation: 2040A Research, Development, Test and Evaluation, Army

Line No	Program Element Number	Item	Act	Sec	FY 2023 Actuals	FY 2024 PB Request with CR Adjustments*	FY 2025 Request
68	0604020A	Cross Functional Team (CFT) Advanced Development & Prototyping	04	U	74,189	117,557	63,831
69	0604035A	Low Earth Orbit (LEO) Satellite Capability	04	U	34,213	38,851	21,935
70	0604036A	Multi-Domain Sensing System (MDSS) Adv Dev	04	U	47,915	191,394	239,135
71	0604037A	Tactical Intel Targeting Access Node (TITAN) Adv Dev	04	U	863	10,626	4,317
72	0604100A	Analysis Of Alternatives	04	U	10,270	11,095	11,234
73	0604101A	Small Unmanned Aerial Vehicle (SUAV) (6.4)	04	U	1,373	5,144	1,800
74	0604103A	Electronic Warfare Planning and Management Tool (EWPMT)	04	U		2,260	2,004
75	0604113A	Future Tactical Unmanned Aircraft System (FTUAS)	04	U	134,719	53,143	127,870
76	0604114A	Lower Tier Air Missile Defense (LTAMD) Sensor	04	U	366,637	816,663	149,463
77	0604115A	Technology Maturation Initiatives	04	U	209,220	281,314	252,000
78	0604117A	Maneuver - Short Range Air Defense (M-SHORAD)	04	U	269,186	281,239	315,772
79	0604119A	Army Advanced Component Development & Prototyping	04	U	198,111	204,914	
80	0604120A	Assured Positioning, Navigation and Timing (PNT)	04	U	54,728	40,930	24,168
81	0604121A	Synthetic Training Environment Refinement & Prototyping	04	U	236,396	109,714	136,029
82	0604134A	Counter Improvised-Threat Demonstration, Prototype Development, and Testing	04	U	14,298	16,426	17,341
83	0604135A	Strategic Mid-Range Fires	04	U	379,535	31,559	
84	0604182A	Hypersonics	04	U	309,068	43,435	
85	0604386A	Biotechnology for Materials - Dem/Val	04	U			20,862
86	0604403A	Future Interceptor	04	U	7,880	8,040	8,058
88	0604531A	Counter - Small Unmanned Aircraft Systems Advanced Development	04	U	36,629	64,242	59,983
90	0604541A	Unified Network Transport	04	U	35,616	40,915	31,837

Department of the Army
FY 2025 President's Budget
Exhibit R-1 FY 2025 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Mar 2024

Appropriation: 2040A Research, Development, Test and Evaluation, Army

Line No	Program Element Number	Item	Act	Sec	FY 2023 Actuals	FY 2024 PB Request with CR Adjustments*	FY 2025 Request
91	0305251A	Cyberspace Operations Forces and Force Support	04	U	55,599		2,270
999	999999999	Classified Programs	04	U		19,200	277,181
	Advanced Component Development & Prototypes				**4,576,716**	**4,420,315**	**2,343,901**
92	0604201A	Aircraft Avionics	05	U	3,213	13,673	7,171
93	0604270A	Electronic Warfare Development	05	U	3,987	12,789	35,942
94	0604601A	Infantry Support Weapons	05	U	80,115	64,076	52,586
95	0604604A	Medium Tactical Vehicles	05	U	21,354	28,226	15,088
96	0604611A	JAVELIN	05	U	15,899	7,827	10,405
97	0604622A	Family of Heavy Tactical Vehicles	05	U	51,261	44,197	50,011
98	0604633A	Air Traffic Control	05	U	2,527	1,134	982
99	0604641A	Tactical Unmanned Ground Vehicle (TUGV)	05	U	107,975	142,125	92,540
100	0604642A	Light Tactical Wheeled Vehicles	05	U	13,667	53,564	100,257
101	0604645A	Armored Systems Modernization (ASM) - Eng Dev	05	U	60,827	102,201	48,097
102	0604710A	Night Vision Systems - Eng Dev	05	U	89,273	48,720	89,259
103	0604713A	Combat Feeding, Clothing, and Equipment	05	U	1,509	2,223	3,286
104	0604715A	Non-System Training Devices - Eng Dev	05	U	17,910	21,441	28,427
105	0604741A	Air Defense Command, Control and Intelligence - Eng Dev	05	U	54,244	74,738	69,653
106	0604742A	Constructive Simulation Systems Development	05	U	28,404	30,985	30,097
107	0604746A	Automatic Test Equipment Development	05	U	4,989	13,626	12,927
108	0604760A	Distributive Interactive Simulations (DIS) - Eng Dev	05	U	7,890	8,802	8,914
109	0604798A	Brigade Analysis, Integration and Evaluation	05	U	22,207	20,828	26,352
110	0604802A	Weapons and Munitions - Eng Dev	05	U	284,859	243,851	242,949
111	0604804A	Logistics and Engineer Equipment - Eng Dev	05	U	74,150	37,420	41,829

Department of the Army
FY 2025 President's Budget
Exhibit R-1 FY 2025 President's Budget
Total Obligational Authority

Mar 2024

(Dollars in Thousands)

Appropriation: 2040A Research, Development, Test and Evaluation, Army

Line No	Program Element Number	Item	Act	Sec	FY 2023 Actuals	FY 2024 PB Request with CR Adjustments	FY 2025 Request
112	0604805A	Command, Control, Communications Systems - Eng Dev	05	U	43,533	34,214	92,300
113	0604807A	Medical Materiel/Medical Biological Defense Equipment - Eng Dev	05	U	25,035	6,496	7,143
114	0604808A	Landmine Warfare/Barrier - Eng Dev	05	U	36,707	13,581	19,134
115	0604818A	Army Tactical Command & Control Hardware & Software	05	U	128,240	168,574	165,229
116	0604820A	Radar Development	05	U	77,158	94,944	76,090
117	0604822A	General Fund Enterprise Business System (GFEBS)	05	U	10,022	2,965	1,995
118	0604827A	Soldier Systems - Warrior Dem/Val	05	U	19,237	11,333	29,132
119	0604852A	Suite of Survivability Enhancement Systems - EMD	05	U	75,520	79,250	77,864
120	0604854A	Artillery Systems - EMD	05	U	42,261	42,490	50,495
121	0605013A	Information Technology Development	05	U	85,713	104,024	120,076
122	0605018A	Integrated Personnel and Pay System-Army (IPPS-A)	05	U	65,055	102,084	126,354
123	0605030A	Joint Tactical Network Center (JTNC)	05	U	17,274	18,662	20,191
124	0605031A	Joint Tactical Network (JTN)	05	U	29,050	30,328	31,214
125	0605035A	Common Infrared Countermeasures (CIRCM)	05	U	9,602	11,509	11,691
126	0605036A	Combating Weapons of Mass Destruction (CWMD)	05	U		1,050	7,846
127	0605038A	Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) Sensor Suite	05	U			7,886
128	0605041A	Defensive CYBER Tool Development	05	U	33,029	27,714	4,176
129	0605042A	Tactical Network Radio Systems (Low-Tier)	05	U	4,265	4,318	4,288
130	0605047A	Contract Writing System	05	U	13,220	16,355	9,276
131	0605049A	Missile Warning System Modernization (MWSM)	05	U		27,571	
132	0605051A	Aircraft Survivability Development	05	U	18,425	24,900	38,225
133	0605052A	Indirect Fire Protection Capability Inc 2 - Block 1	05	U	126,308	196,248	167,912
134	0605053A	Ground Robotics	05	U	25,131	35,319	28,378

Department of the Army
FY 2025 President's Budget
Exhibit R-1 FY 2025 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Mar 2024

Appropriation: 2040A Research, Development, Test and Evaluation, Army

Line No	Program Element Number	Item	Act	Sec	FY 2023 Actuals	FY 2024 PB Request with CR Adjustments*	FY 2025 Request
135	0605054A	Emerging Technology Initiatives	05	U	212,750	201,274	164,734
136	0605143A	Biometrics Enabling Capability (BEC)	05	U	9,186		
137	0605144A	Next Generation Load Device - Medium	05	U	24,094	36,970	2,931
138	0605148A	Tactical Intel Targeting Access Node (TITAN) EMD	05	U	103,987	132,136	157,036
139	0605203A	Army System Development & Demonstration	05	U	143,616	81,657	
140	0605205A	Small Unmanned Aerial Vehicle (SUAV) (6.5)	05	U	6,292	31,284	37,876
141	0605206A	CI and HUMINT Equipment Program-Army (CIHEP-A)	05	U		2,170	1,296
142	0605216A	Joint Targeting Integrated Command and Coordination Suite (JTIC2S)	05	U		9,290	28,553
143	0605224A	Multi-Domain Intelligence	05	U	6,008	41,003	18,913
144	0605231A	Precision Strike Missile (PrSM)	05	U	250,034	272,786	184,046
145	0605232A	Hypersonics EMD	05	U	533,520	900,920	538,017
146	0605233A	Accessions Information Environment (AIE)	05	U	9,720	27,361	32,265
147	0605235A	Strategic Mid-Range Capability	05	U	4,833	348,855	182,823
148	0605236A	Integrated Tactical Communications	05	U	11,993	22,901	23,363
149	0605241A	Future Long Range Assault Aircraft Development	05	U			1,253,637
150	0605242A	Theater SIGINT System (TSIGS)	05	U			6,660
151	0605244A	Joint Reduced Range Rocket (JR3)	05	U			13,565
152	0605247A	Spectrum Situational Awareness System (S2AS)	05	U			9,330
153	0605450A	Joint Air-to-Ground Missile (JAGM)	05	U	2,280	3,014	3,030
154	0605457A	Army Integrated Air and Missile Defense (AIAMD)	05	U	245,791	284,095	602,045
155	0605531A	Counter - Small Unmanned Aircraft Systems Sys Dev & Demonstration	05	U	11,548	36,016	59,563
157	0605625A	Manned Ground Vehicle	05	U	519,131	996,653	504,841
158	0605766A	National Capabilities Integration (MIP)	05	U	16,790	15,129	16,565

Department of the Army
FY 2025 President's Budget
Exhibit R-1 FY 2025 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Mar 2024

Appropriation: 2040A Research, Development, Test and Evaluation, Army

Line No	Program Element Number	Item	Act	Sec	FY 2023 Actuals	FY 2024 PB Request with CR Adjustments*	FY 2025 Request
159	0605812A	Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Phase (EMD)	05	U	9,033	27,243	27,013
160	0605830A	Aviation Ground Support Equipment	05	U	2,851	1,167	979
161	0303032A	TROJAN - RH12	05	U	3,761	3,879	3,930
162	0303767A	AMBIT - Pre-Auctioned SRF	05	U	21,730		
163	0304270A	Electronic Warfare Development	05	U	97,616	137,186	131,096
999	999999999	Classified Programs	05	U			83,136
	System Development & Demonstration				**4,077,609**	**5,639,364**	**6,150,910**
164	0604256A	Threat Simulator Development	06	U	138,264	38,492	71,298
165	0604258A	Target Systems Development	06	U	53,434	11,873	15,788
166	0604759A	Major T&E Investment	06	U	144,173	76,167	78,613
167	0605103A	Rand Arroyo Center	06	U	30,800	37,078	38,122
168	0605301A	Army Kwajalein Atoll	06	U	297,859	314,872	321,755
169	0605326A	Concepts Experimentation Program	06	U	83,668	95,551	86,645
170	0605502A	Small Business Innovative Research	06	U	382,638		
171	0605601A	Army Test Ranges and Facilities	06	U	414,662	439,118	461,085
172	0605602A	Army Technical Test Instrumentation and Targets	06	U	72,760	42,220	75,591
173	0605604A	Survivability/Lethality Analysis	06	U	35,750	37,518	37,604
174	0605606A	Aircraft Certification	06	U	4,777	2,718	2,201
175	0605702A	Meteorological Support to RDT&E Activities	06	U	6,820		
176	0605706A	Materiel Systems Analysis	06	U	22,004	26,902	27,420
177	0605709A	Exploitation of Foreign Items	06	U	6,186	7,805	6,245
178	0605712A	Support of Operational Testing	06	U	69,879	75,133	76,088
179	0605716A	Army Evaluation Center	06	U	67,058	71,118	73,220

Department of the Army
FY 2025 President's Budget
Exhibit R-1 FY 2025 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Mar 2024

Appropriation: 2040A Research, Development, Test and Evaluation, Army

Line No	Program Element Number	Item	Act	Sec	FY 2023 Actuals	FY 2024 PB Request with CR Adjustments*	FY 2025 Request
180	0605718A	Army Modeling & Sim X-Cmd Collaboration & Integ	06	U	5,874	11,204	11,257
181	0605801A	Programwide Activities	06	U	88,780	93,895	91,895
182	0605803A	Technical Information Activities	06	U	36,821	31,327	32,385
183	0605805A	Munitions Standardization, Effectiveness and Safety	06	U	59,088	50,409	50,766
184	0605857A	Environmental Quality Technology Mgmt Support	06	U	1,842	1,629	1,659
185	0605898A	Army Direct Report Headquarters - R&D - MHA	06	U	53,003	55,843	59,727
186	0606002A	Ronald Reagan Ballistic Missile Defense Test Site	06	U	85,873	91,340	73,400
187	0606003A	CounterIntel and Human Intel Modernization	06	U	1,424	6,348	4,574
188	0606942A	Assessments and Evaluations Cyber Vulnerabilities	06	U	5,816	6,025	10,105
189	0909999A	Financing for Cancelled Account Adjustments	06	U	135		
	Management Support				**2,169,388**	**1,624,585**	**1,707,443**
190	0603778A	MLRS Product Improvement Program	07	U	17,790	14,465	14,188
191	0605024A	Anti-Tamper Technology Support	07	U	9,028	7,472	7,489
192	0607101A	Combating Weapons of Mass Destruction (CWMD) Product Improvement	07	U			271
193	0607131A	Weapons and Munitions Product Improvement Programs	07	U	54,216	8,425	9,363
194	0607136A	Blackhawk Product Improvement Program	07	U		1,507	25,000
195	0607137A	Chinook Product Improvement Program	07	U	65,596	9,265	4,816
196	0607139A	Improved Turbine Engine Program	07	U	219,713	201,247	67,029
197	0607142A	Aviation Rocket System Product Improvement and Development	07	U	10,899	3,014	
198	0607143A	Unmanned Aircraft System Universal Products	07	U	10,493	25,393	24,539
199	0607145A	Apache Future Development	07	U	26,607	10,547	8,243
200	0607148A	AN/TPQ-53 Counterfire Target Acquisition Radar System	07	U	59,312	54,167	53,652
201	0607150A	Intel Cyber Development	07	U	13,343	4,345	9,753

Department of the Army
FY 2025 President's Budget
Exhibit R-1 FY 2025 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Mar 2024

Appropriation: 2040A Research, Development, Test and Evaluation, Army

Line No	Program Element Number	Item	Act	Sec	FY 2023 Actuals	FY 2024 PB Request with CR Adjustments*	FY 2025 Request
202	0607312A	Army Operational Systems Development	07	U	26,131	19,000	
203	0607313A	Electronic Warfare Development	07	U	11,417	6,389	5,559
204	0607315A	Enduring Turbine Engines and Power Systems	07	U		2,411	2,620
206	0607665A	Family of Biometrics	07	U	1,073	797	590
207	0607865A	Patriot Product Improvement	07	U	146,753	177,197	168,458
208	0203728A	Joint Automated Deep Operation Coordination System (JADOCS)	07	U	18,606	42,177	27,582
209	0203735A	Combat Vehicle Improvement Programs	07	U	187,377	146,635	272,926
210	0203743A	155mm Self-Propelled Howitzer Improvements	07	U	112,257	122,902	55,205
211	0203752A	Aircraft Engine Component Improvement Program	07	U	148	146	142
212	0203758A	Digitization	07	U		1,515	1,562
213	0203801A	Missile/Air Defense Product Improvement Program	07	U	2,996	4,520	1,511
214	0203802A	Other Missile Product Improvement Programs	07	U	8,698	10,044	23,708
215	0205412A	Environmental Quality Technology - Operational System Dev	07	U	764	281	269
216	0205778A	Guided Multiple-Launch Rocket System (GMLRS)	07	U	19,443	75,952	20,590
217	0208053A	Joint Tactical Ground System	07	U	8,813	203	
220	0303028A	Security and Intelligence Activities	07	U		301	
221	0303140A	Information Systems Security Program	07	U	15,554	15,323	15,733
222	0303141A	Global Combat Support System	07	U	21,775	13,082	2,566
223	0303142A	SATCOM Ground Environment (SPACE)	07	U	14,551	26,838	26,643
226	0305179A	Integrated Broadcast Service (IBS)	07	U	9,426	9,456	5,701
227	0305204A	Tactical Unmanned Aerial Vehicles	07	U	4,500		
228	0305206A	Airborne Reconnaissance Systems	07	U	6,402		
229	0305219A	MQ-1 Gray Eagle UAV	07	U		6,629	6,681

Department of the Army
FY 2025 President's Budget
Exhibit R-1 FY 2025 President's Budget
Total Obligational Authority

Mar 2024

(Dollars in Thousands)

Appropriation: 2040A Research, Development, Test and Evaluation, Army

Line No	Program Element Number	Item	Act	Sec	FY 2023 Actuals	FY 2024 PB Request with CR Adjustments*	FY 2025 Request
230	0708045A	End Item Industrial Preparedness Activities	07	U	128,617	75,317	67,187
999	999999999	Classified Programs	07	U	6,664	8,786	32,518
	Operational Systems Development				**1,238,962**	**1,105,748**	**962,094**
231	0608041A	Defensive CYBER - Software Prototype Development	08	U	92,460	83,570	74,548
	Software And Digital Technology Pilot Programs				**92,460**	**83,570**	**74,548**
232	0901560A	Continuing Resolution Programs	20	U		1,366,740	
	Undistributed					**1,366,740**	
Total Research, Development, Test and Evaluation, Army					**17,098,984**	**17,142,121**	**14,073,308**

*A full-year FY 2024 appropriation for this account was not enacted at the time the budget was prepared; account is operating under the Further Additional Continuing Appropriations and Other Extensions Act, 2024 (Public Law 118-35). The amounts included for FY 2024 reflect the annualized level provided by the continuing resolution.

*FY 2023 includes $7,626 thousand in Overseas Operations Costs (OOC) Actuals. FY 2024 includes $3,166 thousand in OOC Requested. FY 2025 includes $3,157 thousand for the OOC Budget Estimate. OOC were financed previously with former Overseas Contingengy Operations (OCO) funding.

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

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

Line #	Budget Activity	Program Element Number	Program Element Title	Page
27	03	0603002A	Medical Advanced Technology	Volume 1c - 1
28	03	0603007A	Manpower, Personnel and Training Advanced Technology	Volume 1c - 15
29	03	0603025A	Army Agile Innovation and Demonstration	Volume 1c - 19
30	03	0603040A	Artificial Intelligence and Machine Learning Advanced Technologies	Volume 1c - 26
31	03	0603041A	All Domain Convergence Advanced Technology	Volume 1c - 41
32	03	0603042A	C3I Advanced Technology	Volume 1c - 52
33	03	0603043A	Air Platform Advanced Technology	Volume 1c - 72
34	03	0603044A	Soldier Advanced Technology	Volume 1c - 87
35	03	0603116A	Lethality Advanced Technology	Volume 1c - 95
36	03	0603117A	Army Advanced Technology Development	Volume 1c - 109
37	03	0603118A	Soldier Lethality Advanced Technology	Volume 1c - 110
38	03	0603119A	Ground Advanced Technology	Volume 1c - 148
39	03	0603134A	Counter Improvised-Threat Simulation	Volume 1c - 185
40	03	0603386A	Biotechnology for Materials - Advanced Research	Volume 1c - 190
41	03	0603457A	C3I Cyber Advanced Development	Volume 1c - 194
42	03	0603461A	High Performance Computing Modernization Program	Volume 1c - 205

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

Line #	Budget Activity	Program Element Number	Program Element Title	Page
43	03	0603462A	Next Generation Combat Vehicle Advanced Technology	Volume 1c - 212
44	03	0603463A	Network C3I Advanced Technology	Volume 1c - 262
45	03	0603464A	Long Range Precision Fires Advanced Technology	Volume 1c - 306
46	03	0603465A	Future Vertical Lift Advanced Technology	Volume 1c - 324
47	03	0603466A	Air and Missile Defense Advanced Technology	Volume 1c - 364
49	03	0603920A	Humanitarian Demining	Volume 1c - 378

Program Element Table of Contents (Alphabetically by Program Element Title)

Program Element Title	Program Element Number	Line #	BA	Page
Air Platform Advanced Technology	0603043A	33	03	Volume 1c - 72
Air and Missile Defense Advanced Technology	0603466A	47	03	Volume 1c - 364
All Domain Convergence Advanced Technology	0603041A	31	03	Volume 1c - 41
Army Advanced Technology Development	0603117A	36	03	Volume 1c - 109
Army Agile Innovation and Demonstration	0603025A	29	03	Volume 1c - 19
Artificial Intelligence and Machine Learning Advanced Technologies	0603040A	30	03	Volume 1c - 26
Biotechnology for Materials - Advanced Research	0603386A	40	03	Volume 1c - 190
C3I Advanced Technology	0603042A	32	03	Volume 1c - 52
C3I Cyber Advanced Development	0603457A	41	03	Volume 1c - 194
Counter Improvised-Threat Simulation	0603134A	39	03	Volume 1c - 185
Future Vertical Lift Advanced Technology	0603465A	46	03	Volume 1c - 324
Ground Advanced Technology	0603119A	38	03	Volume 1c - 148
High Performance Computing Modernization Program	0603461A	42	03	Volume 1c - 205
Humanitarian Demining	0603920A	49	03	Volume 1c - 378
Lethality Advanced Technology	0603116A	35	03	Volume 1c - 95
Long Range Precision Fires Advanced Technology	0603464A	45	03	Volume 1c - 306
Manpower, Personnel and Training Advanced Technology	0603007A	28	03	Volume 1c - 15

Program Element Title	Program Element Number	Line #	BA	Page
Medical Advanced Technology	0603002A	27	03	Volume 1c - 1
Network C3I Advanced Technology	0603463A	44	03	Volume 1c - 262
Next Generation Combat Vehicle Advanced Technology	0603462A	43	03	Volume 1c - 212
Soldier Advanced Technology	0603044A	34	03	Volume 1c - 87
Soldier Lethality Advanced Technology	0603118A	37	03	Volume 1c - 110

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603002A *I Medical Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	31.398	4.147	3.112	-	3.112	2.046	2.048	2.070	2.091	0.000	46.912
MM2: *MEDICAL ADVANCE TECHNOLOGY INITIATIVES (CA)*	-	26.381	-	-	-	-	-	-	-	-	0.000	26.381
MM7: *Enabling Med Cap to Support Dispersed OPS Adv Tech*	-	0.722	0.856	1.038	-	1.038	1.039	1.040	1.051	1.061	0.000	6.807
MN6: *Blast & Head Impact Exposure Monitor Advanced Tech*	-	1.125	-	-	-	-	-	-	-	-	0.000	1.125
MN7: *Musculoskeletal Injury Screening Tool Adv Tech*	-	1.229	0.762	0.829	-	0.829	0.485	0.486	0.491	0.496	0.000	4.778
MO8: *Expeditionary Performance Nutrition Advanced Techn*	-	0.169	0.731	0.164	-	0.164	0.164	0.164	0.166	0.168	0.000	1.726
MP3: *Phys Chem Toxicity Assessment Sys Adv Tech*	-	1.772	1.798	1.081	-	1.081	0.358	0.358	0.362	0.366	0.000	6.095

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and demonstrates advanced medical technologies including drugs, vaccines, medical diagnostic devices, measures for identification and vector control, and developing medical practices and procedures to effectively protect and improve the survivability of United States Forces across the entire spectrum of military operations. Tri-Service coordination and cooperative efforts are focused in four principal medical areas: Combat Casualty Care, Military Operational Medicine, Militarily Relevant Infectious Diseases, and Clinical and Rehabilitative Medicine. Starting in Fiscal Year 2020 (FY20), the principal area of Clinical and Rehabilitative Medicine was replaced with the area of Medical Assist Support Technologies.

Promising medical technologies are refined and validated through extensive testing, which is conducted in compliance with Food and Drug Administration (FDA) regulations for human medical products, and Environmental Protection Agency (EPA) regulations for insect-control products that impact humans or the environment (e.g., repellents and insecticides). The FDA requires medical products to undergo extensive preclinical testing in animals and/or other models to obtain preliminary effectiveness and safety information before they can be tested in human clinical trials. Clinical trials are conducted stepwise: first to prove the product is safe in humans, second to demonstrate the desired effectiveness and optimal dosage (amount to be administered) in a small group human study, and third to demonstrate effectiveness in large, diverse human populations. Each successive phase includes larger numbers of human subjects and requires FDA cognizance prior to proceeding. Work

conducted in this PE primarily focuses on late stages of technology maturation activities required to conduct safety and effectiveness clinical trials. Some high-risk technologies may require additional maturation with FDA guidance prior to initiating these clinical trials. Such things as proof of product stability and purity are necessary to meet FDA standards before entering later stages of testing and prior to transitioning into a formal acquisition program where large pivotal trials in diverse populations will be conducted for licensure. Activities in this PE may include completion of preclinical animal studies and small safety and effectiveness studies involving humans according to FDA and EPA requirements. Promising medical technologies that are not regulated by the FDA or EPA are modeled, prototyped, and tested in relevant environments.

Blast research and research into maturing field rations in this PE are fully coordinated with the United States Army Combat Capabilities Development Command Soldier Center. This coordination enables improved body armor design and rations for Soldiers. Additionally, the activities funded in this PE are externally peer reviewed and fully coordinated with all Services as well as other agencies through the Joint Technology Coordinating Groups of the Armed Services Biomedical Research Evaluation and Management (ASBREM) Community of Interest (COI). The ASBREM COI, formed under the authority of the Under Secretary of Defense for Research and Engineering, serves to facilitate coordination and prevent unnecessary duplication of effort within the Department of Defense's biomedical research and development community, as well as its associated enabling research areas.

The cited research is consistent with the Under Secretary of Defense (Research and Engineering) Science and Technology (S&T) focus areas and the Army Modernization Strategy.

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	31.588	4.147	3.106	-	3.106
Current President's Budget	31.398	4.147	3.112	-	3.112
Total Adjustments	-0.190	0.000	0.006	-	0.006
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.190	-			
• Adjustments to Budget Years	-	-	0.006	-	0.006

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Project: MM2: *MEDICAL ADVANCE TECHNOLOGY INITIATIVES (CA)*		
Congressional Add: *Program Increase - AERIAL RECONFIGURABLE EMBEDDED SYSTEM*	9.500	-
Congressional Add: *Program Increase - SUICIDE PREVENTION WITH FOCUS ON RURAL, REMOTE, ISOLATED, AND OCONUS INSTALLATIONS*	2.000	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603002A *I Medical Advanced Technology*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Congressional Add: *Program Increase - ARMY BATTLEFIELD EXERCISE AND COMBAT RELATED TRAUMATIC BRAIN AND SPINAL CORD INJURY RESEARCH*	1.700	-
Congressional Add: *Program Increase - HEAD SUPPORTED MASS*	5.000	-
Congressional Add: *Program Increase - HEARING PROTECTION FOR COMMUNICATIONS*	8.000	-
Congressional Add: *Program Increase - HEATED GARMENT TESTING EQUIPMENT FOR WARFIGHTERS*	0.181	-
Congressional Add Subtotals for Project: MM2	26.381	-
Congressional Add Totals for all Projects	26.381	-

Change Summary Explanation

Minor increase in FY25 funding from the previous PB to the current PB due to revised economic assumptions.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603002A / *Medical Advanced Technology*	Project (Number/Name) MM2 / *MEDICAL ADVANCE TECHNOLOGY INITIATIVES (CA)*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
MM2: *MEDICAL ADVANCE TECHNOLOGY INITIATIVES (CA)*	-	26.381	-	-	-	-	-	-	-	-	0.000	26.381
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Medical Advanced Technology Initiatives.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
Congressional Add: Program Increase - AERIAL RECONFIGURABLE EMBEDDED SYSTEM ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Aerial Reconfigurable Embedded System	9.500	-
Congressional Add: Program Increase - SUICIDE PREVENTION WITH FOCUS ON RURAL, REMOTE, ISOLATED, AND OCONUS INSTALLATIONS ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for SUICIDE PREVENTION WITH FOCUS ON RURAL, REMOTE, ISOLATED, AND OCONUS INSTALLATIONS	2.000	-
Congressional Add: Program Increase - ARMY BATTLEFIELD EXERCISE AND COMBAT RELATED TRAUMATIC BRAIN AND SPINAL CORD INJURY RESEARCH ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ARMY BATTLEFIELD EXERCISE AND COMBAT RELATED TRAUMATIC BRAIN AND SPINAL CORD INJURY RESEARCH	1.700	-
Congressional Add: Program Increase - HEAD SUPPORTED MASS ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Head Supported Mass	5.000	-
Congressional Add: Program Increase - HEARING PROTECTION FOR COMMUNICATIONS ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Hearing Protection for Communications	8.000	-
Congressional Add: Program Increase - HEATED GARMENT TESTING EQUIPMENT FOR WARFIGHTERS	0.181	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603002A / *Medical Advanced Technology*	**Project (Number/Name)** MM2 / *MEDICAL ADVANCE TECHNOLOGY INITIATIVES (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for Heated Garment Testing Equipment for Warfighters		
Congressional Adds Subtotals	26.381	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603002A / *Medical Advanced Technology*	Project (Number/Name) MM7 / *Enabling Med Cap to Support Dispersed OPS Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
MM7: *Enabling Med Cap to Support Dispersed OPS Adv Tech*	-	0.722	0.856	1.038	-	1.038	1.039	1.040	1.051	1.061	0.000	6.807
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Matures and demonstrates a tele-monitored and remote-controlled Combat Evacuation Mission Module to support medical resupply and casualty evacuation using future multi-purpose Vertical Take-Off and Landing (VTOL) unmanned aircraft systems (UAS). Provides a self-contained medical module capability adaptable to various future multi- purpose VTOL UAS. Matures and demonstrates an intelligent decision-support capability that can be operated on an Army or Navy provided End User Device (EUD), such as the NETT Warrior system, to assist medics with patient assessment, triage, treatment, and disposition in a Prolonged Field Care (PFC) environment by assessing patient conditions to provide adaptive care guidelines.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Develop Prototype Medical Robotic and Autonomous System (Med-RAS)	0.722	0.856	1.038
Description: Matures and demonstrates a tele-monitored and remote-controlled Combat Evacuation Mission Module to support medical resupply and casualty evacuation using future multi-purpose VTOL UAS. Provides a self-contained medical module capability adaptable to various future multi- purpose VTOL UAS. Matures and demonstrates an intelligent decision-support capability that can be operated on an Army or Navy provided EUD, such as the NETT Warrior system, to assist medics with patient assessment, triage, treatment, and disposition in a PFC environment by assessing patient conditions to provide adaptive care guidelines.			
FY 2024 Plans: Will continue work to mature the Combat Evacuation Mission Module (CEMM) and conceptual designs and physical prototypes of the Multi-Mission Vehicle Interface (MMVI). Will demonstrate the technology and advance the communication infrastructure towards optimal multipurpose system.			
FY 2025 Plans: Continue work to mature the Combat Evacuation Mission Module (CEMM) conceptual designs and physical prototypes of the Multi-Mission Vehicle Interface (MMVI) component. Evaluate MMVI subsystem prototype in critical design review. Perform systematic review of associated Safe Transport and Evacuation Protocols System (STEPS) flight control interface system component. Demonstrate technical functionality and advance the communication infrastructure towards an optimal multipurpose system.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603002A / *Medical Advanced Technology*	**Project (Number/Name)** MM7 / *Enabling Med Cap to Support Dispersed OPS Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Fund increase supports demonstration of new maturing technologies.			
Accomplishments/Planned Programs Subtotals	0.722	0.856	1.038

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603002A / *Medical Advanced Technology*	Project (Number/Name) MN6 / *Blast & Head Impact Exposure Monitor Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
MN6: *Blast & Head Impact Exposure Monitor Advanced Tech*	-	1.125	-	-	-	-	-	-	-	-	0.000	1.125
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project will inform the development of technologies and strategies to detect and provide actionable information to unit leader/Soldier about hazardous exposure to blast and head impact. This capability will help prevent degradation to Soldier cognitive readiness and performance and enhance combat power.

The cited research is fully coordinated with Program Element (PE) 0602143A (Soldier Lethality Technology) and complimentary to PE 0603118A (Soldier Lethality Advanced Technology) and is fully coordinated with other Services in order to avoid duplication of effort.

The cited work is consistent with the Under Secretary of Defense (Research and Engineering) science and technology focus areas and the Army Modernization Strategy.

Research in this Project is performed by the United States Army Medical Research and Development Command (USAMRDC), Fort Detrick, MD.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Injury Criteria for Informing the Development of New Tactical Head borne Systems.	1.125	-	-
Description: This effort validates injury risk assessment/guidance/criteria that will inform the development of technologies (i.e., personal protection equipment, vehicles) and strategies (i.e., health hazard assessments) to protect the Soldier against current and emerging operational threats (i.e., blast, blunt, ballistic, and accelerative).			
Accomplishments/Planned Programs Subtotals	1.125	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603002A / *Medical Advanced Technology*	Project (Number/Name) MN7 / *Musculoskeletal Injury Screening Tool Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
MN7: *Musculoskeletal Injury Screening Tool Adv Tech*	-	1.229	0.762	0.829	-	0.829	0.485	0.486	0.491	0.496	0.000	4.778
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project develops strategies and technologies to reduce musculoskeletal injury (MSKI) rates and improve outcomes following Return to Duty (RTD) in the Army training, operational, and medical communities to improve Soldier readiness.

The cited research is fully coordinated with Program Element (PE) 0602143A (Soldier Lethality Technology) and complimentary to PE 0603118A (Soldier Lethality Advanced Technology) and is fully coordinated with the Army Training and Doctrine Command (TRADOC) and other Services in order to avoid duplication of effort.

The cited work is consistent with the Under Secretary of Defense (Research and Engineering) science and technology focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Leader and Medical Provider Tools to Prevent and Reduce Musculoskeletal Injury in All Settings	1.229	0.762	0.829
Description: Project validates in field environment strategies and technologies to reduce MSKI rates and improve outcomes following RTD in the Army training, operational, and medical communities to improve Soldier readiness. ***FY 2024 Plans:*** Will validate and transition next generation capabilities in musculoskeletal injury risk and performance degrading prediction tools. ***FY 2025 Plans:*** Continue to validate and transition musculoskeletal injury risk and performance degrading prediction tools that can be used to inform interventions for injury resilience and readiness. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned lifecycle of this effort.			
Accomplishments/Planned Programs Subtotals	1.229	0.762	0.829

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603002A / *Medical Advanced Technology*	**Project (Number/Name)** MN7 / *Musculoskeletal Injury Screening Tool Adv Tech*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040 / 3					R-1 Program Element (Number/Name) PE 0603002A / *Medical Advanced Technology*				Project (Number/Name) MO8 / *Expeditionary Performance Nutrition Advanced Techn*			
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
MO8: *Expeditionary Performance Nutrition Advanced Techn*	-	0.169	0.731	0.164	-	0.164	0.164	0.164	0.166	0.168	0.000	1.726
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project covers the development of real-time, specific, and individualized interventions to optimize mental acuity and fatigue and manage metabolic and nutritional needs to sustain Soldier physical, mental, and immunological performance.

The cited research is fully coordinated with Program element (PE) 0602143A (Soldier Lethality Technology) and complimentary to PE 0603118A (Soldier Lethality Advanced Technology) and is fully coordinated with other Services in order to avoid duplication of effort.

The cited research is consistent with the Under Secretary of Defense (Research and Engineering) science and technology focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Medical Strategies to Sustain Soldier Alertness and Performance in All Settings	0.169	0.731	0.164
Description: Develop real-time, specific, and individualized interventions to optimize mental acuity and fatigue and manage metabolic and nutritional needs to sustain Soldier physical, mental, and immunological performance. ***FY 2024 Plans:*** Develop and manage metabolic and nutritional needs to sustain Soldier physical, mental, and immunological performance in response to all Settings. ***FY 2025 Plans:*** Conclude studies that assessed Soldier ration consumption on Warfighter Energy Intake and Performance. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decreases due to concluding studies that assessed Soldier ration consumption on Warfighter Energy Intake and Performance.			
Accomplishments/Planned Programs Subtotals	0.169	0.731	0.164

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603002A / *Medical Advanced Technology*	**Project (Number/Name)** MO8 / *Expeditionary Performance Nutrition Advanced Techn*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603002A / *Medical Advanced Technology*	Project (Number/Name) MP3 / *Phys Chem Toxicity Assessment Sys Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
MP3: *Phys Chem Toxicity Assessment Sys Adv Tech*	-	1.772	1.798	1.081	-	1.081	0.358	0.358	0.362	0.366	0.000	6.095
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project covers the development of products and solutions that will protect and prevent degradation of Soldier health, readiness and performance from environmental stressors (heat, cold, altitude, and chemical toxicants) while conducting prolonged operations in Multi-Domain Operations (MDO). Develop algorithms and physiological models to inform unit leaders and Soldiers and provide actionable information and interventions to manage metabolic needs, maintain performance, and avoid non-battle injuries while operating in extreme environments.

This Project contains no duplication with any effort within the Military Departments and includes direct participation by other Services. The cited research is fully coordinated with Program Element (PE) 0602143A (Soldier Lethality Technology) and complimentary to PE 0603118A (Soldier Lethality Advanced Technology).

The cited research is consistent with the Under Secretary of Defense, Research and Engineering Science and Technology, focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Solutions to Sustain Warfighter Performance in Extreme Environments	1.772	1.798	1.081
Description: Protect and prevent degradation of Soldier health, readiness and performance from environmental stressors (heat, cold, altitude, chemical toxicants) while conducting prolonged operations in the MDO. Develop algorithms and physiological models to inform unit leaders and Soldiers and provide actionable information and interventions to manage metabolic needs, maintain performance, and avoid non-battle injuries while operating in extreme environments.			
FY 2024 Plans: Will provide validated tools to sustain lethality and optimize performance and to prevent injuries related to multi-environmental stressors; complete validation of method for cold habituation to improve cold tolerance and comfort and reduce frostbite when operating in arctic conditions; and conduct field validation and acceptability of novel physiological status monitoring (PSM) compression shirts.			
FY 2025 Plans: Validate early warning hypoxia monitoring tool for use at high altitude. Validate a digital twin for individualized real-time health state prediction and squad readiness assessment.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603002A / *Medical Advanced Technology*	**Project (Number/Name)** MP3 / *Phys Chem Toxicity Assessment Sys Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Decrease in funding is due to planned lifecycle of the effort.			
Accomplishments/Planned Programs Subtotals	1.772	1.798	1.081

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603007A *I Manpower, Personnel and Training Advanced Technology*

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	-	15.146	16.316	16.716	-	16.716	17.200	17.233	18.029	18.529	0.000	119.169
792: *Personnel Performance & Training*	-	15.146	16.316	16.716	-	16.716	17.200	17.233	18.029	18.529	0.000	119.169

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and validates applied behavioral and social science technologies that enhance the Soldier Lifecycle (e.g., selection, assignment, training, leader development) and human relations (e.g. unit cohesion). These technologies provide advanced personnel measures that more fully assess potential and predict performance, behavior, attitudes, and resilience. These technologies also provide innovative and effective Talent Management methods to optimize individual and team performance to ensure the Army can meet mission requirements in uncertain and complex environments. This PE evaluates new selection measures, assignment methods, and performance metrics for individuals and units, assesses innovative training methods, and conducts scientific assessments to inform Human Capital policy and programs. Work in this PE will result in effective non-materiel solutions to help the Army adjust to changes in force size and structure, a variety of mission demands and contexts, challenges in human relations, and budgetary constraints.

Work in this PE complements and is fully coordinated with PE 0602785A (Manpower/Personnel/Training Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas, the Army Vision, the Army's Talent Management Strategy, and the Army Modernization Strategy

Work in this PE is performed by the United States Army Research Institute (ARI) for the Behavioral and Social Sciences in Ft. Belvoir, VA.

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	15.598	16.316	18.084	-	18.084
Current President's Budget	15.146	16.316	16.716	-	16.716
Total Adjustments	-0.452	0.000	-1.368	-	-1.368
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.001	-			
• SBIR/STTR Transfer	-0.453	-			
• Adjustments to Budget Years	-	-	-1.368	-	-1.368

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603007A *I Manpower, Personnel and Training Advanced Technology*

Change Summary Explanation

Decrease in funding due to realignment to higher priorities in Artificial Intelligence (AI) that benefit talent management.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603007A / *Manpower, Personnel and Training Advanced Technology*	Project (Number/Name) 792 / *Personnel Performance & Training*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
792: *Personnel Performance & Training*	-	15.146	16.316	16.716	-	16.716	17.200	17.233	18.029	18.529	0.000	119.169
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrate applied behavioral and social science technologies that enhance the Soldier Lifecycle (e.g., selection, assignment, training, leader development) and human relations (e.g., unit cohesion). These technologies provide advanced personnel measures that more fully assess potential and predict performance, behavior, attitudes, and resilience. These technologies also provide innovative and effective Talent Management methods to optimize individual and team performance to ensure the Army can meet mission requirements in uncertain and complex environments. This demonstrates new selection measures, assignment methods, and performance metrics for individuals and units; assesses innovative leader development and learning methods, and conducts scientific assessments to inform Human Capital policy and programs. Research will result in effective non-materiel solutions to help the Army adjust to changes in force size and structure, a variety of mission demands and contexts, challenges in human relations, and budgetary constraints.

Work in this Project complements PE 0602785A (Personnel Performance & Training Technology)

The cited work is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology priority focus areas, the Army Vision, the Army People Strategy, the Army's Talent Management Strategy, and the Army Modernization Strategy.

Work is performed by the United States Army Research Institute (ARI) for the Behavioral and Social Sciences in Fort Belvoir, VA.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Talent Assessment and Development	15.146	16.316	16.716
Description: This effort optimizes and demonstrates innovative talent management approaches to provide the Army the flexibility to adapt to changes in force structure and recruiting environments. This effort matures Soldier selection measures, techniques, and tools to more fully assess Soldier potential and better predict behavior, attrition, Soldier performance, and team effectiveness. This effort also matures and demonstrates methods that develop and model Soldier talents/competencies longitudinally across a career.			
FY 2024 Plans: Will initiate prototype development of officer talent management assessments; will continue to validate augmented assessment prototypes designed to automatically generate personnel assessment content; will mature research on methods to develop			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603007A / *Manpower, Personnel and Training Advanced Technology*	**Project (Number/Name)** 792 / *Personnel Performance & Training*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
complex leader competencies by conducting field validations of the transfer of knowledge to performance environments; will continue to develop small unit performance measurement tools. ***FY 2025 Plans:*** Will mature prototype development and initiate longitudinal validation of officer talent management assessments; will validate prototypes of automated test item generation for knowledge tests; will mature research on methods to develop complex leader competencies; will develop small unit performance training methods. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Accomplishments/Planned Programs Subtotals	15.146	16.316	16.716

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603025A *I Army Agile Innovation and Demonstration*

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	-	17.757	23.156	14.608	-	14.608	16.309	18.014	18.845	19.251	0.000	127.940
CK8: *Advanced Technology Development and Convergence*	-	8.925	15.319	10.102	-	10.102	10.140	10.148	10.318	10.422	0.000	75.374
DA3: *Army Advanced Innovation*	-	8.832	7.837	4.506	-	4.506	6.169	7.866	8.527	8.829	0.000	52.566

A. Mission Description and Budget Item Justification

This Program Element (PE) funds the Army's goal of accelerating innovative solutions to achieve future force modernization. The Army is using strategic and "non-traditional" partnerships and working with traditional vendors in novel ways to respond at the speed of innovation to accelerate the development of cutting-edge technology. Critical technologies that allow for technological superiority are increasingly dual-use or developed in academia-led partnerships that leverage cutting edge innovation. In an era of global competition, technological superiority requires agile and rapid innovation. Cross-cutting modernization initiatives leveraging strategic partnerships and foster an environment to bring knowledge and expertise to demonstrate breakthrough and innovative technologies that will benefit the warfighter. These collaborations bring new ways of doing business to demonstrate emerging technologies and systems with high payoff potential to address current technology shortfalls or future capability gaps and systems. Leveraging other innovative mechanisms, to include accelerators, incubators, and other technology accelerants, to enhance innovation is part of the overall innovation strategy. Innovation includes not only hardware, and physical products but also software, software development, artificial intelligence (AI) and machine learning, all as stand-alone initiatives and as part of broader innovation to programs and technology development. Through the Army's Innovation Oversight Board, Army senior leadership approves Innovation projects in the budget year and year of execution based on priority and opportunity, ensuring that innovations have a high potential for filling capability gaps and transitioning to Army acquisition to rapidly deliver capabilities to the Soldier.

Research in this PE is closely coordinated with PE 0602002A (Army Agile Innovation and Development-Applied Research)

Work is performed by the United States Army Combat Capabilities Development Command (DEVCOM), Army Artificial Intelligence Integration Center (AI2C), the Engineering Research and Development Center, Space and Missile Defense Technical Center, and the United States Army Research Institute for the Behavioral and Social Sciences.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603025A *I Army Agile Innovation and Demonstration*

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	20.900	23.156	24.242	-	24.242
Current President's Budget	17.757	23.156	14.608	-	14.608
Total Adjustments	-3.143	0.000	-9.634	-	-9.634
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-2.381	-			
• SBIR/STTR Transfer	-0.762	-			
• Adjustments to Budget Years	-	-	-9.634	-	-9.634

Change Summary Explanation

Funding decrease is due to a reduction the assessment of innovative proposals in FY25 and realignment to Program Element (PE) 0602150A (Air and Missile Defense Technology) to accelerate Army investment in Counter Small Unmanned Aircraft System (C-sUAS).

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603025A / *Army Agile Innovation and Demonstration*	Project (Number/Name) CK8 / *Advanced Technology Development and Convergence*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CK8: *Advanced Technology Development and Convergence*	-	8.925	15.319	10.102	-	10.102	10.140	10.148	10.318	10.422	0.000	75.374
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project aims to accelerate the Army's goal of finding innovative and nontraditional solutions to the most difficult technological problems. Efforts to pair with nontraditional entities, such as industry, to rapidly solve System and Sub-System Component and Prototype Convergence by merging smaller subsystems towards a more complex solution and integrating one or more technologies to prove out concepts. This project enables the Army to quickly implement novel solutions garnered from operational experimentation. It allows the Army to accelerate efforts with industry to better inform requirements. Through the Army's Innovation Oversight Board, Army Senior leadership approves Innovation projects in the budget year and year of execution based on priority and opportunity, ensuring that innovations have a high potential for filling capability gaps and transitioning to Army Science and Technology (S&T) projects to inform an optional technology investment strategy and rapidly deliver capabilities to the Soldier.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas.

Work is performed by the Army Application Lab.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Technology Development of Existing Commercial Technology	8.925	10.226	10.102
Description: Advanced commercial development exists when direct investment leads to rapid technology applications and demonstration. The Army identifies existing technology to further develop and modify for Army use. Partnerships with industry both traditional and non-traditional, allow the Army to advance non-military commercial research and development investments through focused engagements resulting in commercial adaption and integration to address Army technology and modernization efforts. Initial nominal Army investment in proof of technology and technology demonstrations will expedite novel technologies shaping their development to meet Army requirements and expediting both component and complete system adaptation and integration.			
FY 2024 Plans: Address operational challenges that enable the Army to conduct operations in contested environments, which will enable our ability to prevail on the future battlefield. These include, but are not limited to emerging and commercially available technology			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603025A / *Army Agile Innovation and Demonstration*	**Project (Number/Name)** CK8 / *Advanced Technology Development and Convergence*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
that enhances next generation combat vehicles, dismounted soldier lethality, power generation and storage, logistics, data driven human performance and soldier readiness, AI and robotic enabled small units, and network and satellite support. ***FY 2025 Plans:*** Assess, seed, demonstrate, integrate and bridge technologies which will allow for rapid transitions that will transition to acquisition and other programs to deliver capabilities to Soldiers. Innovation projects from the Army S&T Executing Commands will be approved by the Army Innovation Oversight Board, in the budget year and year of execution based on priority and opportunity. The Army Innovation Program will accelerate approved efforts that support the design of the Army of 2040, that enable rapid integration with transitions supporting Weapons, Soldier Lethality, C3I, Aviation, Ground portfolios; and emerging priorities including areas of Deep Sensing, Sustainment, and AI/ML. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects the planned lifecycle of the effort.			
Title: Demonstration and Development of Army Discovered Innovative Technologies ***Description:*** The Army seeks to develop and demonstrate technology that display unique and innovative potential in a cross-domain fashion. This effort seeks to direct advanced research funding towards technologies that are discovered from Army Innovation events such as Innovation Days funded by PE 0605054A (Emerging Technology Initiatives) / Project FI3 (Rapid Capability Development and Maturation) or the Expeditionary Technology Search effort in PE 0605803A (Technical Information Activities) / Project CC2 (Expeditionary Technologies). ***FY 2024 Plans:*** Will develop and demonstrate unique solutions to Army wide problems leveraging technology discovered through Army technology search events. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding realigned to PE 0602150A (Air and Missile Defense Technology) to accelerate Army priority in Counter Small Unmanned Aircraft System (C-sUAS).	-	5.093	-
Accomplishments/Planned Programs Subtotals	8.925	15.319	10.102

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603025A / *Army Agile Innovation and Demonstration*	**Project (Number/Name)** CK8 / *Advanced Technology Development and Convergence*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603025A / *Army Agile Innovation and Demonstration*	Project (Number/Name) DA3 / *Army Advanced Innovation*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DA3: *Army Advanced Innovation*	-	8.832	7.837	4.506	-	4.506	6.169	7.866	8.527	8.829	0.000	52.566
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project funds the Advanced Development portion of the Army Innovation Plan, the Army's investment strategy to rapidly accelerate innovative solutions to challenging Warfighter problems. This Project will provide the Army with the most advanced and cutting-edge solutions with the ability to adapt and integrate multi-disciplinary innovative technologies by bridging the interfaces between internal and external efforts for a holistic entry into the acquisition pipeline at the most appropriate milestone. Cross-cutting modernization initiatives leverage strategic partnerships that foster an environment to bring knowledge and expertise to demonstrate innovative technologies that will benefit the warfighter. The pace of advancing technology and the flexibility to respond to cutting-edge technology at the Speed of Innovation, will accelerate the development of unanticipated technology opportunities, and allow the Army to rapidly deliver capabilities to the Soldier. Through the Army's Innovation Oversight Board, the Army senior leadership approves the Innovation projects in the budget year and year of execution based on priority and opportunity, ensuring that innovations have a high potential for filling capability gaps and transitioning to Army S&T projects to inform an optimal technology investment strategy and rapidly deliver capabilities to the Soldier.

This Project is coordinated with PE 0602002A (Army Agile Innovation and Development-Applied Research) / Project DC4 (Army Applied Innovation).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas.

Work is performed by the United States Army Combat Capabilities Development Command (DEVCOM), Army Artificial Intelligence Integration Center (AI2C), the Engineering Research and Development Center, Space and Missile Defense Technical Center, and the United States Army Research Institute for the Behavioral and Social Sciences.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Army Advanced Innovation	8.832	7.837	4.506
Description: The Army seeks to develop and demonstrate technology that display unique and innovative potential in a cross-domain fashion. This effort will serve as funding to rapidly transition disruptive and groundbreaking capabilities that fall outside of the normal acquisition pipeline.			
FY 2024 Plans: Assess, seed, demonstrate, integrate and bridge technologies from experimentation demonstrations which will allow for rapid transitions that meet persistent modernization requirements. The Army Innovation Program will accelerate multiple efforts to include cyber, Electronic Warfare, Sensors, Power and Energy, Artificial Intelligence and Autonomy, Communications, Position,			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603025A / *Army Agile Innovation and Demonstration*	**Project (Number/Name)** DA3 / *Army Advanced Innovation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Navigation and Timing, advancing Synthetic Training Environments; and Air and Ground Platform integration, Long Range Precision Fires, and Air and Missile Defense ***FY 2025 Plans:*** The Army seeks to assess and demonstrate innovative technology that will accelerate transition of capabilities that will allow for rapid modernization. Proposal topics will focus on transformational technologies with a shift in focus to the design of the Army of 2040. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Decrease in FY25 funding due to reduction of assessment of innovative technology proposals in FY25.			
Accomplishments/Planned Programs Subtotals	8.832	7.837	4.506

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603040A *I Artificial Intelligence and Machine Learning Advanced Technologies*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	6.162	13.187	18.263	-	18.263	16.763	17.376	19.159	19.316	0.000	110.226
CL1: *AI Enhanced Intel Operations Advanced Technologies*	-	1.372	1.359	2.261	-	2.261	2.164	2.204	4.008	4.008	0.000	17.376
CL6: *ATR Using Multiple Cooperative Sensors Adv Tech*	-	1.814	4.909	8.740	-	8.740	7.386	7.394	7.464	7.549	0.000	45.256
CN6: *Predictive Maintenance Advanced Technology*	-	2.227	4.117	4.139	-	4.139	4.086	4.070	4.185	4.227	0.000	27.051
DA7: *AI-Enabled Command and Coordination Adv Tech*	-	0.749	1.396	1.157	-	1.157	1.159	1.664	1.417	1.431	0.000	8.973
DE9: *AI Development Environment Advanced Technology*	-	-	1.406	1.966	-	1.966	1.968	2.044	2.085	2.101	0.000	11.570

A. Mission Description and Budget Item Justification

This Program Element (PE) will mature and demonstrate advanced technologies using artificial intelligence (AI) and machine learning (ML) to improve target recognition/ detection using multiple cooperative autonomous sensors, leader decision-making, and replication of tactical behaviors to enable autonomous capabilities for maneuver, predictive maintenance, talent management, Intel support for Operations, network and cybersecurity and medical support. The Army's Artificial Intelligence Integration Center (AI2C) will provide strategic guidance and coordination of these advanced research efforts in AI/ML across the Army Modernization enterprise.

Research in this PE contributes to the Army Science and Technology (S&T) portfolio and is fully coordinated with efforts in PE 0601601A (Artificial Intelligence and Machine Learning Basic Research) and PE 0602180A (Artificial Intelligence and Machine Learning Technologies).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering S&T focus areas, the Army Modernization Strategy and the Chief Digital and Artificial Intelligence Office (CDAO).

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603040A *I Artificial Intelligence and Machine Learning Advanced Technologies*

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	6.395	13.187	14.412	-	14.412
Current President's Budget	6.162	13.187	18.263	-	18.263
Total Adjustments	-0.233	0.000	3.851	-	3.851
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.001	-			
• SBIR/STTR Transfer	-0.232	-			
• Adjustments to Budget Years	-	-	3.851	-	3.851

Change Summary Explanation

Increased funding for Combat Environment Sustainment (ACES) Demo.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army										Date: March 2024		
Appropriation/Budget Activity 2040 / 3					R-1 Program Element (Number/Name) PE 0603040A / *Artificial Intelligence and Machine Learning Advanced Technologies*				Project (Number/Name) CL1 / *AI Enhanced Intel Operations Advanced Technologies*			
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
CL1: *AI Enhanced Intel Operations Advanced Technologies*	-	1.372	1.359	2.261	-	2.261	2.164	2.204	4.008	4.008	0.000	17.376
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Artificial Intelligence (AI) Enabled Intelligence Fusion for Targeting will address a "multi-INT" fusion problem and mature and demonstrate how AI algorithms can fuse data from various military intelligence systems to support sensor to shooter automation for the strategic, operational, and tactical levels. This effort will mature and demonstrate AI capabilities for support of Long Range Precision Fires, Mission Command, and Maneuver Commanders by exploiting Intelligence Community enterprise investments in sensing, data transport, and Machine Learning (ML) / AI frameworks.

Research in this Project supports the Army Science and Technology Lethality Portfolio and the Chief Digital and Artificial Intelligence Office (CDAO).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: AI Enhancements for Prometheus ***Description:*** AI Enabled Intelligence Fusion for Targeting will mature and demonstrate how AI algorithms can fuse data from various military intelligence systems (multi-INT) to support sensor to shooter automation for the strategic, operational, and tactical levels. This effort will mature and demonstrate AI capabilities for target recognition for support of Long Range Precision Fires, Mission Command, and Maneuver Commanders by leveraging Intelligence Community enterprise investments in sensing, data transport, and ML / AI frameworks.	0.601	-	-
Title: Intelligence Fusion for Targeting ***Description:*** AI Enabled Intelligence Fusion for Targeting will optimize AI algorithms and demonstrate howthey can fuse data from various military intelligence systems (multi-INT) to support sensor to shooter automation for the strategic, operational, and tactical levels. This effort will improve AI capabilities for support of Long Range Precision Fires, Mission Command, and Maneuver Commanders by leveraging Intelligence Community enterprise investments in sensing, data transport, and ML / AI frameworks.	0.771	-	-
Title: AI Enabled Intelligence Fusion for Targeting ***Description:*** AI Enabled Intelligence Fusion for Targeting will mature and demonstrate how AI algorithms can fuse data from various military intelligence systems (multi-INT) to support sensor to shooter automation for the strategic, operational, and tactical levels. This effort will design and develop AI capabilities for support of Long Range Precision Fires, Mission Command, and	-	1.359	1.203

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603040A / *Artificial Intelligence and Machine Learning Advanced Technologies*	**Project (Number/Name)** CL1 / *AI Enhanced Intel Operations Advanced Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Maneuver Commanders by leveraging Intelligence Community enterprise investments in sensing, data transport, and Machine Learning / AI frameworks. ***FY 2024 Plans:*** AI Enabled Intelligence Fusion for Targeting will provide a system of applications to identify targets of interest. This effort will mature algorithms to predict representation of novel object classes from a small number of novel class samples, improving the AI algorithm learning capability and reducing the need for manual data input. Will investigate the use of visual, language, signal, and event-based information and semantic relationships to learn new objects and relationships and validate knowledge transfer from base classes to novel classes in order to reduce the time it takes to train AI algorithms. Will demonstrate the ability of the algorithm to fuse data from various military intelligence systems in a simulated test. Will then demonstrate the algorithm performing fusion of real-world intelligence data to show improved target confirmation over what can be provided by any single AI-enabled sensor. Will work with product owners of TITAN and SHOT systems to exploit the fusion algorithm and the required data pipelines. ***FY 2025 Plans:*** AI Enabled Intelligence Fusion for Targeting will continue to provide a system of applications to identify targets of interest. This effort will further mature and optimize algorithms to predict representation of novel object classes from a small number of novel class samples, improving the AI algorithm learning capability and reducing the need for manual data input. Will continue to develop the use of visual, language, signal, and event-based information and semantic relationships to learn additional new objects and relationships and validate knowledge transfer from base classes to novel classes in order to reduce the time it takes to train AI algorithms. Will demonstrate the ability of the algorithm to fuse data from various military intelligence systems in a simulation and then demonstrate the algorithm performing fusion of real-world intelligence data to show improved target confirmation over what can be provided by any single AI enabled-sensor. Will work with PEO C3T and PEO IEWS program managers for JTIC2S and TITAN respectively to exploit the fusion algorithm and the required data pipelines. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease is consistent with the planned lifecycle of this effort.			
Title: Foundation for AI Intel Support to Operations ***Description:*** Develop and mature an AI infrastructure/pipeline for training, integrating, and sustaining AI across multiple AI domains to inform requirements for enterprise production systems and edge systems for the Army Military Intelligence and Operations (Intel/Ops) community. ***FY 2025 Plans:***	-	-	1.058

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603040A / *Artificial Intelligence and Machine Learning Advanced Technologies*	**Project (Number/Name)** CL1 / *AI Enhanced Intel Operations Advanced Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
In order to inform requirements for Project Linchpin, will continue to mature data frameworks and data pipelines for fusion of intelligence data from multiple military intelligence systems. Will continue to develop and optimize data frameworks and pipelines with infrastructure components that can implement machine learning algorithms across multiple AI domains. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** New effort in FY25.			
Accomplishments/Planned Programs Subtotals	1.372	1.359	2.261

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603040A / *Artificial Intelligence and Machine Learning Advanced Technologies*	Project (Number/Name) CL6 / *ATR Using Multiple Cooperative Sensors Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CL6: *ATR Using Multiple Cooperative Sensors Adv Tech*	-	1.814	4.909	8.740	-	8.740	7.386	7.394	7.464	7.549	0.000	45.256
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project will mature and demonstrate a team of air and ground sensors that use Artificial Intelligence (AI) and Machine Learning (ML) to autonomously navigate and collaborate through shared perception of the optical, thermal, and electromagnetic spectrums to find, identify, geo-locate, and track targets during reconnaissance missions. This Project also complements and exploits the applied research in Program Element (PE) 0602180A (Artificial Intelligence Technologies) / Project CL7 (ATR Using Multiple Cooperative Sensors App Tech).

The cited research is consistent with Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Research in this Project supports the Army Science and Technology Lethality Portfolio and the Joint Artificial Intelligence Center (JAIC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Collaborative Target Detection and Tracking	1.316	4.909	8.740
Description: This effort will mature and demonstrate an AI-enabled scalable team of autonomous air and ground vehicles that will cooperatively conduct a zone recon to identify, geolocate, and track threats using on-board electronic intelligence (ELINT) and electro optical-infrared (EO-IR) sensors. ***FY 2024 Plans:*** Will mature the autonomous mobility and threat perception algorithms by updating and improving the Robot Operating System (ROS) to its latest version and will provide enhanced security and faster messaging between subsystems. Will demonstrate the ability to rapidly retrain the AI algorithms using a cloud-based, machine learning pipeline. Will optimize the use of additional sensors on the robotic combat vehicle (RCV) surrogates to more precisely detect and geo-locate targets at longer ranges. Will participate in government-run demonstrations to support technology transition. Will mature the human interfaces to the system, including Android Tactical Assault Kit (ATAK) and the Integrated Visual Augmentation System (IVAS), for faster and more intuitive target validation and shooter pairing. Will mature collaborative reconnaissance algorithms to exploit radio frequency sensor information to improve the search for targets and improve tactical maneuver. ***FY 2025 Plans:*** Provides modular sensor and computer hardware and integrates them onto two transitions platforms. Matures and demonstrates the functionality of low-level vehicle control and drive commands for the Small Multi-purpose Equipment Transport (SMET) and			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603040A / *Artificial Intelligence and Machine Learning Advanced Technologies*	**Project (Number/Name)** CL6 / *ATR Using Multiple Cooperative Sensors Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Remote Control Vechicle (RCV) using the Robotics Technology Kernel (RTK) By-wire-Kit (B-kit). Matures the existing, non-controlled, autonomy stack developed under the previous phases of this project to Robot Operating System (ROS) version 2.0 to ease the transition of autonomy modules to the Army's latest version of its controlled autonomy stack called Robotics Technology Kernel (RTK) that uses ROS 2.0 or selected module. Install and evaluate RTK '23 release (ROS 2.0 version) onto transition platforms. Matures and demonstrates the following capabilities - as functional modules or libraries - within RTK: Aided Target recognition (ATR), perception system including stereo vision, pose estimation system, Android Tactical Assault Kit (ATAK) command & control, zone reconnaissance multi-vehicle collaborative search. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the planned lifecycle of this effort.			
Title: COEUS Advanced Technology ***Description:*** Will mature and optimize a cloud native AI model development architecture, mature and validate data integration techniques, and demonstrate and validate an AI model operationalization architecture to cloud or edge endpoints.	0.498	-	-
Accomplishments/Planned Programs Subtotals	1.814	4.909	8.740

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603040A / *Artificial Intelligence and Machine Learning Advanced Technologies*	Project (Number/Name) CN6 / *Predictive Maintenance Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CN6: *Predictive Maintenance Advanced Technology*	-	2.227	4.117	4.139	-	4.139	4.086	4.070	4.185	4.227	0.000	27.051
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates artificial intelligence (AI) and machine learning (ML) tools and capabilities to predict and analyze maintenance status for emerging and legacy aviation and ground platforms. Will extract maintenance data from databases and sensors and make inferences of missing data via virtual simulations and improve and provide AI data capture and other AI tools for enterprise maintenance resource planning for military aviation and ground vehicles. Platforms of focus will be prioritized by cost and value to Army missions and include the UH60, AH64, CH47, Stryker, and Abrams. Each platform will be sequentially evaluated both at the component (i.e. engine health) and fleet level. This Project matures and demonstrates the use of predictive maintenance to increase fleet operational readiness through reduced downtime by preventing critical failure during missions to maximize availability to combatant commands. Results from this project will inform requirements and technical architectures for a predicative maintenance platform that will include data engineering, data pipelines, AI development eco-system, and application delivery.

The cited research is consistent with Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Research in this Project supports the Army Science and Technology Ground Portfolio and the Joint Artificial Intelligence Center (JAIC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: PMx Platform Data Management and Integrated Environment Refinement	2.227	3.717	4.139
Description: Will mature and optimize a predictive maintenance (PMx) cloud-based environment, mature and validate data collection/aggregation techniques, and demonstrate and validate a data architecture and the data pipelines to a cloud-based environment.			
FY 2024 Plans: This project will provide edge/cloud components and AI models and mature and demonstrate a minimum viable product. The PMx platform will be improved and optimized to provide required data, AI models, and visualizations to the local and enterprise network locations necessary for coherent maintenance operations in both autonomous (network denied) and permissive (network connected) conditions. Will improve and optimize AI models for specific use cases in field operations. Will automate common maintenance and supply trackers at the edge and in the enterprise cloud environment across multiple tactical echelons. Will			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603040A / *Artificial Intelligence and Machine Learning Advanced Technologies*	**Project (Number/Name)** CN6 / *Predictive Maintenance Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
develop specific architectural components for edge/cloud data pipelines, artificial intelligence development/data curation platforms (i.e., Coeus), visualization services, and cloud infrastructure nodes ***FY 2025 Plans:*** The project will mature and demonstrate the edge/cloud compute capability to experiment and develop progressive web applications that are able to operate in a Denied, Degraded, Intermittent, and Limited (bandwith) (DDIL) environment. These applications will provide functionality for the tactical unit collocated with the node and any other units connected to that node and will federate with the enterprise when connection is restored. This leverages work in support of the tactical data fabric and the Lower Echelon Analytics Platform Tactical (LTAC). ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned lifecycle of this effort.			
Title: PMx Autonomous Resupply ***Description:*** This effort will develop, mature, and demonstrate AI models and algorithms for an autonomous aviation platform to transport supply stocks to support operations. Emphasis will be on ensuring the airworthiness of an autonomous aviation platform that can move from a rear resupply point forward to a designated location while avoiding basic obstacles and accounting for normal weather conditions. Resupply will occur using human intervention after the autonomous aircraft safely stops in the designated end location. ***FY 2024 Plans:*** Will combine an existing autonomous flight and navigation system with an Army helicopter and/or an unmanned aerial system (UAS) and demonstrate the integrated system's ability to fly without human intervention for the delivery of supplies from a starting location to a simulated forward location. This demonstration will validate procedures to safely demonstrate this technology within the bounds of existing civil and military regulations. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease due to completion of this effort.	-	0.400	-
Accomplishments/Planned Programs Subtotals	2.227	4.117	4.139

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603040A / *Artificial Intelligence and Machine Learning Advanced Technologies*	**Project (Number/Name)** CN6 / *Predictive Maintenance Advanced Technology*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603040A / *Artificial Intelligence and Machine Learning Advanced Technologies*	Project (Number/Name) DA7 / *AI-Enabled Command and Coordination Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DA7: *AI-Enabled Command and Coordination Adv Tech*	-	0.749	1.396	1.157	-	1.157	1.159	1.664	1.417	1.431	0.000	8.973
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates solutions for Artificial Intelligence (AI)-enabled Command and Coordination that provide timely understanding and application of the commander's intent. This Project improves sensor-to-shooter and course of action development timelines by developing algorithms, software, and hardware to efficiently capture, transport, process, and convey complex battlefield data into user friendly, streamlined, interfaces. This Project also exploits advances in the application of game theory to explore hypothetical operational scenarios that inform mission planning. These technologies will optimize mission command and network capabilities to fully realize AI on the battlefield.

Work in this Project complements PE 0602180 (Artificial Intelligence and Machine Learning Technologies) / Project DA6 (AI-Enabled Command and Coordination Apl Research)

The cited research is consistent with Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: AI-Enhanced Battle Damage Assessment	0.749	-	-
Description: Will mature and demonstrate game theory-based sensor-to-shooter optimization to assign available sensors to assess effects based on target and engagement type (target acquisition to terminal effects) and incorporate the capabilities into aided target recognition algorithms using mobile cooperative autonomous sensors (ATR-MCAS) and Prometheus. ATR-MCAS utilizes data from multiple sensors and artificial intelligence technology to identify threat targets for engagement with various weapons systems. Prometheus is a system that utilizes artificial intelligence (AI) technologies to identify targets of interest from overhead satellite images.			
Title: AI-Enabled Common Operating Picture and Battle Tracking	-	1.396	0.501
Description: This effort will develop and mature AI-enabled tools that allow commanders and staff to prepare for, execute, and assess Army operations to enable decision dominance. Will mature and demonstrate human-machine interfaces that take input of commanders' intent and plans and provides computer-based battle tracking to identify risk to mission and force and AI-optimized direction to Army forces and unified action partners.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603040A / *Artificial Intelligence and Machine Learning Advanced Technologies*	**Project (Number/Name)** DA7 / *AI-Enabled Command and Coordination Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will develop Geospatial Information Services (GIS) as a Service (GISaaS) capabilities in support of development of AI-Enabled Common Operating Picture (COP). ***FY 2025 Plans:*** Develop AI-enabled common operating picture that surfaces ML/AI insights from the Sustainment, Intelligence, Fires, Protection, Movement and Maneuver, and Information Advantage warfighting functions. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects the planned lifecycle of this effort.			
Title: AI Foundations for Command and Coordination ***Description:*** Matures and optimizes novel foundational models in computer vision, natural language processing/understanding, and temporal/event series analysis that analyze, understand, and optimize AI-operations across Army Battle Command Systems and data fabrics. Establishes access to fused multitudinous data sources in support of AI-based analytics capabilities. ***FY 2025 Plans:*** Will mature and demonstrate advanced algorithms for use by wider force and Operational Data Science Teams (ODSTs) to build and support emerging artificial intelligence enabled mission command information applications for the command post. Validates emerging lower echelon analytic platform tactical data fabric. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** New effort in FY25.	-	-	0.406
Title: AI Enhanced Planning for Optimal Operations ***Description:*** Designs and develops AI-enabled systems that link people, processes, networks, and command posts in support of command and control. Develops and trains models that analyze, understand, and optimize AI-operations across Army Battle Command Systems and data fabrics. Establishes access to fused multitudinous data sources in support of AI-based analytics capabilities. ***FY 2025 Plans:*** Will mature and demonstrate game theory and multi-agent reinforcement learning and other foundational AI models and algorithms to integrate with an available simulation framework to create COAs at the theater echelons. Will optimize scenario criteria needed for the algorithm to function, design, and develop learning strategies and utility functions, and integrate the AI system into an available simulation suite to enable model training. ***FY 2024 to FY 2025 Increase/Decrease Statement:***	-	-	0.250

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603040A / *Artificial Intelligence and Machine Learning Advanced Technologies*	**Project (Number/Name)** DA7 / *AI-Enabled Command and Coordination Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
New effort in FY25.			
Accomplishments/Planned Programs Subtotals	0.749	1.396	1.157

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603040A / *Artificial Intelligence and Machine Learning Advanced Technologies*	Project (Number/Name) DE9 / *AI Development Environment Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DE9: *AI Development Environment Advanced Technology*	-	-	1.406	1.966	-	1.966	1.968	2.044	2.085	2.101	0.000	11.570
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project funds the Army lacking a common platform to develop AI/ML. This results in siloed and duplicative work that is inefficient. Many current solutions have narrow application and are proprietary, requiring additional funding, time, and labor for even minor modifications. The AI-enabled Army of the future will require low cost, rapid AI/ML solutions at the edge. This project will mature and demonstrate a set of platform(s), and infrastructure optimized for Army use and ready for rapid employment in enterprise, multi, and hybrid cloud environments to support modular software (cloud native) intended to continuously develop and integrate AI/ML models. It will mature and demonstrate hardware and software technologies, including cloud native applications and infrastructure for globally dispersed AI/ML development collaboration, artifact sharing, automated resource provisioning, and continuous ML Operations. The AI Development Environment will provide the AI-enabled Army of the future with low cost, rapid AI/ML solutions at the edge and accelerated algorithm development for faster delivery to the field.as well as less expensive AI/ML development by leveraging shared resources.

The cited research is consistent with Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Research in this Project supports the Army Science and Technology Network Portfolio and the Chief Digital and Artificial Intelligence Office (CDAO).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Artificial Intelligence Development Environment Advanced Technology Development	-	1.406	1.966
Description: Will mature and optimize a cloud native AI model development architecture, mature and validate data integration techniques, and demonstrate and validate an AI model operationalization architecture to cloud or edge endpoints. ***FY 2024 Plans:*** Will mature and demonstrate an architecture enabling scalable machine learning operations (MLOps) at echelon. Will improve interfaces with external data environments that serve as data lake repositories for incoming data pipelines. Will integrate data analysis software within the development environment to support ongoing model performance assessment. ***FY 2025 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603040A / *Artificial Intelligence and Machine Learning Advanced Technologies*	**Project (Number/Name)** DE9 / *AI Development Environment Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will mature and demonstrate scalable Machine Learning Operations (MLOps) at echelon. Improve and optimize data interfaces for multi-cloud data lake repositories and data mesh technologies. Demonstrate advanced tools for Artificial Intelligence (AI) test, evaluation, verification and validation, and the security of AI models. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the planned lifecycle of this effort.			
Accomplishments/Planned Programs Subtotals	-	1.406	1.966

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603041A *I All Domain Convergence Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	40.955	33.332	23.722	-	23.722	27.764	28.804	28.831	29.633	0.000	213.041
CL9: *Collab Battlefield Networked Leth Sys Adv Tech*	-	11.831	-	-	-	-	-	-	-	-	0.000	11.831
CM2: *Collaborative Convergence Adv Tech Development*	-	4.993	18.381	23.722	-	23.722	24.758	26.800	26.827	27.629	0.000	153.110
CM8: *Convergence Battlefield Integration*	-	7.831	1.049	-	-	-	-	-	-	-	0.000	8.880
DA4: *All Domain Convergence Engineering & Architectures*	-	16.300	13.902	-	-	-	3.006	2.004	2.004	2.004	0.000	39.220

A. Mission Description and Budget Item Justification

The Program Element (PE) develops, matures, and demonstrates as part of a campaign of learning, technologies in an operational environment, learning from early failure and re-scope research to improve speed of response, scalability, interoperability and range of engagement. This PE will deliver technologies that will enable sensor to shooter applications, from tactical to strategic level, taking a system design approach in support of Army experimentation events and Department of Defense (DoD) Combined Joint All-Domain Command and Control (CJADC2). The research will enable optimal lethal and non-lethal effects across all domains using artificial intelligence and machine learning to improve how we recognize threats, augment and enhance leader decision-making, and replicate tactical behaviors to enable autonomous capabilities.

Work in this PE complements PE 0603465A (Future Vertical Lift Advanced Technology), PE 0603462A (Next Generation Combat Vehicle Advanced Technology), and PE 0603463 (Network C3I Advanced Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering Priority focus areas.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603041A *I All Domain Convergence Advanced Technology*

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	45.377	33.332	54.853	-	54.853
Current President's Budget	40.955	33.332	23.722	-	23.722
Total Adjustments	-4.422	0.000	-31.131	-	-31.131
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-2.767	-			
• SBIR/STTR Transfer	-1.655	-			
• Adjustments to Budget Years	-	-	-31.131	-	-31.131

Change Summary Explanation

Decrease due to realignment to Sensor to Shooter PE 0602141A and PE 0603116A to accelerate efforts in Indirect Fires PE 0603116A and Long Range Maneuverable Fires, PrSM Inc 4 PE 0603464A.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603041A / *All Domain Convergence Advanced Technology*	Project (Number/Name) CL9 / *Collab Battlefield Networked Leth Sys Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CL9: *Collab Battlefield Networked Leth Sys Adv Tech*	-	11.831	-	-	-	-	-	-	-	-	0.000	11.831
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates dynamic Weapon-Target Pairing (WTP) fires planning and execution for maneuver forces, integration of fires and intelligence technologies, Artificial Intelligence (AI)-based decision aid implementation, and integration & demonstration of a role-based networked lethality architecture.

Work in this Project compliments PE 0602181A (All Domain Convergence Applied Research)/CM1 (Collab Battlefield Networked Leth Sys App Tech).

Work in this Project supports Next Generation Combat Vehicle, Tactical Network, Future Vertical Lift, and Long Range Precision Fires Army Modernization Priorities.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Distributed Lethality Architecture ***Description:*** This effort provides a decision aid architecture that will integrate with current and future sensors and weapon systems to network fires for a mounted/dismounted and tactical operation center capability for Combined Arms Maneuvers. Matures and demonstrates distributed architecture and data transmission for sensor to shooter to optimize effects-based WTP.	3.568	-	-
Title: Integrated Sensor to Shooter System ***Description:*** Demonstrates software that ingests intelligence, sensor cueing, tasking and target hand off data from/to higher and lower echelons for sensor to shooter integration. Integrates software on combat platforms to enable on-board sensor and weapon systems to execute fires missions based on decision aids' recommendations with minimal operator input.	3.434	-	-
Title: Fires Synchronization ***Description:*** Provides real-time, joint airspace integration between airspace users and fires at various echelons to de-conflict airspace for emerging long range munitions. Matures and demonstrates algorithms for modeling adversary behavior for autonomous engagement using prior knowledge and real-time sensor data.	4.829	-	-
Accomplishments/Planned Programs Subtotals	11.831	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603041A / *All Domain Convergence Advanced Technology*	**Project (Number/Name)** CL9 / *Collab Battlefield Networked Leth Sys Adv Tech*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603041A / *All Domain Convergence Advanced Technology*	Project (Number/Name) CM2 / *Collaborative Convergence Adv Tech Development*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CM2: *Collaborative Convergence Adv Tech Development*	-	4.993	18.381	23.722	-	23.722	24.758	26.800	26.827	27.629	0.000	153.110
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project develops and integrates critical Project Convergence technologies and the architecture through which the Project Convergence technologies will operate. This is accomplished using adaptive data fusion and task allocation algorithm to support the development of Artificial Intelligence (AI) decision support agents. This Project includes development of advanced methods for processing and information extraction for mission oriented tasks in support of tactical decision makers. Additionally, this Project will develop the scalable architecture solutions necessary to facilitate tactical data collection, movement, processing, storage and modeling and simulation necessary to enable mission command in multi-domain operations. Also, the Project will shape early programs to accelerate technologies and achieve sensor to shooter dominance.

Work in this Project complements Program Element (PE) 0602181A (All Domain Convergence Applied Research).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Analysis Center, Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center, Ground Vehicle Systems Center (GVSC), and Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Effects in the Joint Kill Web ***Description:*** Virtually demonstrate kinetic and non-kinetic actions in a contested, Multi-Domain environment at all echelons. This effort seeks to ensure that the Army can readily contribute to the Joint Force in the land, air, maritime, cyber, space, and electromagnetic domains in an integrated and coordinated fashion.	4.993	-	-
Title: Joint Systems Integration ***Description:*** This effort integrates and demonstrates tactical network and associated command, control, communication, computers, cyber, intelligence, surveillance and reconnaissance (C5ISR) technologies in Multi-Domain Operations (MDO) laboratory experiments through live, virtual, and constructive environments. The effort will integrate these technologies for? tactical ground, air, air and missile defense, fires, network platforms and other missions to demonstrate system of systems integration and evaluate operational performance in representative MDO scenarios during laboratory experiments.	-	7.300	11.085

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603041A / *All Domain Convergence Advanced Technology*	**Project (Number/Name)** CM2 / *Collaborative Convergence Adv Tech Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
FY 2024 Plans: Will demonstrate advancing C5ISR technologies in risk reduction events, such as communication exercises, in advance of field experiments (e.g. Project Convergence); will mature and demonstrate integrated risk reduction capability between laboratory and field, such as inclusion of tactical units connected to laboratory environments; will provide advanced network replication environments, such as the inclusion of electronic warfare injection. ***FY 2025 Plans:*** Will evaluate and demonstrate advancing C5ISR technologies through persistent lab-based risk reduction experimentation for Army; identify and mitigate, Joint and Coalition challenges with recommendations for experimentation in persistent environment. Improve lab-based risk reduction for larger scale demonstration events by resolving specific interoperability issues prior to capstone event; continue to enhance replicated network environments under demanding and complex mixed electro-magnetic environments. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned support of persistent and iterative testing of Science and Technology (S&T) technologies for Army capstone events.			
Title: Analytics for Convergence Technology Integration ***Description:*** Validate maturity of battlefield integration of Army ground and air assets with all sensor and command assets via the Tactical Network (TN) by collecting, providing, optimizing, and fully exploiting available data concerning system and system-of-systems interface performance and effectiveness. ***FY 2024 Plans:*** Will provide threat environments for validated demonstration of the highest Army priority battlefield systems in FY24. Will mature and demonstrate the technical connectivity and tactical integration between those systems and all other relevant Army and Joint systems. Will optimize technologies under advanced development by scientists, technologists, system developers, and system analysts. ***FY 2025 Plans:*** Will provide cyber threat representations and cyber vulnerability mitigation recommendations for design improvement; provide Denied, Degraded, Intermittent, and/or Limited (DDIL) electromagnetic environments to qualify emerging technologies for inclusion in the conduct of integrated Army Futures Command (AFC) experiments; reduce risks through laboratory-based / field-based technology integration experiments to optimize scalability of architecture solutions, to improve interface designs, and to exploit available data for mitigation recommendations. ***FY 2024 to FY 2025 Increase/Decrease Statement:***	-	3.000	5.038

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603041A / *All Domain Convergence Advanced Technology*	**Project (Number/Name)** CM2 / *Collaborative Convergence Adv Tech Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding increase reflects planned support of additional laboratory-based and field-based integration efforts.			
Title: Convergence Ground and Aviation Platform Integration	-	8.081	7.599
Description: Integration of ground and aviation efforts in direct support of maturing and demonstrating Project Convergence capabilities. This effort matures and demonstrates ground vehicle technologies as an integrated system and system of systems to reduce sensor to shooter targeting time, increase real-time battlefield understanding and ensure communications across all echelons. It also integrates capabilities such as geo-location and identification of targets from Army aviation assets, air to ground situational awareness and target data exchange, exchange of unmanned asset control, advanced tactical and teaming behaviors, synchronized data management, and efficient usage of air lethality assets. Lastly it focuses on the integration of ground and aviation capabilities to demonstrate Multi-Domain Operations as part of Project Convergence. ***FY 2024 Plans:*** Will mature and demonstrate additional ground vehicle and aviation integration, multi-platform, and multi-service network communication and perform analytics to inform requirements for both present and future tactical and combat military air and ground vehicles and against a complex moving enemy in a Multi-Domain Operational environment. The Army's modernization enterprise is integrated with that of the Joint Force. Networked aided target detection and recognition, networked survivability, autonomous tactical behaviors, AI-enabled decision support agent, and data management technologies on multiple ground and aviation platforms are critical to success on the modern battlefield. ***FY 2025 Plans:*** Will mature and demonstrate additional ground vehicle platforms, aviation integration, and applicable multi-service network communication and perform analytics to inform requirements for both present and future tactical and combat military air and ground platforms against a complex moving enemy in a Multi-Domain Operational environment. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Accomplishments/Planned Programs Subtotals	4.993	18.381	23.722

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603041A / *All Domain Convergence Advanced Technology*	Project (Number/Name) CM8 / *Convergence Battlefield Integration*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CM8: *Convergence Battlefield Integration*	-	7.831	1.049	-	-	-	-	-	-	-	0.000	8.880
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project integrates and demonstrates aided target detection and recognition, autonomous tactical behaviors, Artificial Intelligence (AI)-enabled decision support agent, and data management technologies in Multi-Domain Operations (MDO) field experiments. This Project integrates these technologies on tactical ground, air, air and missile defense, fires, network platforms and other missions to demonstrate reduced sensor to shooter timelines and evaluate operational performance in representative MDO scenarios during annual field experiments.

Work in this Project complements Program Element (PE) 0602181A (All Domain Convergence Applied Research).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Convergence Ground Platform System Integration ***Description:*** Integration of ground efforts in direct support of maturing and demonstrating Project Convergence capabilities. This effort matures and demonstrates ground vehicle technologies as an integrated system and system of systems to reduce sensor to shooter targeting time, increase real-time battlefield understanding and ensure communications across all echelons.	5.433	-	-
Title: Convergence Aviation Platform Integration ***Description:*** Integration of Aviation/Future Vertical Lift efforts in direct support of maturing and demonstrating Project Convergence capabilities. Focus is on integration of capabilities such as geo-location and identification of targets from Army aviation assets, air to ground situational awareness and target data exchange, exchange of unmanned asset control, advanced tactical and teaming behaviors, synchronized data management, and efficient usage of air lethality assets.	2.396	-	-
Title: Convergence Joint and Multinational Integration ***Description:*** Integration with Joint and Multi-National Partner technologies to demonstrate cross domain capabilities and concepts.	0.002	-	-
Title: Coordinated Lethality Advanced Development	-	1.049	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603041A / *All Domain Convergence Advanced Technology*	**Project (Number/Name)** CM8 / *Convergence Battlefield Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Description: This effort investigates commercial off the shelf items to determine those with high reward for use in achieving lethality across domains. ***FY 2024 Plans:*** Investigate commercial off the shelf technologies with the intent of achieving increased lethality through reconnaissance and surveillance capabilities. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease due to life cycle evolution.			
Accomplishments/Planned Programs Subtotals	7.831	1.049	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603041A / *All Domain Convergence Advanced Technology*	Project (Number/Name) DA4 / *All Domain Convergence Engineering & Architectures*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DA4: *All Domain Convergence Engineering & Architectures*	-	16.300	13.902	-	-	-	3.006	2.004	2.004	2.004	0.000	39.220
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project enables critical engineering and architecture support to all Army modernization priorities as the Army pursues convergence. Full development of mature system and system of systems level architectures ensure objective and data-driven analyses can be performed on new Army technologies and modernization efforts. Development of digital engineering products for new Army technologies currently under development enable digital analyses and assessments to be performed rapidly and repeatedly prior to full scale field tests like Project Convergence.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Engineering for Architectures	11.300	13.902	-
Description: The engineering and architecture project provides critical systems engineering and codesigning of systems at the design phase in a digital engineering environment to improve performance and integration. This includes development and integration of architecture and engineering products from system level to a full system of systems level, models and simulations, software engineering, and other key efforts to support senior leader decisions. ***FY 2024 Plans:*** Will develop and integrate system and system of systems level architectures of signature modernization priorities into a full Army Materiel Enterprise architecture baseline. Will leverage system of systems architecture in performing assessments of new and evolving system requirements to ensure system of systems integration in support of the Army of 2030 and 2040. Will perform portfolio health assessment modeling and simulation to inform Project Convergence and generate digital engineering artifacts. Will leverage system of systems architectures and engineering artifacts to inform cross warfighting function assessments to support senior leader decisions. Will leverage system of systems architectures and engineering artifacts to support AFC's mission of Delivering Army 2030 and Designing Army 2040. Designing Army 2030 support includes documenting DOTMLPF-P integrated architecture to ensure Army 2030 is delivered on time. Designing Army 2040 support includes assessing new formation based requirements against the baseline architecture to assess changes in performance between Army 2030 and Army 2040. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease due to integration of the software modules into broader requirements software for sustainment.			
Title: Technology Integration Analysis for Army Modernization Priorities	2.000	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603041A / *All Domain Convergence Advanced Technology*	**Project (Number/Name)** DA4 / *All Domain Convergence Engineering & Architectures*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Description: Conduct independent assessments of the feasibility, scalability and interoperability of technologies evaluated in an all-domain convergence environment. Primary focus will be to develop and assess architectures, develop models and simulations to support trade studies and decision making across the Army Modernization Priority technologies, and evaluation of planned demonstration efficacy.			
Title: Army Capability Architecture Development and Integration Environment (ArCADIE) ***Description:*** ArCADIE will develop and demonstrate the Army's authoritative cloud-based data source for Army Architectures, data and tools. This effort develops ArCADIE enhancements, architectures, and dashboards to enable experimentation, capability development, and S&T efforts in support of Army modernization.	3.000	-	-
Accomplishments/Planned Programs Subtotals	16.300	13.902	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603042A *I C3I Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	12.252	19.225	22.814	-	22.814	20.327	18.801	19.198	21.583	0.000	134.200
CN3: *Network Enabling University Adv Development*	-	3.847	4.031	3.932	-	3.932	3.594	3.597	3.636	3.672	0.000	26.309
CX7: *Intelligent Env Battlefield Awareness Adv Tech*	-	4.713	6.396	7.968	-	7.968	7.724	3.545	1.883	2.889	0.000	35.118
CX8: *Persistent Geophysical Sensing-Infrasound Adv Tech*	-	2.249	2.635	3.137	-	3.137	2.085	2.611	2.994	3.167	0.000	18.878
CX9: *Sensing in Contested Environments Adv Technologies*	-	1.043	1.104	2.083	-	2.083	0.151	0.459	2.989	3.019	0.000	10.848
CZ5: *Subterranean Detection and Monitoring Adv Tech*	-	0.400	1.272	1.432	-	1.432	1.834	2.328	0.862	1.388	0.000	9.516
DB5: *Enabling Long Standoff 3D (ELS3D) Adv Tech*	-	-	1.045	1.502	-	1.502	2.593	4.931	5.490	6.091	0.000	21.652
DE7: *Understanding Environment as a Threat Adv Tech*	-	-	2.742	1.433	-	1.433	1.017	-	-	-	0.000	5.192
DI6: *Anti-Tamper Advanced Tech Development*	-	-	-	1.327	-	1.327	1.329	1.330	1.344	1.357	0.000	6.687

Note

Project DI6 (Anti-Tamper Advanced Tech Development) is a new start within PE 0603042A (C3I Advanced Technology) in FY 2025. Funding for DI6 (Anti-Tamper Advanced Tech Development) transitioned from PE 0602146A (Network C3I Technology) / AV5 (Protective Technologies) to support maturation to Technology Readiness Level 6 (TRL6) and transition of anti-tamper technologies into DoD and Army weapons systems.

A. Mission Description and Budget Item Justification

This Program Element (PE) matures, demonstrates, optimizes, and validates Network Command, Control, Communications, and Intelligence (C3I) technologies through the integration of future equipment and systems that improve overmatch and meet mission needs in the future operating environments. This PE provides mid-to-long term tactical C3I capabilities (e.g. networking, cyber, electronic warfare, Positioning, Navigation, and Timing (PNT), space, persistent surveillance) based upon promising technologies that address emerging and future threats, and includes research critical and unique to the Army and DoD. Efforts focus on advanced maturation and demonstration of materials, technologies, methodologies and systems that span the range from electronics, protective technologies, electronic warfare, and mission

support capabilities such as situational awareness. These efforts directly inform and transition key capabilities to Army programs of record that support the Army modernization priorities.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	12.716	19.225	23.223	-	23.223
Current President's Budget	12.252	19.225	22.814	-	22.814
Total Adjustments	-0.464	0.000	-0.409	-	-0.409
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.002	-			
• SBIR/STTR Transfer	-0.466	-			
• Adjustments to Budget Years	-	-	-0.409	-	-0.409

Change Summary Explanation

Funding change reflects realignment of funding priorities within Army's Science and Technology (S&T) network portfolio.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) CN3 / *Network Enabling University Adv Development*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CN3: *Network Enabling University Adv Development*	-	3.847	4.031	3.932	-	3.932	3.594	3.597	3.636	3.672	0.000	26.309
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates advanced Network Command, Control, Communications, and Intelligence (C3I) technologies into future equipment and systems. This Project accelerates advanced technologies originating from extramural research in academia, will enable intelligent networks, self-sensing/self-healing network, network security, advanced teaming and operations in a Global Positioning System (GPS) degraded or denied GPS environment. This Project also accelerates the Army modernization in next generation Network and Assured Positioning, Navigation, and Timing (APNT) systems. Work in this Project will lead to emerging technologies in areas of strategic importance to the Army in communications and networking, by engaging competitively selected Universities.

Work in this Project complements Program Element (PE) 0602182A (C3I Applied Research) / Project CN4 (Network Enabling University Applied Research).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the University Technology Development Division.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Intelligent, Secure and Self-Sensing/Self-Healing Networks	0.546	0.420	1.798
Description: This effort matures and integrates advanced intelligent network solutions with autonomous or self-sensing intelligence to deny corruption, and/or attacks and to execute operational missions securely and reliably.			
FY 2024 Plans: Will continue maturation and demonstration of AI/ML emerging technologies for Network solutions, optimal network usage and network inference, RF-based deceptive tactical networks, improve cyber defense systems through secure and reliable ML, multi-modal and multi-vantage sensing for joint inference, and network localization.			
FY 2025 Plans: Will optimize software simulation tools that provide environment-aware radio frequency (RF) pathloss calculations in Army relevant scenarios using terrain feature data from geospatial data sources; optimize artificial intelligence/machine learning (AI/ML) emerging technologies for network solutions, optimal network usage and network inference, RF-based deceptive tactical			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CN3 / *Network Enabling University Adv Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
networks, improve cyber defense systems through secure and reliable ML, multimodal and multi-vantage sensing for joint inference, and network localization to enable a more intelligent and robust communications network. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned milestones to support intelligent networks and administrative realignment from task (Advanced Sensors and Non-GPS PNT Systems) within this project.			
Title: Advanced Real-Time Tactical Networks ***Description:*** This effort develops tactical network technology platforms consisting of a fleet of ground and air vehicles that will perform an autonomous reconnaissance mission in a relevant environment. ***FY 2024 Plans:*** Mature and demonstrate an information network that will resiliently support information pathways for sensing, computing, and control in cyber-physical systems, such as autonomous vehicle teams over unreliable communication networks. Mature and demonstrate an information network that responds dynamically to changes in operating conditions through real-time adaptation and evolution to enable continuity of the core services that it provides to the networked system. ***FY 2025 Plans:*** Will mature and demonstrate an information system functional orchestrator with real-time communications service over self-organizing nodes. Will utilize communication network, compute and information pathway status for orchestration and migration of components on substrate node to enable a resilient tactical network with reduced bandwidth requirements. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned milestones to support tactical networks and administrative realignment from task (Advanced Sensors and Non-GPS PNT Systems) within this project.	1.346	1.307	1.625
Title: Advanced Sensors and Non-GPS PNT Systems ***Description:*** Develop advanced sensors with enhanced signal processing software/algorithms to improve assurance against both electronic and kinetic attacks relative to GPS, and that can provide matured Positioning, Navigation and Timing (PNT) technology in disrupted, degraded or denied Global Positioning System (GPS) environments. ***FY 2024 Plans:*** Will continue the development and integration of GNSS global and tactical sensors, exploitation of LEO satellites for robust PNT back up to GPS, and demonstrate capability on a sensor fusion framework. ***FY 2025 Plans:***	1.955	2.304	0.509

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CN3 / *Network Enabling University Adv Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will mature and demonstrate supporting emerging requirements and technologies for PNT and alternatives to GPS, including performance and assurance improvements against both electronic and kinetic attacks relative to current state of-the-art GPS, and that can provide PNT technology to users in disrupted, degraded or denied GPS environments; mature and demonstrate the integration of global navigation satellite systems (GNSS) global and tactical sensors, exploitation of Low Earth Orbit (LEO) satellites for robust PNT back up to GPS, and demonstrate capability on a sensor fusion framework. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects administrative realignment to task (Advanced Intelligent, Secure and Self-Sensing/Self-Healing Networks) and task (Advanced Real-Time Tactical Networks) within this project.			
Accomplishments/Planned Programs Subtotals	3.847	4.031	3.932

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) CX7 / *Intelligent Env Battlefield Awareness Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CX7: *Intelligent Env Battlefield Awareness Adv Tech*	-	4.713	6.396	7.968	-	7.968	7.724	3.545	1.883	2.889	0.000	35.118
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project optimizes and demonstrates technologies to allow Soldiers to maneuver faster around or through existing environmental (urban/industrial) conditions and physical landscape constraints. This effort matures and demonstrates web modules/software tools delivering crucial geo-chemical resources and advanced knowledge of geo-environmental infrastructure to mission planners. This Project delivers critical technologies that provide situational awareness for multi-source intelligence, particularly for anti-access/area denial (A2/AD) outside the continental United States (OCONUS) sites.

Work in this Project complements Program Element (PE) 0602182A (C3I Applied Research) / Project CX3 (Intelligent Env Battlefield Awareness Apl Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center Environmental Laboratory, Geospatial Research Laboratory, Information Technology Laboratory, Cold Regions Research and Engineering Laboratory, Construction Research Engineering Laboratory, and Geotechnical and Structures Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Arctic Threats Demonstrations ***Description:*** This effort matures and demonstrates visualization tools which enable geospatial decisions based on anticipated physical threats, hazards and dependencies posed by terrain and weather extremes in cold regions.	1.082	-	-
Title: Geo-Forensics for Reconnaissance Exploitation ***Description:*** This effort provides unique terrestrial patterns to describe and predict the geological, biological, and overall ecological information associated with anti-access/area denial (A2/AD) sites from the continental United States (CONUS) analogs. ***FY 2024 Plans:*** Will provide a global soil analog tool application in which soil diversity and functionality can be predicted to inform mobility operations. Will also provide final documentation of geo-forensic capabilities for predicting soil provenance and properties within a predictive GIS platform. ***FY 2024 to FY 2025 Increase/Decrease Statement:***	0.985	1.134	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CX7 / *Intelligent Env Battlefield Awareness Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding change reflects planned conclusion of this Science and Technology effort with transition of software and data models to the Predictive GIS Mapping (physical) integration effort within this Project.			
Title: Predictive Geographic Information Systems (GIS) Mapping (physical) Demonstration ***Description:*** This effort reduces the impact of unknown and changing terrain conditions by automating the integration of disparate datasets and overlays of terrain obstacles producing a high-fidelity map that integrates soil composition, vegetation, hydrology, and permafrost/ice data. ***FY 2024 Plans:*** Will integrate high resolution remotely sensed weather models demonstrating terrain state changes such as freeze/thaw, and global soil analog tools into a predictive GIS platform. ***FY 2025 Plans:*** Will integrate soil models into a global soil mapping system incorporating cold region and hydrology effects using ground and surface water conditions to identify potential hazards of extreme cold weather on maneuverability corridors. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the planned milestones to integrate developments from concluding tasks.	1.585	1.248	2.073
Title: Hydrology Mapping Demonstrations ***Description:*** This effort matures and demonstrates data tools and models to support high-fidelity battlefield overlay maps that accurately show hydrologic/soil moisture threats (soil, hydrology, and snow/ice) not captured by current terrain mapping capabilities. ***FY 2024 Plans:*** Will mature hydrologic modeling to support soil moisture change predictions on a prototype GIS platform from field data gained at CONUS test bed sites. ***FY 2025 Plans:*** Will mature the global watershed analog mapping tool to support the hydrologic computational framework to include flood zone, soil moisture, and run-off mapping. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects planned milestones required for computational modeling.	0.473	1.753	1.463
Title: Vegetation Property Demonstrations	0.588	0.627	3.002

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CX7 / *Intelligent Env Battlefield Awareness Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Description: This effort provides forest metrics with other Intelligent Environmental Battlefield Awareness Tech threat area parameters to inform global ecological analogues in areas with limited data. ***FY 2024 Plans:*** Will validate interactive machine learning models to assign to global forest analogs (e.g., digital forest twins) incorporated from the U.S. Forest Service. ***FY 2025 Plans:*** Will mature the framework for assignment of global forest analogs from U.S. Forest Service plot data. Will utilize high performance computing (HPC) resources to validate machine learning algorithms for the forest analog tool. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the planned focus on the use of HPC resources.			
Title: Extreme Environmental Effects on Operations Demonstrations ***Description:*** This effort designs and develops modeling of natural terrain following extreme disturbances that impact operational environments such as wildfires, flash floods, earthquakes and landscape changes induced by high intensity military conflict. ***FY 2024 Plans:*** Will assess sources and linkages to meet foundational and dynamic environmental data requirements for extreme event capabilities within a predictive GIS platform. ***FY 2025 Plans:*** Will mature algorithms for seasonal snow and wildland fire hazards across complex terrains that captures terrain impediments. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects completed assessment of environmental data requirements.	-	1.634	1.430
Accomplishments/Planned Programs Subtotals	4.713	6.396	7.968

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) CX8 / *Persistent Geophysical Sensing-Infrasound Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CX8: *Persistent Geophysical Sensing-Infrasound Adv Tech*	-	2.249	2.635	3.137	-	3.137	2.085	2.611	2.994	3.167	0.000	18.878
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates kitted hardware and software solutions that provide passive, persistent, non-line-of-sight, multi-modal sensing capable of providing fused battlefield intelligence for increased situational awareness in a dynamic operational environment. These technologies provide near-real-time data collection, processing, and alerting on evolving cross-domain threats including strategic and tactical fires, air and ground platforms, as well as critical transportation infrastructure (bridges) and explosive events with applications for deep sensing. These technologies deliver time-critical intelligence for engineer and intelligence communities to provide decisive advantage.

Work in this Project complements Program Element (PE) 0602182A (C3I Applied Research) / Project CX4 (Persistent Geophysical Sensing-Infrasound Apl Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed at the United States Army Engineer Research and Development Center Geotechnical and Structures Laboratory, Coastal and Hydraulics Laboratory, Construction Engineering Research Laboratory, Cold Regions Research and Engineering Laboratory, Environmental Laboratory, and Information Technology Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Battlefield Intelligence by Geophysical Sensing (BIGS) Demonstration	2.249	2.635	3.137
Description: This effort matures and demonstrates geophysical and geo-sensing technologies to persistently assess battlefield elements to include infrastructure (algorithm refinements) and additional sources of interest, such as explosive and fires events and various threats. Optimization of the array sensors and geometry to improve array performance for new sources of interest while reducing logistics will also be matured and demonstrated. New detection and classification signal processing algorithms will be validated throughout the life of the task in a phased demonstration schedule.			
FY 2024 Plans: Will optimize and demonstrate algorithm components. Will demonstrate alternate array geometry in a simulated operational environment.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CX8 / *Persistent Geophysical Sensing-Infrasound Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will demonstrate full complement of automated algorithms for selected sources of interest with optimized array configurations and placement tools in a relevant environment (accounting for terrain/topography and meteorological effects). ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned transition of technologies for Soldier touch point demonstrations and integrations.			
Accomplishments/Planned Programs Subtotals	2.249	2.635	3.137

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) CX9 / *Sensing in Contested Environments Adv Technologies*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CX9: *Sensing in Contested Environments Adv Technologies*	-	1.043	1.104	2.083	-	2.083	0.151	0.459	2.989	3.019	0.000	10.848
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates advanced sensor technologies that characterize hazards posed to warfighters by non-weaponized biological hazards in subterranean environments. Demonstrations of previously developed sensor packages and adaptive commercial off the shelf sensor technologies on existing unmanned ground vehicles (UGV) platforms to gather end-user feedback. The capabilities resulting from this project provide Soldiers the capability to understand biological hazards present in subterranean environments and take necessary steps to mitigate or avoid these threats.

Work in this Project complements Program Element (PE) 0602182A (C3I Applied Research) / Project CX5 (Sensing in Contested Environments Technologies).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed at the United States Army Engineer Research and Development Center Environmental Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Non-traditional Threat Detection in Contested Environments Tech	1.043	1.104	2.083
Description: This effort identifies, examines, prioritizes, and exploits commercial of the shelf capabilities from multiple sources that can accurately detect biological and water quality hazards relevant to operations in subterranean environments from point of ingress/egress to evaluate exposure potential and affects. ***FY 2024 Plans:*** Will demonstrate macroscopic and microscopic organism classification and hazard detection in a field realistic environment. ***FY 2025 Plans:*** Will optimize hardware to meet requirements. Will demonstrate macro biological threat detection at additional sites inside and outside the continental United States. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the planned milestones for this effort to conduct demonstrations at multiple site locations.			
Accomplishments/Planned Programs Subtotals	1.043	1.104	2.083

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CX9 / *Sensing in Contested Environments Adv Technologies*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) CZ5 / *Subterranean Detection and Monitoring Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CZ5: *Subterranean Detection and Monitoring Adv Tech*	-	0.400	1.272	1.432	-	1.432	1.834	2.328	0.862	1.388	0.000	9.516
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project validates and demonstrates advanced subterranean monitoring and vulnerability assessment technologies providing mobile and man-portable solutions to enhance survivability and threat awareness during urban operations and negate enemy subterranean operation advantage. This Project also optimizes and demonstrates enhanced technologies to detect tunnels and tunneling activity in complex and varied environments. These capabilities are critical to provide greater situational awareness of the subterranean domain and enhanced survivability for the Soldier.

Work in this Project complements Program Element (PE) 0602182A (C3I Applied Research) / Project CX6 (Subterranean Detection and Monitoring Apl Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center Geotechnical and Structures Laboratory, Construction Engineering Research Laboratory, Coastal and Hydraulics Laboratory and Cold Regions Research and Engineering Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Cavity Assessment in Variable Environments-Subterranean (CAVES) Demonstrations	0.400	1.272	1.432
Description: This effort validates and demonstrates an integrated suite of tunnel detection and perimeter security systems for application in variable terrain, and complex geologic environments, such as mountains, and hard rock geology common in the western pacific. ***FY 2024 Plans:*** Will conduct field experimentation to baseline capabilities of tunnel detection and perimeter security technologies in an operationally relevant environment. ***FY 2025 Plans:*** Will mature and demonstrate systems in a simulated operational environment using selected technologies. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned milestones for this effort.			
Accomplishments/Planned Programs Subtotals	0.400	1.272	1.432

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** CZ5 / *Subterranean Detection and Monitoring Adv Tech*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) DB5 / *Enabling Long Standoff 3D (ELS3D) Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DB5: *Enabling Long Standoff 3D (ELS3D) Adv Tech*	-	-	1.045	1.502	-	1.502	2.593	4.931	5.490	6.091	0.000	21.652
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project will integrate and demonstrate and mature a low size, weight, and power (SWAP) laser transmitter, processing algorithms and calibration models tailored for higher resolution 3D data collections over larger areas from longer stand-off for mapping, Intelligence Surveillance and Reconnaissance (ISR) and targeting. Long standoff airborne collection of high-resolution quick turnaround 3D data is vital for mission planning, target detection and identification, fire control, autonomous navigation, kinetic targeting, and battle damage assessment. Existing light detection and ranging (LIDAR) systems are limited to short standoff and/or near-nadir collection, limiting their use against near-peer adversaries and restricting the provision of 3D data. The payoff will enable long standoff airborne collection of high-resolution quick turnaround 3D data through the development LIDAR subsystems and processing algorithms.

Work in this Project complements Program Element (PE) 0602182A (C3I Applied Research) / Project DB4 (Enabling Long Standoff 3D (ELS3D) Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center Geospatial Research Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Enabling Long Standoff 3D (ELS3D) Demonstration	-	1.045	1.502
Description: This effort will demonstrate and integrate a prototype airborne system to collect long standoff high-resolution quick turnaround 3D data. Sensors will be ruggedized for operation at very high altitudes for collection of high-resolution 3D data. This long standoff collection will meet Army needs for mapping, ISR, and targeting, and be of a sufficient SWAP to be integrated onto Army platforms.			
FY 2024 Plans: Will conduct hardware design for SWAP-optimization of lidar components, as initial phase of the advanced collection methodology.			
FY 2025 Plans: Will mature a calibration framework with rigorous error propagation, signal processing and image formation software in support of long standoff data collection.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** DB5 / *Enabling Long Standoff 3D (ELS3D) Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding increase reflects the planned milestones for the development of a prototype system and processing algorithms.			
Accomplishments/Planned Programs Subtotals	-	1.045	1.502

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) DE7 / *Understanding Environment as a Threat Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DE7: *Understanding Environment as a Threat Adv Tech*	-	-	2.742	1.433	-	1.433	1.017	-	-	-	0.000	5.192
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates tools that provide capability to inform the Solider of different routes through a complex urban landscape. Optimizes tools that balance exposure to environmental threats with mission constraints to provide a risk versus reward capability of operating in different areas of the urban theater. This Project matures and demonstrates predictive software accurately integrating the risks of physical, chemical, and biological threats in an urban environment into route planning tools.

Work in this Project complements Program Element (PE) 0602182A (C3I Applied Technology) / Project DE6 (Understanding the Environment as a Threat Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center Environmental Laboratory, Geospatial Research Laboratory, and Information Technology Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Environmental Threat Technology Demonstrations for route planning	-	0.682	-
Description: This effort matures and demonstrates a software tool that informs and balances the risk of exposure to environmental threats with maneuver constraints along potential routes. The software integrates the risks associated with different environmental matrices in complex urban environments and includes the capability for routing in off-road scenarios. ***FY 2024 Plans:*** Will demonstrate operational viability of individual course-forecasting algorithms. Will demonstrate final threat-overlay software products and validate performance within an established interface. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects the planned life cycle conclusion of this Science and Technology effort.			
Title: Hazard Prediction Demonstration	-	1.030	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** DE7 / *Understanding Environment as a Threat Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Description: This effort matures and demonstrates a mission planning platform that provides Soldiers with a predictive visualization technology to identify, track and plan for industrial or commercial chemical/environmental threats in operational environments. ***FY 2024 Plans:*** Will demonstrate and validate suite of standalone air, water, and soil media model algorithms using toxic industrial chemical/ material (TIC/TIM) databases. Will demonstrate final threat-overlay software product and validate performance within an established interface. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects the planned life cycle conclusion of this Science and Technology effort.			
Title: Subsurface Forensics Demonstration ***Description:*** This effort matures and demonstrates sensing technologies for TIC/TIMs to detect illicit activities with authentic wastewater treatment influent. ***FY 2024 Plans:*** Will validate capabilities to exploit pre-existing physical, chemical, and biological information from urban subterranean systems for threat identification with special and temporal resolution in current and future operational environments. ***FY 2025 Plans:*** Will demonstrate techniques for ultra-low detection levels of explosive constituents and other industrial and commercial chemical threats for reverse-point sourcing threats in dense urban and subterranean environments. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned milestones to conduct field demonstrations.	-	1.030	1.433
Accomplishments/Planned Programs Subtotals	-	2.742	1.433

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603042A / *C3I Advanced Technology*	Project (Number/Name) DI6 / *Anti-Tamper Advanced Tech Development*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DI6: *Anti-Tamper Advanced Tech Development*	-	-	-	1.327	-	1.327	1.329	1.330	1.344	1.357	0.000	6.687
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Anti-Tamper Advanced Tech Development is a new start within the C3I Advanced Technology program in FY 2025.

Funding for DI6 (Anti-Tamper Advanced Tech Development) transitioned from PE 0602146A (Network C3I Technology) / AV5 (Protective Technologies) to support maturation to TRL6 and transition of anti-tamper technologies into DoD and Army weapons systems.

A. Mission Description and Budget Item Justification

This Project matures and transitions Anti-Tamper tools, devices, and techniques that protect acquisition program systems and Critical Program Information (CPI) from evolving adversarial threats. Efforts are coordinated with Department of Defense (DoD) Executive Agent for Anti-Tamper.

Work in this Project complements Program Element (PE) 0602146 (Protective Technologies) / Project AV5 (Protective Technologies).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation and Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Anti-Tamper Advanced Tech Development	-	-	1.327
Description: This effort matures tools, devices, and techniques that protect acquisition program systems and (CPI) from adversarial threats. ***FY 2025 Plans:*** Will mature advanced microelectronics-based anti-tamper security solutions to allow for integration of these solutions in Army and DoD weapons systems to meet their Program Protection requirements. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** This is a new effort in FY 2025. Funding transitioned from PE 0602146A (Network C3I Technology) / AV5 (Protective Technologies) to support maturation to TRL6 and transition of anti-tamper technologies into DoD and Army weapons systems.			
Accomplishments/Planned Programs Subtotals	-	-	1.327

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603042A / *C3I Advanced Technology*	**Project (Number/Name)** DI6 / *Anti-Tamper Advanced Tech Development*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603043A *I Air Platform Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	13.062	14.165	17.076	-	17.076	35.538	44.013	45.493	45.936	0.000	215.283
CL4: *Air Platform Enabling University Adv Development*	-	1.205	1.367	1.466	-	1.466	1.167	1.168	1.181	1.193	0.000	8.747
CV1: *Control & Autonomy for Tactical Superiority Adv*	-	1.098	1.254	1.257	-	1.257	7.804	13.227	11.713	10.282	0.000	46.635
CV2: *Structures Platform Int Resilience & Efficiency*	-	3.010	3.358	5.148	-	5.148	6.562	5.158	5.214	5.266	0.000	33.716
CX1: *Advanced Rotors Advanced Tech*	-	2.522	2.657	2.689	-	2.689	2.692	2.694	2.723	2.750	0.000	18.727
CX2: *Next Generation Aviation Transmission Adv Tech*	-	0.001	-	-	-	-	-	-	-	-	0.000	0.001
DC3: *HPC For Army Aviation Concepts*	-	5.226	5.529	5.514	-	5.514	7.508	8.735	8.868	9.118	0.000	50.498
DK2: *Air Vehicle Improvement & Adv Tech (AVIATe)*	-	-	-	1.002	-	1.002	9.805	13.031	15.794	17.327	0.000	56.959

Note

In Fiscal Year (FY) 2025, project DK2 / Air Vehicle Improvement & Adv Tech (AVIATe) is a new start within PE 0603043A / Air Platform Advanced Technology.

A. Mission Description and Budget Item Justification

This Program Element (PE) undertakes advanced technology efforts that support and enable the overall Army Aviation portfolio in general, and the Army's modernization priority for Future Vertical Lift (FVL). Vital and enduring research into advanced technologies is conducted pertinent to the air portfolio that supports mid-to-long term requirements in contested operational environments and technologies that have broad application to FVL modernization, as well as overall Army and specific Department of Defense (DoD) aviation needs.

Research in this PE contributes to the Army Science and Technology (S&T) air systems portfolio and is fully coordinated with efforts in PE 0602148A (Future Vertical Lift Technology), PE 0603465A (Future Vertical Lift Advanced Technology) and PE 0602183A (Air Platform Applied Research).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering S&T focus areas and the Army Modernization Strategy.

Research in this PE is performed by the University Technology Development Division, Aviation and Missiles Center and Information Technology Laboratory.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603043A *I Air Platform Advanced Technology*

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	17.946	14.165	16.126	-	16.126
Current President's Budget	13.062	14.165	17.076	-	17.076
Total Adjustments	-4.884	0.000	0.950	-	0.950
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-4.229	-			
• SBIR/STTR Transfer	-0.655	-			
• Adjustments to Budget Years	-	-	0.950	-	0.950

Change Summary Explanation

Funding increased to support Hybrid-Electric Aviation Technology (HEAT) demonstration and Autonomy for Combat Environment Sustainment (ACES) Demo.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army										Date: March 2024		
Appropriation/Budget Activity 2040 / 3					R-1 Program Element (Number/Name) PE 0603043A / *Air Platform Advanced Technology*				Project (Number/Name) CL4 / *Air Platform Enabling University Adv Development*			
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
CL4: *Air Platform Enabling University Adv Development*	-	1.205	1.367	1.466	-	1.466	1.167	1.168	1.181	1.193	0.000	8.747
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project focuses on experimentation and demonstration of advanced technologies originating from extramural applied research in academia pertaining to navigation/ routing, autonomous robotic vehicles, artificial intelligence and machine learning as applied to aerial mobility and maneuver, holistic survivability, teaming, integrated mission systems, air-launched effects, and other innovative air enabling applied research technologies, that will accelerate the Army modernization in next generation aerial vehicles. This Project will mature and integrate advanced efforts to focus more on mid to far-term Army modernization priorities while also maintaining delivery of near-term technologies fundamental to the modernization priorities. This effort conducts and demonstrates advanced technology efforts arising from academic research in all areas of strategic importance to Army Aviation in artificial intelligence / machine learning (AI/ML), autonomous teaming systems, survivability, aeromechanics, advanced vertical take-off and landing (VTOL) design & concepts, flight dynamics, vibration & noise control, propulsion, human factor engineering and structures and materials, etc., by bringing competitively selected Universities with research and development teams into Technical Alliances. The Project will continuously experiment with methods to identify, demonstrate and transition novel technology from entities that might not otherwise collaborate with the Department of Defense (DoD), with the end goal of accelerating the adoption of cutting-edge applied research technology for the warfighter in the Army aviation portfolio.

Work in this Project complements Program Element (PE) 0603465A (Future Vertical Lift Advanced Technology), PE 0603119A (Ground Advanced Technology), PE 0602148A (Future Vertical Lift Technology) and PE 0602183A (Air Platform Applied Research).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the University Technology Development Division.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Vertical Lift Advanced Technologies	1.205	1.367	1.466
Description: Conduct advanced development within academia to mature and integrate Vertical Lift research of promising and emerging technologies.			
FY 2024 Plans: Will continue to mature and integrate rotorcraft emerging technologies through autonomous teaming systems, aeromechanics, advanced VTOL design & concepts, flight dynamics models to extend reach, and agility.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603043A / *Air Platform Advanced Technology*	**Project (Number/Name)** CL4 / *Air Platform Enabling University Adv Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will mature and demonstrate the coordination of multiple land and air vehicles participating in an unmanned long-term reconnaissance operation using distributed command/control architecture despite communication delays and/or failures; mature and demonstrate rotorcraft emerging technologies through aeromechanics, advanced Vertical Takeoff and Landing (VTOL) design & concepts, and develop flight dynamics models to extend reach and agility. The benefit of this effort is it enables future vertical lift capability improvements. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Accomplishments/Planned Programs Subtotals	1.205	1.367	1.466

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603043A / *Air Platform Advanced Technology*	Project (Number/Name) CV1 / *Control & Autonomy for Tactical Superiority Adv*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CV1: *Control & Autonomy for Tactical Superiority Adv*	-	1.098	1.254	1.257	-	1.257	7.804	13.227	11.713	10.282	0.000	46.635
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project will deliver advanced flight controls, autonomy technologies, and new handling qualities criteria are implemented and tested in a realistic environment to demonstrate their functionality and increase their technology readiness level (TRL). This Project also delivers demonstrated and matured flight controls and autonomy technologies at TRL 6 to transition partners.

Work in this Project complements Program Element (PE) 0602183A (Air Platform Applied Technology) / Project CU7 (Control & Autonomy for Tactical Superiority Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Adaptive Tactical Autonomy and Control (ATAC) Technology Demonstration	1.098	1.254	1.257
Description: Mature, integrate, and demonstrate advanced flight control technologies and state-of-the-art autonomy algorithms that provide Future Vertical Lift (FVL) aircraft with enhanced maneuverability and agility, reduced cognitive workload, improved survivability through damage tolerance, and the ability to operate on an autonomy spectrum from piloted to fully autonomous and exploit degraded environments as a force multiplier.			
FY 2024 Plans: Will integrate and demonstrate autonomous obstacle field navigation enhancements, including Risk-Aware Path Planner (RAPP), on Army flying laboratories. Will integrate and demonstrate control laws for active sensing to improve the effectiveness of sensors. Will integrate and demonstrate advanced concepts for ensuring pilot awareness of autonomous system's intent.			
FY 2025 Plans: Will explore pilot-assist/autonomous functions for autorotation such as automatically lowering of collective and configuring the aircraft for best autorotation airspeed; integrate and demonstrate concepts for transition of control between pilot and autonomous system and back.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603043A / *Air Platform Advanced Technology*	**Project (Number/Name)** CV1 / *Control & Autonomy for Tactical Superiority Adv*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding increase is an economic adjustment.			
Accomplishments/Planned Programs Subtotals	1.098	1.254	1.257

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603043A / *Air Platform Advanced Technology*	Project (Number/Name) CV2 / *Structures Platform Int Resilience & Efficiency*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CV2: *Structures Platform Int Resilience & Efficiency*	-	3.010	3.358	5.148	-	5.148	6.562	5.158	5.214	5.266	0.000	33.716
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project will ensure a continuous stream of transition-ready critical structures advanced technologies for improvement of performance (via weight efficiency and multifunctionality for parasitic weight avoidance) and resilience (survivability, sustainment, and operational availability).

Work in this Project is fully coordinated with Program element (PE) 0602183A (Air Platform Applied Technology) / Project CU8 (Structures Tech for Enduring Efficient Resilience).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Adaptive Resilient Engineered Structures (ARES)	3.010	3.358	5.148
Description: Mature, integrate, and demonstrate advanced structures technologies providing performance, survivability, and sustainment benefits with broad applicability across platform scale and role, enabling mission success for manned/unmanned Future Vertical Lift (FVL) platforms in the contested environment of multi-domain operations.			
FY 2024 Plans: Will further mature, test, and integrate advanced structures technologies, quantifying their contribution to improved efficiency, performance, survivability, and sustainment (reliability and availability). Will use building block testing and analysis to prepare for an integrated demonstration exploiting the synergy of technologies including weight-saving, fatigue-tolerant, affordable, multifunctional, and damage-tolerant configurations for primary and secondary structure.			
FY 2025 Plans: Will mature, through building block testing, advanced structures technologies, quantifying their contribution to improved efficiency, performance, survivability, and sustainment (reliability and availability); leverage building block test results to integrate technologies and begin fabrication for demonstration exploiting the synergy of technologies including weight-saving, fatigue-tolerant, affordable, multifunctional, and damage-tolerant configurations for primary and secondary structure.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603043A / *Air Platform Advanced Technology*	**Project (Number/Name)** CV2 / *Structures Platform Int Resilience & Efficiency*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding increase in FY 2025 reflects increased testing and fabrication in preparation for FY 2026 demonstration testing.			
Accomplishments/Planned Programs Subtotals	3.010	3.358	5.148

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603043A / *Air Platform Advanced Technology*	Project (Number/Name) CX1 / *Advanced Rotors Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CX1: *Advanced Rotors Advanced Tech*	-	2.522	2.657	2.689	-	2.689	2.692	2.694	2.723	2.750	0.000	18.727
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project investigates Future Vertical Lift (FVL) and other Army and Department of Defense (DoD) advanced drive train technologies that increase performance and double current drivetrain life cycles while improving their reliability and maintainability.

Work in this Project is fully coordinated with PE 0602183A (Air Platform Applied Technology) / Project CW3 (Advanced Rotors Applied Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: High Speed Highly Efficient Rotors ***Description:*** This effort demonstrates full scale, integrated rotor system technologies through the assessment of alternative designs aimed to satisfy future capability needs for aviation and FVL increased system durability, efficiency, speed, range, and payload. Potential technologies include: integrated high speed, low drag rotor technologies for high speed configurations; interactional aerodynamics tailoring between rotor and body & auxiliary lift/ propulsors; light weight, low volume, efficient and high authority electro-mechanical actuators (EMAs); reliable and robust actuators/hubs/controls for Independent Blade Control (IBC)/ swashplateless rotors; active/passive flow control; and automated track and balance.	2.522	-	-
Title: Lightweight Durable Rotor Technologies ***Description:*** This effort matures and demonstrates full scale, integrated durable rotor system technologies to improve rotor blade service lives and reduce maintenance costs aimed to satisfy future capability needs for aviation and FVL increased system durability, efficiency, speed, range, and payload. Potential technologies include lightweight and highly durable blade erosion protection, low power and more reliable blade deicing capability, more reliable rotor system sensors/instrumentation, reliable and durable rotor actuation, low drag/low part count hubs, and improved blade repair methodologies. ***FY 2024 Plans:***	-	2.657	2.689

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603043A / *Air Platform Advanced Technology*	**Project (Number/Name)** CX1 / *Advanced Rotors Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will test low drag, low part count rotor hub. Will screen initial durable rotor technologies as part of program kickoff planning. ***FY 2025 Plans:*** Will conduct durable rotor trade studies and start rotor system integration conceptual design. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase is an economic adjustment.			
Accomplishments/Planned Programs Subtotals	2.522	2.657	2.689

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603043A / *Air Platform Advanced Technology*	Project (Number/Name) CX2 / *Next Generation Aviation Transmission Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CX2: *Next Generation Aviation Transmission Adv Tech*	-	0.001	-	-	-	-	-	-	-	-	0.000	0.001
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project develops and ground demonstrates variable-speed advanced transmission technologies that can be matured and integrated into the development of Future Vertical Lift (FVL) platforms and other Army and Department of Defense (DoD) aviation systems.

Work in this Project is fully coordinated with PE 0602183A (Air Platform Applied Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: High Reduction Ratio Transmission (HRT)	0.001	-	-
Description: This effort will mature and demonstrate the technologies necessary for development, design, fabrication, and testing of a high reduction-ratio transmission in two stages or less (60:1 reduction ratio) with high efficiency and improved reliability against corrosion and seal leakage. Technology demonstrations from this effort will be applicable to FVL platforms.			
Accomplishments/Planned Programs Subtotals	0.001	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603043A / *Air Platform Advanced Technology*	Project (Number/Name) DC3 / *HPC For Army Aviation Concepts*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DC3: *HPC For Army Aviation Concepts*	-	5.226	5.529	5.514	-	5.514	7.508	8.735	8.868	9.118	0.000	50.498
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates the use of high-fidelity computational fluid dynamics for Future Vertical Lift (FVL) platforms through the utilization of Department of Defense (DoD) High- Performance Computing (HPC) and software tools for cutting-edge modeling and simulation, as well as adding software capabilities for workflow automation and design space exploration. Efforts in this Project are also applicable to the family of FVL and Future Tactical Unmanned Aircraft System (FTUAS) platforms.

Work in this Project complements PE 0602183A (Air Platform Applied Research).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center Information Technology Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Engineered Resilient Systems (ERS) for Army Aviation	2.273	-	-
Description: This effort supports Future Vertical Lift by exploiting advancements in physics-based software tools to provide rapid engineering analysis of proposed rotorcraft platforms, providing high-fidelity computational modeling of candidate Future Attack Reconnaissance Aircraft (FARA) platforms during the FARA down-selection, increasing the speed of simulations by automating simulation setup and execution on DoD HPC systems, and maturing and demonstrating the use of advanced machine learning techniques for aviation datasets to inform both the development of FVL systems and current operations.			
Title: Advanced Computational Technologies for Army Aviation	2.953	5.529	3.022
Description: This effort supports FVL by utilizing advanced computational techniques leveraging automated design processes to expand computational testbeds in support of testing and evaluation. Increase high accuracy physics in modeling and simulation to optimize platforms for all operational environments and mission scenarios. Provide multi-fidelity computational models of candidate FLRAA and FTUAS platforms to support acquisition decision-makers.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603043A / *Air Platform Advanced Technology*	**Project (Number/Name)** DC3 / *HPC For Army Aviation Concepts*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will mature the Decision Support Tool (DST) for executing combined engineering analysis and mission scenarios. Will demonstrate computational modeling and simulation capabilities for rotorcraft design and analysis on secret high-performance computing assets. Will expand computational modeling frameworks to include multi-fidelity computational models of candidate Future Vertical Lift (FVL) platforms. ***FY 2025 Plans:*** Will demonstrate and provide modeling and simulation capabilities for optimization of candidate future vertical lift platforms and upgrades. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects the planned conclusion of this effort.			
Title: Machine-Assisted Design and Evaluation ***Description:*** This effort matures advanced machine-assisted design algorithms to explore design spaces and improve resilience for Future Vertical Lift (FVL). Physics-informed machine learning will improve and augment high-fidelity simulation and expand availability of high-fidelity data for tradespace generation and analysis. Reinforcement learning and other computational exploration methods will improve evaluation of mission effectiveness of FVL platforms. ***FY 2025 Plans:*** Will develop physics informed machine learning to reduce simulation turnaround for rotorcraft. Will explore machine-guided tradespace generation and exploration for machine assisted design. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned initiation of this effort.	-	-	2.492
Accomplishments/Planned Programs Subtotals	5.226	5.529	5.514

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603043A / *Air Platform Advanced Technology*	Project (Number/Name) DK2 / *Air Vehicle Improvement & Adv Tech (AVIATe)*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DK2: *Air Vehicle Improvement & Adv Tech (AVIATe)*	-	-	-	1.002	-	1.002	9.805	13.031	15.794	17.327	0.000	56.959
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Air Vehicle Improvement & Adv Tech (AVIATe) is a new start within the Air Platform Advanced Technology program in FY 2025.

A. Mission Description and Budget Item Justification

This project enhances Army aviation mission capability and address operational energy and environmental challenges. Includes the maturation, system integration, and demonstration of technologies including advanced engines, hybrid and electric systems, power and control allocation, propulsive power delivery, electric actuation, structures, and other technologies that enhance performance, efficiency or are critical to implementation up to the aircraft system level.

Work in this Project complements Program Element (PE) 0602183A (Air Platform Applied Technology) / Project DK1 (Air Vehicle Integrated & Alternative Tech (AVIATe)).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Hybrid-Electric Aviation Technology (HEAT) Demonstration	-	-	1.002
Description: This effort focuses on developing data to assess the viability of meeting future rotorcraft motive and mission equipment power needs through demonstration of hybrid-electric technology up to the aircraft system level. Emphasis will be on analytical tool and technology maturation, identifying hybrid-electric applications through system design and optimization, executing risk mitigation through analysis and test, system integration, and addressing suitability aspects in order to inform and plan future transition into current fleet and FVL aircraft.			
FY 2025 Plans: Will begin scaled hybrid-electric system and integration laboratory efforts as a means to train, expand knowledge base, mitigate technical risk, calibrate models, and integrate and optimize hybrid-electric systems to inform and plan future transition efforts for the Army aviation fleet.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603043A / *Air Platform Advanced Technology*	**Project (Number/Name)** DK2 / *Air Vehicle Improvement & Adv Tech (AVIATe)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
This effort begins in FY25.			
Accomplishments/Planned Programs Subtotals	-	-	1.002

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603044A / *Soldier Advanced Technology*

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	-	0.462	1.214	10.133	-	10.133	13.384	6.062	7.111	8.559	0.000	46.925
CN8: *Soldier Enabled University Advanced Development*	-	0.462	0.587	2.874	-	2.874	2.802	2.804	2.835	2.863	0.000	15.227
CW1: *Technical-SAVVY Soldier Advanced Research*	-	-	0.627	1.047	-	1.047	1.364	1.154	1.671	1.688	0.000	7.551
EA7: *Enhanced Indirect Fire Adv Tech*	-	-	-	6.212	-	6.212	9.218	2.104	2.605	4.008	0.000	24.147

Note

Enhanced Indirect Fire Adv Tech is a new start within the Soldier Advanced Technology program in FY 2025.

A. Mission Description and Budget Item Justification

This Program Element (PE) matures, optimizes, and validates applied research technologies to demonstrate improved capabilities and systems that advance Soldier and Squad lethality-overmatch and Soldier performance beyond those technologies planned within the Soldier Lethality Cross-Functional Team. Advanced technology research efforts focus on the maturation and integration of broad capabilities and systems that span a range of technical areas to address enduring Soldier needs. These efforts transition outputs to existing and emerging systems in support of continuing enhancement of Soldier capabilities. This PE will fund civilian salaries for in-house researchers/scientists and program managers collaborating with external subject matter experts in academia and industry who are leaders in these technology research areas.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603044A / *Soldier Advanced Technology*

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	0.479	1.214	3.913	-	3.913
Current President's Budget	0.462	1.214	10.133	-	10.133
Total Adjustments	-0.017	0.000	6.220	-	6.220
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.017	-			
• Adjustments to Budget Years	-	-	6.220	-	6.220

Change Summary Explanation

Increase funding reflects planned research support increased mortar system lethality and effective range across 81mm and 120mm calibers for enhanced Brigade Combat Team (BCT) operations.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603044A / *Soldier Advanced Technology*	Project (Number/Name) CN8 / *Soldier Enabled University Advanced Development*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CN8: *Soldier Enabled University Advanced Development*	-	0.462	0.587	2.874	-	2.874	2.802	2.804	2.835	2.863	0.000	15.227
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project leverages advanced technological innovations from academia to accelerate the optimization and demonstration of improved capabilities and systems that advance Soldier and Squad lethality-overmatch and Soldier performance and meet mission needs in the future operating environments. This Project funds collaborative, enduring advanced extramural university-based maturation and demonstration of technologies and brings together competitively selected universities with Army research teams into Technical Alliances. This Project will focus efforts on mid- to far-term Army modernization priorities while also maintaining delivery of near-term technologies critical to supporting the modernization priorities. The technical scope of this Project includes the optimization, maturation and demonstration of overarching Soldier-centric technologies including human systems integration, simplified synthetic training environments, advanced protective materials, power and energy, Warfighter endurance, robotics, as well as other innovative Soldier enabled advanced research technologies that will accelerate the Army modernization in Synthetic Training Environment, and Soldier Lethality. This Project conducts advanced research and development leading to potential emerging technologies in areas of strategic importance to the Army in Soldier capabilities related to increased protection, performance, agility, situational awareness, and lethality. This Project will also continuously strive to engage and collaborate with entities that might not otherwise collaborate with the Department of Defense (DoD) to demonstrate and provide novel Soldier-centric technologies for accelerating the adoption of emerging technologies for the Warfighter in the Army Soldier portfolio.

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the University Technology Development Division.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Soldier Performance and Training	0.462	0.587	2.874
Description: Mature and demonstrates Soldier capabilities related to increased protection, performance, agility, situational awareness, training, and lethality.			
FY 2024 Plans: Prototype data lake environment and data ecosystem to refine the synthetic training environment data management architecture; mature and demonstrates technologies to monitor health, cognitive state and readiness of Warfighters through digital biosensors.			
FY 2025 Plans: Will mature and demonstrate the capture, warehousing, and manipulation of synthetic training data to support Commanders in making training and operational readiness decisions; mature and demonstrate technologies to monitor health, cognitive state			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603044A / *Soldier Advanced Technology*	**Project (Number/Name)** CN8 / *Soldier Enabled University Advanced Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
and readiness of Warfighters through digital biosensors; mature and demonstrate emerging Soldier related technologies related to increased protection, performance, agility, situational awareness, training, and lethality. The benefit of this effort is improved realistic training for decision making and improved understanding of a Soldier's cognitive load. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects increased activity to identify and mature emerging technologies for advanced Soldier Lethality applications.			
Accomplishments/Planned Programs Subtotals	0.462	0.587	2.874

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603044A / *Soldier Advanced Technology*	Project (Number/Name) CW1 / *Technical-SAVVY Soldier Advanced Research*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CW1: *Technical-SAVVY Soldier Advanced Research*	-	-	0.627	1.047	-	1.047	1.364	1.154	1.671	1.688	0.000	7.551
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project conducts applied technology development to provide critical breakthroughs in developing a "technologically" fluent force. This research will refine, adapt, and validate methods and measures to assess and develop the technological fluency (TF) of Soldiers across a career (TF Personnel Assessments) and technologies to maximize technological fluency resilience and performance in Soldiers and units (Maximizing TF). TF is defined as the ability of Soldier and units to use and rapidly adapt new and intelligent technologies without formal training on these technologies, and it will be a decisive factor in a future operating environment in which Soldiers and squads are teamed with increasingly sophisticated and evolving technologies. Soldiers and leaders in specialty areas (e.g., Cyber, and Emerging Tech) and general purpose forces will require increased technological aptitudes and skills to adapt emerging technologies to evolving mission sets and avoid being overmatched by Artificial Intelligence (AI)-enabled "smart" technologies.

This Project supports key Army needs and will coordinate and/or leverage findings of several PEs to include 0602184A (Soldier Applied Research), and 0603007A (Manpower, Personnel and Training Advanced Technology).

This research will be performed by the U.S. Army Research Institute (ARI) for Behavioral and Social Sciences, and in coordination with collaborative research between ARI and the Army Research Laboratory (ARL) performed within 0602184A (Soldier Applied Research).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas, the Army Modernization Strategy, and the Army People Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Soldier Technical Enhancement Advanced Research	-	0.627	1.047
FY 2024 Plans: Will initiate validation of assessment instruments to assess Technological Fluency (TF) attributes.			
FY 2025 Plans: Will validate assessment instruments to measure TF attributes. Will conduct preliminary analysis of proof-of-concept training methods to enhance TF performance.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603044A / *Soldier Advanced Technology*	**Project (Number/Name)** CW1 / *Technical-SAVVY Soldier Advanced Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding increase reflects planned milestones for validation of assessment instruments to measure Technological Fluency attributes.			
Accomplishments/Planned Programs Subtotals	-	0.627	1.047

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603044A / *Soldier Advanced Technology*	Project (Number/Name) EA7 / *Enhanced Indirect Fire Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
EA7: *Enhanced Indirect Fire Adv Tech*	-	-	-	6.212	-	6.212	9.218	2.104	2.605	4.008	0.000	24.147
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Enhanced Indirect Fire Adv Tech is a new start within the Soldier Advanced Technology program in FY 2025.

A. Mission Description and Budget Item Justification

This project matures and demonstrates enhancements to current mortar systems. This effort will provide solutions that increase the range and lethality of currently fielded systems.

Work in this Project complements work done in Program Element (PE) 0602141A (Lethality Technology) / Project AH9 (Advanced Warheads Technology).

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Futures Command (AFC), U.S. Army Combat Capabilities Development Command (DEVCOM) Armaments Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Enhanced Range & Lethality Mortar System	-	-	6.212
Description: This effort demonstrates technology to support increased mortar system lethality and effective range across 81mm and 120mm calibers for enhanced Brigade Combat Team (BCT) operations. ***FY 2025 Plans:*** Will mature mortar cartridge and tube component technologies to extend the range of current 81mm fielded systems required to defeat current and emerging threats; mature mortar cartridge components including the airframe, propulsion systems, and payloads to increase lethal effects at extended ranges; optimize mortar system prototype to comply with safe firing standards. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** In Fiscal Year (FY) 2025, this effort is a New Start.			
Accomplishments/Planned Programs Subtotals	-	-	6.212

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603044A / *Soldier Advanced Technology*	**Project (Number/Name)** EA7 / *Enhanced Indirect Fire Adv Tech*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603116A / *Lethality Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	11.460	20.582	33.969	-	33.969	46.692	40.828	51.433	40.384	0.000	245.348
CG2: *Lethality Enabling University Adv Development*	-	9.374	8.594	8.073	-	8.073	8.522	8.528	8.621	8.708	0.000	60.420
CH5: *Terminal Effects Against Critical Targets Adv Tech*	-	2.086	4.020	5.178	-	5.178	1.035	1.885	2.556	3.800	0.000	20.560
CID: *Sensor to Shooter (STS) Advanced Technology*	-	-	5.655	9.987	-	9.987	23.622	16.299	15.654	4.241	0.000	75.458
DB2: *Future Armaments Scalable Technologies*	-	-	2.313	6.123	-	6.123	8.061	6.352	13.148	12.067	0.000	48.064
LR1: *Long Range Sensing Adv Tech*	-	-	-	4.608	-	4.608	5.452	7.764	11.454	11.568	0.000	40.846

Note

In Fiscal Year (FY) 2025, Project LR1 (Long Range Sensing Adv Tech) is a new start within Program Element (PE) 0603116A (Lethality Advanced Technology).

A. Mission Description and Budget Item Justification

Work done in this Program Element (PE) matures technologies, methodologies, and models required to enable next generation lethality. The PE focuses on: lethal mechanism technologies for projectiles and warheads that provide revolutionary capability to defeat Tier 1 adversary vehicle and body armors; selection of propulsion and energetic materials and technology to validate novel energetic materials concepts to exploit controllable energy release for future gun/missile systems; scalable effects for mixed target defeat while simultaneously decreasing warhead mass; experimentation of materials solutions for improvement of weight and volume efficiency, lethal effects and sustainability for the warfighter in the Army of today and beyond; and multiple pathways to enhance lethal effects by investigating synergistic effects of novel micro warheads using advanced materials.

This PE continues to mature and demonstrate technology developed under PE 0602141A (Lethality Technology).

Work in this PE complements PE 0603118A (Soldier Lethality Advanced Technology), PE 0603462A (Next Generation Combat Vehicle Advanced Technology), PE 0603464A (Long Range Precision Fires Advanced Technology), 0603465A (Future Vertical Lift Advanced Technology), and 0603466A (Air and Missile Defense Advanced Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603116A / *Lethality Advanced Technology*

Research in this PE is performed by University Technologies Development Division (UTDD), GeoTechnical Instructors Laboratory, Armaments Center, Space and Missile Defense Technical Center and Command, Control, Communication, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center.

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	9.796	20.582	22.485	-	22.485
Current President's Budget	11.460	20.582	33.969	-	33.969
Total Adjustments	1.664	0.000	11.484	-	11.484
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	2.000	-			
• SBIR/STTR Transfer	-0.336	-			
• Adjustments to Budget Years	-	-	11.484	-	11.484

Change Summary Explanation

Funding increase is due to realignment for Sensor to Shooter from 0603041A All Domain Convergence Advanced Technology / CL9 Collab Battlefield Networked Leth Sys Adv Tech, 0603464A Long Range Precision Fires Advanced Technology / AG3 Extended Range Cannon Artillery (ERCA) Adv Tech, and 0603462A Next Generation Combat Vehicle Advanced Technology / BK6 Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603116A / *Lethality Advanced Technology*	Project (Number/Name) CG2 / *Lethality Enabling University Adv Development*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CG2: *Lethality Enabling University Adv Development*	-	9.374	8.594	8.073	-	8.073	8.522	8.528	8.621	8.708	0.000	60.420
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Project leverages advanced developments and technological innovations from academia, of lethal directed energy, laser diagnostics and accelerated design of future hypersonics and their scramjet engine combustion, deep learning and novel materials of importance to the Army, by maturing developments and performs demonstrations focused on getting technology to the warfighter more quickly. This Project exploits advanced research and development efforts to focus more on mid to far-term Army modernization priorities while also maintaining delivery of near-term technologies critical to the Long Range Precision Fires and Air and Missile Defense. This Project focuses on maturation and demonstration of various advanced technologies originating from extramural applied research in academia pertaining to lethal directed energy, laser diagnostics, future hypersonic glide body and scramjet propulsor design, deep learning, novel materials, and expansion of the Ballistic, Aero-Optics and Materials (B.A.M.) range applied to lethality. This effort validates advanced research and performs demonstrations leading to potential emerging technologies in areas of strategic importance to the Army in directed energy, future hypersonic glide body design, deep learning and novel materials, etc., by bringing competitively selected Universities with research and development teams into Technical Alliances.

Work in this Project complements Program Element (PE) 0620141A (Lethality Technology), PE 0602147A (Long Range Precision Fires), PE 0603464A (Long Range Precision Fires Advanced Technology), and PE 0603466A (Air and Missile Defense Advanced Technology)

The work cited is consistent with Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the University Technology Development Division.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Laser Diagnostics for Hypersonics and Directed Energy	2.719	2.469	2.873
Description: This effort matures laser diagnostics to assess turbulence and boundary layer transition, leading to validation of hypersonic flight models and enhanced directed energy system effectiveness and range through improved targeting, prediction and beam control.			
FY 2024 Plans: Will continue to improve and validate models for directed energy system effectiveness. Mature and demonstrate methods of sensing for hypersonic ground test and flight applications and for the measurement of turbulent aero-optical environments.			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603116A / *Lethality Advanced Technology*	**Project (Number/Name)** CG2 / *Lethality Enabling University Adv Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Validate and optimize models from results of experimentation in the Ballistic Aero-Optics and Materials (B.A.M.) and other test facilities. ***FY 2025 Plans:*** Will mature and demonstrate measurement technologies to enable further understanding of hypersonic flow physics and the design and development of more agile, robust and higher efficiency hypersonic platforms. Develops higher fidelity characterization of ground test facilities and the ability of the measurements to capture critical physical phenomena through the application of advanced laser-based technologies for diagnostics in hypersonic flows and related laser-based and spectroscopic diagnostic applications; improves the accuracy of propagation distortion predictions using high performance computer generated fully turbulent simulated environments; validates predictive tools using enclosed ranges with well quantified atmospheric conditions and the development of methods to correct for near field turbulence; incorporates the Ballistic Aero-Optics and Materials (BAM) range to validate data and improve test techniques. The benefits of this effort are long term reductions in test cost, improving the amount and quality of data gathered through ground testing, and increased effectiveness of directed energy systems. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects administrative realignment from the task titled Intelligent Hypersonics and Other Missile Defense Systems within this project.			
Title: Turbulence and Transition Modeling and Validation for Hypersonic Vehicles ***Description:*** This effort matures modeling turbulence and transition for hypersonic vehicles to accelerate design of future hypersonic glide bodies and systems through modeling and sub scale testing. ***FY 2024 Plans:*** Continue to improve and provide computational fluid dynamics high performance computing models for transition, and turbulence models to improve hypersonic investigations and improve the rate of hypersonic vehicle design. Conduct validation experiments across multiple types of hypersonic test tunnels. ***FY 2025 Plans:*** Will mature and demonstrate a toolkit for hypersonic vehicle design; mature and demonstrate the prediction and control of drag and thermal loading of hypersonic platforms; improve tools for next generation flight systems and extending the operating envelope for current systems; continue to mature technologies to improve modeling for hypersonic flight activity; incorporates the Ballistic Aero-Optics and Materials (BAM) range to validate data and improve test techniques. The benefits of this effort are a	3.324	3.039	3.807

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603116A / *Lethality Advanced Technology*	**Project (Number/Name)** CG2 / *Lethality Enabling University Adv Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
reduction in hypersonic glide body development life cycle timelines and reduction in flight testing required to achieve an optimal glide body design. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects administrative realignment from the task titled Intelligent Hypersonics and Other Missile Defense Systems within this project.			
Title: Novel Materials for Extreme Environments ***Description:*** This effort matures and validates computational and multiscale models of high strain rate materials to mitigate the effects of hypervelocity impacts (HVIs) and offer thermal protection. ***FY 2024 Plans:*** Will continue to mature and improve characterization and materials for extremely high temperature applications. Will demonstrate an accelerated discovery approach for selecting high entropy materials for extreme environments. Will mature and demonstrate novel coatings as thermal protection systems. Will validate techniques and performance of composite joining materials and their multi-physics models. ***FY 2025 Plans:*** Will validate performance of specified materials exposed to extreme environments to enable optimization of new protective coatings designed for targeted functions; validate the ability of different materials and materials interfaces to withstand large internal temperature gradients and stress; mature and demonstrate novel techniques to support carbon-carbon composite manufacturing, joining, and repair; matures and demonstrates emerging technologies in thermal protection and hypervelocity impact; incorporates the Ballistic Aero-Optics and Materials (BAM) range to validate data and improve test techniques. The benefits in this effort support improvements in thermal protection systems and manufacturing and repair techniques of specific novel materials. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects administrative realignment from the task titled Intelligent Hypersonics and Other Missile Defense Systems within this project.	1.125	0.932	1.135
Title: Intelligent Hypersonics and Other Missile Defense Systems ***Description:*** This effort matures and validates hypersonic vehicle flight systems with deep learning neural networks that can adapt to changing conditions and become more lethal. Integration of air and missile defense (AMD) command and control (C2) systems and their instrumentation, simulation, and stimulation. ***FY 2024 Plans:***	2.206	2.154	0.258

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603116A / *Lethality Advanced Technology*	**Project (Number/Name)** CG2 / *Lethality Enabling University Adv Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will continue to validate ablation characteristics and the semi-autonomous synthetic flight control system's performance and vehicle self-health monitoring sensors. Will continue to mature, integrate and demonstrate instrumentation, simulation, and stimulation of air and missile defense (AMD) C2 systems. ***FY 2025 Plans:*** Will mature and demonstrate emerging intelligent hypersonics technology, relevant hardware to optimize aerothermodynamic performance; mature, integrate and demonstrate emerging technologies for instrumentation, simulation, and stimulation of air and missile defense command and control systems. The benefits of this effort improve hypersonic flight adaptability and lethality. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects administrative realignment to task (Laser Diagnostics for Hypersonics and Directed Energy), task (Turbulence and Transition Modeling and Validation for Hypersonic Vehicles), and task (Novel Materials for Extreme Environments) within this project.			
Accomplishments/Planned Programs Subtotals	9.374	8.594	8.073

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603116A / *Lethality Advanced Technology*	Project (Number/Name) CH5 / *Terminal Effects Against Critical Targets Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CH5: *Terminal Effects Against Critical Targets Adv Tech*	-	2.086	4.020	5.178	-	5.178	1.035	1.885	2.556	3.800	0.000	20.560
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates engineering tools and high-fidelity modeling and simulation capabilities to predict and optimize weapon performance to ensure lethality against structures and critical assets. This project provides validated engineering tools and technologies to rapidly evaluate and predict weapon performance.

Work in this Project complements Program Element (PE) 0602141A (Lethality Technology) / Project CF8 (Terminal Effects Against Critical Targets Tech).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center Geotechnical and Structures Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Terminal Effects Demonstration	2.086	4.020	5.178
Description: Demonstrates and provides a predictive capability for terminal effects and lethality and a fast running engineering tool to support Long Range Precision Fires (LRPF) weaponeering on critical structural and geological targets of interest. ***FY 2024 Plans:*** Will demonstrate combined blast/frag/structural models in BlastX tool, will validate PENFRAG Code for prediction and analysis of munition fragment and small caliber penetration, will demonstrate PENCURV+ updates for advanced penetration prediction and analysis capabilities. ***FY 2025 Plans:*** Will demonstrate and provide BlastX engineering tool for advanced blast propagation and combined blast/fragmentation models for integration into Army and joint weaponeering systems and will provide semi-automated assessment/capabilities for battle damage assessment for implementation into Army and joint weaponeering systems. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned additional workflows for this effort as technologies are transitioned for maturation and demonstration.			
Accomplishments/Planned Programs Subtotals	2.086	4.020	5.178

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603116A / *Lethality Advanced Technology*	**Project (Number/Name)** CH5 / *Terminal Effects Against Critical Targets Adv Tech*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603116A / *Lethality Advanced Technology*	Project (Number/Name) CID / *Sensor to Shooter (STS) Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CID: *Sensor to Shooter (STS) Advanced Technology*	-	-	5.655	9.987	-	9.987	23.622	16.299	15.654	4.241	0.000	75.458
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates an advanced network lethality architecture to enable Joint All Domain Command and Control decision aid algorithms for coordinated and synchronized response and incorporates a full spectrum of effects and scalability to reduce the sensor to shooter timeline for Large Scale Combat Operations in a multi-domain environment.

Work in this Project complements Program Element (PE) 0602141A (Lethality Technology) / Project CIB (Sensor to Shooter (STS) Applied Research).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project supports Next Generation Combat Vehicle, Tactical Network, Future Vertical Lift, and Long-Range Precision Fires Army Modernization Priorities.

Work in this Project is performed by the Armaments Center and Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Lethal Effects Architecture for Decision Synchronization Advanced Technology	-	5.655	8.102
Description: This effort demonstrates an enhanced decision aid architecture to automate synchronized effects, improve sensor to shooter interaction, and optimize threat engagement in support of Large-Scale Combat Operations in a joint all-domain command and control environment.			
FY 2024 Plans: Will mature networked lethality architecture to enable automated targeting for rapid engagement; mature digital collaborative targeting capabilities, fires planning and de-confliction tools, and coordination and delivery algorithms to reduce sensor to shooter timelines; mature disparate joint effects across domains in support of future large scale combat operations and multi-domain operations; mature sensor to shooter decision aid algorithms to incorporate multi-domain effects into decision aid recommendations; mature decision aid algorithms to allow for scalability and increased number of weapons and targets.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603116A / *Lethality Advanced Technology*	**Project (Number/Name)** CID / *Sensor to Shooter (STS) Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will demonstrate advanced algorithms for decision aids to reduce the effector to shooter timelines; demonstrate permissive airspace algorithms to improve coordination and reduce airspace deconfliction timelines; demonstrate sensor to shooter decision aid algorithms to incorporate non-kinetic effects into optimized recommendations across domains in support of future large scale combat operations; demonstrate scalable decision aid algorithms for processing increasing paired weapon-target solution sets in a dynamic battlespace. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the planned demonstration of networked lethality architecture and digital collaborative targeting interoperability.			
Title: Real Time Multi-Int Support to Terminal Guidance Targeting (RTMTG) ***Description:*** This project extends intelligence targeting capabilities to support updating and/or altering onboard terminal guidance of emerging munitions while in flight for enhanced lethality. This project seeks to augment/adjust munition target seeking (e.g. coordinate seeking technology and Terrain Contour Matching (TERCOM)) and target identification capabilities post-launch to ensure that steel meets target. ***FY 2025 Plans:*** Will extend the Army's Advanced Field Artillery Tactical Data System (AFATDS) target selection standards to address the data requirements of advanced target-seeking munitions to support planning, coordinating, controlling, and executing fires and effects; connect these munitions with continuous intelligence over watch to update onboard terminal guidance while in-flight; align current efforts with system developers for AFATDS updates, Joint Targeting Integrated Command and Coordination Suite (JTIC2S) software development and the Tactical Intelligence Targeting Access Node (TITAN) development to ensure data types and formats can be seamlessly exchanged machine-to-machine across security domains. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase to initiate effort for Real time Multi-Int Support to Terminal Guidance Targeting.	-	-	1.885
Accomplishments/Planned Programs Subtotals	-	5.655	9.987

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603116A / *Lethality Advanced Technology*	Project (Number/Name) DB2 / *Future Armaments Scalable Technologies*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DB2: *Future Armaments Scalable Technologies*	-	-	2.313	6.123	-	6.123	8.061	6.352	13.148	12.067	0.000	48.064
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Future Armaments Scalable Technologies addresses the need to enhance the capability of existing and future critical enabling technologies. This effort will mature critical armament component technologies in the areas of energetics & warheads, fuzing & sensing, guidance navigation and control (GNC), materials & structures in order to support critical technology insertions into program requirements.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Futures Command (AFC), U.S. Army Combat Capabilities Development Command (DEVCOM) Armaments Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Future Armaments Scalable Technology	-	2.313	6.123
Description: This effort will mature and demonstrate armament sub-components to improve end item performance of critical enabling technologies. ***FY 2024 Plans:*** Will mature novel energetic and electronic critical sub-component armament technologies for future integration into munitions and armament systems technology insertion. Will mature gun launched fuzing and sensing components, energetics, and advanced materials for future munition and weapon system capabilities that can survive extreme environments. ***FY 2025 Plans:*** Will mature armament specific components for electronic safe and arm, thermal batteries for fuzing, and novel countermeasure solutions; improve performance of fuzing and sensing components, and energetic materials through gun firing; optimize advanced materials and technologies for future munition and weapon system capabilities for survival in extreme environments. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects increase in hardware scale-up iterations in FY25 to support the maturation and optimization of multiple technologies.			
Accomplishments/Planned Programs Subtotals	-	2.313	6.123

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603116A / *Lethality Advanced Technology*	**Project (Number/Name)** DB2 / *Future Armaments Scalable Technologies*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603116A / *Lethality Advanced Technology*	Project (Number/Name) LR1 / *Long Range Sensing Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
LR1: *Long Range Sensing Adv Tech*	-	-	-	4.608	-	4.608	5.452	7.764	11.454	11.568	0.000	40.846
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Long Range Sensing Adv Tech is a new start within the Lethality Advanced Technology program in FY 2025.

A. Mission Description and Budget Item Justification

This project develops the modeling and simulation tools, physics-based models, virtual and scaled radio frequency (RF) hardware and software prototypes to validate and mature adaptive multi-function resource management, tracking and discrimination algorithms, and radar sensor technologies in support of Long Range Precision Fires.

Work in this Project complements Program Element (PE) 0602141A (Lethality Technology) / Project CG4 (Advanced Radar Concepts and Technologies).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Research in this Project is performed by the Command, Control, Communication, Computers, Cyber, Intelligence, Surveillance and Reconnaissance Center (C5ISR).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Adaptive Radar Multifunction Manager (ARMM) Adv Tech	-	-	4.608
Description: Provides radar algorithms and software to enable communications between existing radar systems. Matures and demonstrates advanced techniques to enable adaptive multi- function resource management and expand the utility of current and future sensor technologies in support of Long-Range Precision Fires. ***FY 2025 Plans:*** Will mature and validate a system and physics model to conduct rapid performance investigations within a system in the loop environment emulator; exploit state-of-the-art software algorithm and determine impacts to counter fire radars; provide and mature resource management algorithms based on defined radar hardware utilization; further mature tracking and discrimination algorithms based on the system and physics model baseline. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Increase to initiate the Adaptive Radar Multifunction Manager Advanced Technology efforts.			
Accomplishments/Planned Programs Subtotals	-	-	4.608

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603116A / *Lethality Advanced Technology*	**Project (Number/Name)** LR1 / *Long Range Sensing Adv Tech*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603117A *I Army Advanced Technology Development*

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	0.000	138.774	136.280	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	275.054
BS2: *Army Advanced Technology Development*	-	138.774	136.280	-	-	-	-	-	-	-	0.000	275.054

A. Mission Description and Budget Item Justification

The Army Advanced Technology Development budget line includes development of subsystems and components and efforts to integrate subsystems and components into system prototypes for field experiments and/or tests in a simulated environment.

Efforts develop proof of technological feasibility and assessment of subsystem and component operability that may lead to full system development and prototyping.

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	134.874	136.280	164.254	-	164.254
Current President's Budget	138.774	136.280	0.000	-	0.000
Total Adjustments	3.900	0.000	-164.254	-	-164.254
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	3.900	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-164.254	-	-164.254

Change Summary Explanation

Funding decrease due to budget line item restructure.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	150.020	102.778	94.899	-	94.899	118.236	135.096	137.886	139.275	0.000	878.190
AY5: *Soldier Squad Small Arms Armaments Advanced Tech*	-	6.417	6.651	8.530	-	8.530	10.891	10.900	10.977	11.087	0.000	65.453
AY7: *Small Arms Fire Control Advanced Technology*	-	2.954	2.575	-	-	-	-	-	-	-	0.000	5.529
AY9: *Body Armor & Integrated Headborne Advanced Tech*	-	7.915	8.247	5.897	-	5.897	4.902	4.261	4.373	4.417	0.000	40.012
AZ6: *Soldier Signature Management Advanced Technology*	-	3.005	3.130	-	-	-	-	-	-	-	0.000	6.135
BB3: *Dismounted Soldier Survivability Equip/Tech Integ*	-	3.338	3.538	11.551	-	11.551	11.482	10.627	10.703	10.810	0.000	62.049
BB8: *Soldier Centric Advanced Technology*	-	2.317	1.888	-	-	-	-	-	-	-	0.000	4.205
BC1: *Human Performance AdvTech for Mobility & Lethality*	-	9.171	7.017	7.230	-	7.230	17.380	24.407	26.113	26.374	0.000	117.692
BC8: *Training Advanced Technology (Other than STE)*	-	6.826	7.684	8.073	-	8.073	23.316	32.521	32.866	33.194	0.000	144.480
BC9: *Adv Soldier Sensors/ Displays AdvTech for Dismounts*	-	25.302	27.160	24.041	-	24.041	26.106	29.209	29.527	29.823	0.000	191.168
BD7: *Soldier Sys Interfaces/ Integration-Sensor AdvTech*	-	8.254	7.931	7.628	-	7.628	7.432	8.595	8.597	8.692	0.000	57.129
BD9: *Soldier & Sm Unit Tactical Energy AdvTech*	-	4.143	9.310	7.577	-	7.577	6.573	5.064	5.114	5.165	0.000	42.946
BE2: *Joint Service Combat Feeding Advanced Technology*	-	1.969	2.673	2.678	-	2.678	2.786	2.140	2.163	2.185	0.000	16.594
BE5: *Personnel & Airdrop Safety Advanced Technology*	-	6.307	6.632	6.718	-	6.718	7.368	7.372	7.453	7.528	0.000	49.378
BE9: *STE Advanced Technology*	-	10.352	8.342	4.976	-	4.976	-	-	-	-	0.000	23.670

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*							
BS8: *Soldier Lethality Advanced Technology*	-	51.750	-	-	-	-	-	-	-	-	0.000	51.750

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and demonstrates Soldier Lethality technologies that improve Soldier operational performance by increasing lethality, mobility, protection, and optimizing situational awareness across the spectrum of operating environments and missions. This PE matures Soldier weapons and enabling components / subsystems, demonstrates lethal weapons systems with potential to provide greater lethality, target acquisition, fire control, and range at a significantly reduced weight for optimized Soldier and Small Unit system performance. The major focus areas for Soldier Lethality Science and Technology are Soldier weapons and ammunition technologies, protection technologies, cognitive and physical performance measures, training in synthetic training environments, and mission support capabilities such as situational awareness sensors and displays, dismounted power and energy technologies, and Soldier and Small Unit sustainment capabilities. This technology diverse PE also matures and demonstrates sensor technologies that increase Warfighter situational understanding, survivability, and lethality by providing sensor capabilities to acquire and engage all targets and threats at longer ranges in complex environments and operational conditions (e.g. day/night, obscured, smoke, adverse weather, and other degraded visual environments), and for advancing live training technologies that accurately replicate and realistically represent the effects of current and future weapons systems during force-on-force and force-on-target training. This PE matures and demonstrates effective technology in personal combat clothing, protective equipment such as personal armor, helmets, and eyewear, combat rations, shelters, logistical support items for aerial delivery of personnel and cargo, and energy systems to power current and emerging Soldier-born Intelligence, Surveillance, and Reconnaissance (ISR), sensor, optical, and communication systems with the least weight and sustainment burden on the Soldiers and Small Combat Units. This PE also matures and demonstrates technologies supporting the Army's Synthetic Training Environment (STE), a single, interconnected synthetic training system that will enable Army units and leaders to conduct realistic multi-echelon / multi-domain combined arms maneuver and mission command training, increasing proficiency through repetition. A specific research thrust area is applying systems-based practices to mature and demonstrate scientific and tailored knowledge of Soldiers' physical and cognitive architecture to facilitate rapid and efficient designs, assessments and trade-off analyses of technology insertions on the Soldier. Significant science and technology (S&T) investments are directed to improve the effectiveness of the technologies a Soldier utilizes while reducing the size and weight of the form factor of the equipment.

Research in this PE complements PE 0602143A (Soldier Lethality Technology).

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	154.639	102.778	102.970	-	102.970
Current President's Budget	150.020	102.778	94.899	-	94.899
Total Adjustments	-4.619	0.000	-8.071	-	-8.071
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.998	-			
• SBIR/STTR Transfer	-2.621	-			
• Adjustments to Budget Years	-	-	-8.071	-	-8.071

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Project: BS8: *Soldier Lethality Advanced Technology*		
Congressional Add: *Program Increase - Small Arms Fire Control Advanced Technology*	4.500	-
Congressional Add: *Program Increase - ADVANCED TECHNOLOGY DEVELOPMENT FOR MDO TO SUPPORT SOLDIER LETHALITY*	15.000	-
Congressional Add: *Program Increase - HMD RISK REDUCTION FOR IVAS FUTURES*	5.000	-
Congressional Add: *Program Increase - HYPER ENABLED SOLDIER LETHALITY*	10.000	-
Congressional Add: *Program Increase - SHOCK ATTENUATION AND BLUNT FORCE TRAUMA IMPROVEMENTS IN HEADBORNE*	5.000	-
Congressional Add: *Program Increase - SPECTROSCOPY DEVICES FOR CHEM BIO DETECTION AND DEACTIVATION WITH UV-C*	11.250	-
Congressional Add: *Program Increase - Improvements to Arctic Heaters for Tents and Shelters*	1.000	-
Congressional Add Subtotals for Project: BS8	51.750	-
Congressional Add Totals for all Projects	51.750	-

Change Summary Explanation

Funding realigned to PE 0603464A / Long Range Precision Fires Advanced Technology, AF2 / Long Range Maneuverable Fires (LRMF) Advanced Tech in support of Precision Strike Missile (PRSM) Increment 4.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) AY5 / *Soldier Squad Small Arms Armaments Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AY5: *Soldier Squad Small Arms Armaments Advanced Tech*	-	6.417	6.651	8.530	-	8.530	10.891	10.900	10.977	11.087	0.000	65.453
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project demonstrates individual and crew-served weapon designs and technologies that enhance the fighting capabilities and survivability of the dismounted Warfighter in support of the Army's Soldier Lethality Modernization priority and all of the Services. All work is led by the Joint Service Small Arms Program (JSSAP) and is based upon the Joint Service Small Arms Master Plan (JSSAMP) and the Joint Capabilities Integration Development System's Small Arms Analyses.

Work in this Project complements Program Element (PE) 0602143A (Soldier Lethality Technology) / AY6 (Soldier Squad Small Arms Armaments Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Armaments Center (AC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Small Arms Technology Demonstration	6.417	6.651	6.666
Description: This effort matures and demonstrates advanced small arms ammunition, enablers, and weapon system technologies for integration into live fire demonstrations. It refines and optimizes weapon system integration and supports the Joint Warfighters' small arms capability needs. The effort validates small arms weapon system technology readiness levels and confidence of design functionality in advanced and emerging operating scenarios.			
FY 2024 Plans: Will?demonstrate future small arms concepts to enable a more efficient, effective, and lethal Joint?Warfighter. Will mature weapon and munition prototypes to improve small arms system performance against future targets in relevant environments. Will validate signature reduction devices and automated target recognition technologies for fielded and next generation weapons. Will mature hardware, software, and algorithms to improve small arms fire control targeting and precision.			
FY 2025 Plans: Will optimize weapon and munition prototypes to improve small arms system performance against future targets in relevant environments; optimize signature reduction devices and automated target recognition and engagement technologies based on validation results; demonstrate hardware, software, and algorithms to improve small arms fire control targeting performance.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** AY5 / *Soldier Squad Small Arms Armaments Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding increase is an economic adjustment.			
Title: Medium Machinegun for Maneuvers (Mounted and Dismounted) Technology (M4DT) ***Description:*** This effort demonstrates feasibility of advanced small arms weapon, ammunition, enablers, and subsystem concepts by means of live-fire demonstrations and Soldier assessment. Mature small caliber gun system technologies to achieve infantry mobility needs and increase lethality. ***FY 2025 Plans:*** Will mature small arms concepts and models for target defeat, target suppression, and future operational needs; analyze high-risk components of machine gun, ammunition, and fire control subsystems for maturation and future demonstration; demonstrate system weight optimization through material selection and advanced system designs. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Increase reflects the initiation of efforts to support Medium Machine Gun research.	-	-	1.864
Accomplishments/Planned Programs Subtotals	6.417	6.651	8.530

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) AY7 / *Small Arms Fire Control Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AY7: *Small Arms Fire Control Advanced Technology*	-	2.954	2.575	-	-	-	-	-	-	-	0.000	5.529
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In Fiscal Year (FY) 2025, this Project is completed.

A. Mission Description and Budget Item Justification

This Project matures and demonstrates fire control and targeting sensor technologies and techniques to improve targeting and lethality in order to maintain overmatch at longer ranges in all operational environments and to meet the capability needs of Army Science and Technology Soldier Lethality, Next Generation Combat Vehicle, and Long-Range Precision Fires modernization priorities.

Work in this Project complements Program Element (PE) 0602143A (Soldier Lethality Technology) / AY8 (Small Arms Fire Control Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Armaments Center (AC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Fire Control Tech	2.954	2.575	-
Description: This effort will mature and demonstrate fire control and targeting sensor technologies and techniques to improve targeting and lethality, and maintain overmatch at longer ranges in all environments. ***FY 2024 Plans:*** Will mature common fire control system interfaces and architecture. Will mature advanced target recognition and tracking for static and dynamic partially obscured objects. Will improve small arms precision while reducing target engagement time. Will validate the integration of shooter aim augmentation devices. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned life cycle conclusion of this effort.			
Accomplishments/Planned Programs Subtotals	2.954	2.575	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** AY7 / *Small Arms Fire Control Advanced Technology*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) AY9 / *Body Armor & Integrated Headborne Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AY9: *Body Armor & Integrated Headborne Advanced Tech*	-	7.915	8.247	5.897	-	5.897	4.902	4.261	4.373	4.417	0.000	40.012
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates body armor weight reductions and improves the performance of personal protection and survivability equipment. It also demonstrates combat helmet ballistic, blast, and small arms protection performance enhancements and the integration and optimization of power, energy, and digital sensor and display headborne technologies.

This Project supports Force Protection capability demonstrations for Soldiers and Small Units and demonstrated technologies from this effort transition to various Program Executive Office (PEO) Soldier programs.

This Project complements work done in Program Element (PE) 0602143A (Soldier Lethality Technology) / AZ2 (Body Armor & Integrated Headborne Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Soldier Center (SC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Body Armor and Integrated Headborne Advanced Technology	7.915	8.247	5.897
Description: This effort focuses on maturing, integrating and demonstrating personal protective capabilities against ballistic, blast, and directed energy threats as well as the development and demonstration of Soldier worn platform architectures to optimize the integration of personal protective equipment and Soldier lethality enabling technologies. Demonstrates advanced test methods to validate personal protective equipment performance enhancements against current and emerging small arms, fragmentation, and blast threats from anti-personnel munitions. The objective of these technology development efforts is to significantly increase Soldier lethality by enhancing the protective capabilities and reducing sub-system and system-level weight of individual protective equipment to reduce the Soldier burden and increase survivability.			
FY 2024 Plans: Will optimize a standalone multi-threat plate designed to provide protection against multiple small arms threats without increasing the weight of armor material; mature modular and lightweight fragmentation protection garments for vulnerable or under protected regions of the body; ; demonstrate significant weight and bulk reductions of personnel body armor within the			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** AY9 / *Body Armor & Integrated Headborne Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Soldier ensemble in support of the Combat Protective Ensemble (CAPE) program (PE 0603118A / Soldier Lethality Advanced Technology);demonstrate power and data interface architectures for combat helmets; to develop common interface designs;; Exploit novel and emerging helmet shell pre-forming and molding techniques to improve helmet performance; Improve mechanical and electrical integration of cable-free communication headset subsystems with wireless down links;; provide integrated eye protection with enhanced fragmentation performance and active anti-fog capability. ***FY 2025 Plans:*** Will validate power and data interface architecture for combat helmets and integrated headborne accessories utilizing universal interface designs to enable active technology insertion; exploit novel helmet shell forming techniques and emerging ballistic materials to increase helmet ballistic and blunt impact performance; mature cable-free communication headset subsystems with wireless down links; optimize integrated eye protection with enhanced fragmentation performance and active anti-fog capability; demonstrate eye protection with integrated heads up display to enhance daytime situational awareness. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects administrative realignment to PE 0603118A (Soldier Lethality Advanced Technology)/Project BB3 (Dismounted Soldier Survivability Equip/Tech Integ) in support of the Combat Protective Ensemble Program.			
Accomplishments/Planned Programs Subtotals	7.915	8.247	5.897

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040 / 3					R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*				Project (Number/Name) AZ6 / *Soldier Signature Management Advanced Technology*			
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
AZ6: *Soldier Signature Management Advanced Technology*	-	3.005	3.130	-	-	-	-	-	-	-	0.000	6.135
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project optimizes, matures and demonstrates advances in novel materials, technologies, techniques, and applications increasing the capabilities of camouflage, concealment, and deception against known and emerging sensor threats. These technologies will produce proof of concept systems that decrease the probability of detection and targeting by peer and near-peer adversaries, enabling freedom of movement of semi-independent and dispersed formations, and increase protection of high-valued assets. This Project will demonstrate disruptive Camouflage, Concealment and Deception technologies, supporting expeditionary maneuver in the Multi-Domain Battle Environment to open and retain windows of advantage.

Research in this Project supports key Army needs and leverages/complements the technical research of several Program Elements (PEs) and Projects to include PE 0602143A (Soldier Lethality Technology) / BB4 (Dismounted Soldier Survivability Materials), Project AZ5 (Soldier Protection Technology - Vulnerability), Project AZ9 (Soldier Protection Advanced Tech - Detectability); PE 0601102A (Defense Research Sciences; and PE 0602145A (Next Generation Combat Vehicle Technology) / Project BI2 (Sensor Protection Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Soldier Center (SC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Soldier Camouflage, Concealment and Decoys Demonstration	3.005	3.130	-
Description: This effort demonstrates innovative camouflage, concealment, and deception technologies for the dismounted Soldier to defeat advanced current and emerging adversary Intelligence, Surveillance and Reconnaissance (ISR) threats and to reduce the probability of detection and identification across the electromagnetic spectrum. Matures physics-based models for material and system performance that support probability of detection metrics in the multi-domain operational environment, assisting to close the capability gap between current camouflage, concealment, and deception technologies and defeating enemy sensorial capabilities in future operating environments.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** AZ6 / *Soldier Signature Management Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will demonstrate overgarments specifically designed to camouflage a Soldier's signature from battlefield sensors operating in the infrared (thermal) wavelengths in multiple environments to enable Soldiers with greater freedom of movement in close combat; demonstrate optimized topical spray paints for Soldier clothing and individual equipment for improved concealment against SWIR sensor threats; optimize and perform Soldier user assessments of passive ground surveillance radar threat detection devices to provide advanced notice of threat for greater situational awareness and tactical advantage; collect imagery data of Soldiers and squad formations against ground and aerial sensor threats in jungle environments to validate ground-force vulnerabilities in multiple bands of the electromagnetic spectrum against sensor threats to assess high impact camouflage and concealment opportunities; baseline Soldier signature across the threat spectrum obtained in arctic, urban and jungle environments to define Soldier signature capability gaps against ground and air sensor threats. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects administrative realignment to Program Element 0603118A (Soldier Lethality Advanced Technology) / Project BB3 (Dismounted Soldier Survivability Equip/Tech Integ).			
Accomplishments/Planned Programs Subtotals	3.005	3.130	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BB3 / *Dismounted Soldier Survivability Equip/Tech Integ*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BB3: *Dismounted Soldier Survivability Equip/Tech Integ*	-	3.338	3.538	11.551	-	11.551	11.482	10.627	10.703	10.810	0.000	62.049
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates Soldier survivability materials and technologies to increase the speed and efficiency of dismounted Soldier movement and maneuver. This Project matures and demonstrates body armor weight reductions and improves the performance of personal protection and survivability equipment. This project optimizes, matures and demonstrates advances in novel materials, technologies, techniques, and applications increasing the capabilities of camouflage, concealment, and deception against known and emerging sensor threats. This Project focuses on reducing Soldier-worn equipment weight, improving Soldier and system integration and reducing the dismounted Soldier's detectability, susceptibility, and vulnerability to operational threats. Operational threats are characterized as combat threats (e.g., flame and thermal, blast and ballistic, multispectral sensors, and laser threats), environmental threats (e.g., cold, heat, wet, vector, water contamination, concealment, etc.), and Soldier system components and system limitations (e.g., size, weight, and bulk). This Project includes the demonstration and validation of integrated technologies, novel subsystems/ systems, and test methods.

This Project complements work done in Program Element (PE) 0602143A (Soldier Lethality Technology) / Project BB4 (Dismounted Soldier Survivability Materials).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Soldier Center (SC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Dismounted Soldier Survivability Equipment and Technology Integration	3.338	3.538	11.551
Description: This effort matures and integrates multifunctional protective materials, sub-components, and systems for field demonstrations to significantly increase the survivability of Soldiers through their multi-functional clothing and individual protective equipment. This effort also demonstrates and validates tradeoff analyses in sub-component and system-level designs of ballistic, blast, signature management and integrated protection clothing and equipment technologies.			
FY 2024 Plans: Will demonstrate optimized, well-integrated uniform and load management system enhancements that provide greater survivability against battlefield threats in (1) temperate to extreme cold environments and (2) temperate to extreme heat and high humidity environments; perform Soldier user assessments of optimized adjustable load frame to better accommodate the range of Soldier statures; mature and demonstrate Soldier and Squad level desalination devices that provide potable water from indigenous			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BB3 / *Dismounted Soldier Survivability Equip/Tech Integ*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
sources, improving maneuverability and reducing logistical burden; validate optimized camouflage and concealment materials from PE 0602143A (Soldier Lethality Technology) and modular ballistic and blast protection from PE 0602143A (Soldier Lethality Technology) against anti-personnel munitions and small arms threats for integration with uniform and load management system architectures matured under the Combat Protective Ensemble (CAPE) program. ***FY 2025 Plans:*** Will demonstrate fully-integrated power/data management in load management system enhancement to provide streamlined form factor and connectivity of electronic devices across the Soldier ensemble platform, reducing snag hazards and increasing Soldier maneuverability and lethality; demonstrate solutions for extreme cold weather protection that complement both existing and future cold weather ensembles to mitigate debilitating injuries and preserve unit strength in extreme cold conditions; perform Soldier user assessments on optimized ensemble system prototypes for Multi-Domain Operations (MDO) Ready Soldier of 2035 cross-domain maneuver temperate-to-hot and temperate-to-cold operating environments to improve performance and demonstrate enhanced technology integration; establish protocol to validate desalination devices for efficacy and durability; validate optimized Soldier and Squad level desalination devices in a relevant environment to demonstrate the ability to obtain drinking water from indigenous sources, reducing logistics; mature and demonstrate standalone multi-threat plate designed to provide protection against emerging small arms threats; optimize a standalone small arms protective insert at varying weights to introduce a family of plate technology; demonstrate an integrated rear plate with load carriage technology for improved systems integration; mature and demonstrate a scalable plate against operational relevant threat; optimize overgarment prototypes designed to camouflage a Soldier's signature from battlefield sensors operating in the infrared (thermal) region of the electromagnetic (EM) spectrum and maintaining protection in other EM spectrum regions; demonstrate integration of overgarment into existing cold weather ensemble system and the MDO 2035 cross-domain maneuver temperate-to-cold ensemble matured under the Combat Protective Ensemble program; validate improved concealment against EM sensor threats versus baseline Soldier signature of optimized MDO 2035 cross-domain maneuver temperate-to-hot and temperate-to-cold ensembles to demonstrate improvement and identify further optimization opportunities. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects administrative realignment from PE 0603118A (Soldier Lethality Advanced Technology) / Project AY9 (Body Armor and Integrated Headborne Advanced Tech) and PE 603118A (Soldier Lethality Advanced Technology) / Project AZ6 (Soldier Signature Management Advanced Technology) in support of the Combat Protective Ensemble Program.			
Accomplishments/Planned Programs Subtotals	3.338	3.538	11.551

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BB3 / *Dismounted Soldier Survivability Equip/Tech Integ*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BB8 / *Soldier Centric Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BB8: *Soldier Centric Advanced Technology*	-	2.317	1.888	-	-	-	-	-	-	-	0.000	4.205
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Project BB8 / Soldier Centric Advanced Technology has no FY 2025 budget request due to the planned life cycle conclusion of this Science and Technology effort.

A. Mission Description and Budget Item Justification

This Project matures and demonstrates an optimized training systems to enable effective training and provide increased levels of Soldier proficiency and readiness. This Project matures and demonstrates Soldier centric technologies for the Soldier/Squad virtual environment to support the Army's Synthetic Training Environment (STE). The STE is the next generation holistic collective training capability that will train units where they will fight, with whom they will fight with, and in complex operational environments to include dense urban and sub-terrain; within the entire range of combined arms maneuver tasks in support of Multi-Domain Operations. The Soldier/ Squad virtual environment combines and integrates several individual Soldier and Squad training capabilities, STE Squad Capability (SSC), Weapon Skill Development (WSD), Joint Fires Training (JFT), and Use of Force (UoF), into a single capability that can be conducted simultaneously or individually and enable physical movement/ exertion related to the execution of Soldier/Marine individual and Squad collective training tasks. The STE will provide the realistic repetitions necessary to fight 25 bloodless battles before the first battle.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Soldier Center (SC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: STE Soldier/Squad Virtual Trainer	2.317	1.888	-
Description: This effort matures and demonstrates a common battle drill squad-level mixed reality based system that allows for the rapid conduct and repetition of squad-level training. The training system will make it possible to conduct diverse, repeatable and effective training without extensive training infrastructure. This effort matures and demonstrates novel and realistic training environments that provide increased levels of proficiency and readiness through immersive training scenarios conducted at the point of need.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BB8 / *Soldier Centric Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will complete maturation of agnostic camera and tracking technologies required for dynamic occlusion to perform in daylight training environments; and optimize individual Soldier position- and orientation-tracking technologies. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned life cycle conclusion of this Science and Technology effort.			
Accomplishments/Planned Programs Subtotals	2.317	1.888	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040 / 3				R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*					Project (Number/Name) BC1 / *Human Performance AdvTech for Mobility & Lethality*			
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
BC1: *Human Performance AdvTech for Mobility & Lethality*	-	9.171	7.017	7.230	-	7.230	17.380	24.407	26.113	26.374	0.000	117.692
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures technologies, methodologies, and human performance models to demonstrate increased mobility and lethality of the individual and small unit to achieve overmatch and offset vulnerabilities of maneuvering infantry. It validates and integrates human performance assessment methods and algorithms into training/ education, test and evaluation methodologies, and materiel solutions to optimize the Soldier as a weapons system and the small unit as an integration combat platform. These methods and algorithms have potential to enable the development of doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF) improvements and efficiencies. This Project also uses Soldier assessments to iteratively improve the performance and integration of technologies to augment Soldier function (e.g. shoot, move, perceive, decide, and communicate) during distributed operations utilizing cross-domain capabilities.

This Project also complements and is fully coordinated with work performed across Army, Navy, and Air Force under the Human Systems Community of Interest: Systems Interfaces & Cognitive Processes and Protection, Sustainment, and Warfighter Performance.

This Project supports key Army needs and complements the technical research of Program Element (PE) 0602143A (Soldier Lethality Technology)/Project BC2 (Next Gen Mobility & Lethality Tech for Warfighters). This research is in partnership with Forces Command (FORSCOM) operational units and the appropriate Training and Doctrine Command (TRADOC) organizations as well as established transition partners, including Program Executive Office-Soldier (PEO-S).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas, the Close Combat Lethality Task Force, and the Army Modernization Strategy.

Work in this Project is performed by the Soldier Center (SC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Operational Unit Partnership and Soldier Touch Point	9.171	7.017	2.800
Description: This effort optimizes innovation through Science and Technology touch points with the Operational force, resulting in rapid iteration, concept maturation, integration, validation of laboratory findings, and transition of technologies and methodologies in response to operational unit demand signal. This effort streamlines demonstration, data collection, and technology maturation for near term DOTMLPF solutions, enabling faster delivery of materiel and non-materiel products/knowledge refined with direct Soldier input. This body of work allows validated, empirical, assessment of any equipment capability or training intervention as part of the Soldier architecture to inform future acquisition investments, training, and operational trade space decisions.			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BC1 / *Human Performance AdvTech for Mobility & Lethality*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
FY 2024 Plans: Will integrate field study data and algorithms into performance prediction models; conduct iterative Soldier Touch Points (STPs) demonstrations with FORSCOM partners to refine prediction models (e.g., prediction outcomes and information portrayal); demonstrate the capabilities and outputs from the Measuring and Advancing Soldier Tactical Readiness and Effectiveness MASTR-E) Program in a culminating event. ***FY 2025 Plans:*** Will mature performance prediction models by integrating expanded model inputs (e.g., physical performance and cognitive and physical interactions) into simulated and field assessments for refinement and validation; conduct user touch points on updated prediction model to inform usability and integration requirements; and mature framework for incorporating real-time Soldier data (e.g., data from wearables) into performance models. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects administrative realignment to task Soldier/Squad Performance Metrics for Lethality within this project.			
Title: Soldier/Squad Performance Metrics for Lethality ***Description:*** This effort validates and matures technologies, methodologies, and human performance models to demonstrate increased Soldier and small unit mobility & lethality to achieve overmatch in maneuverability and tempo to degrade enemy targeting on the transparent battlefield. The effort validates and integrates human performance sensors, models, and design guidance into training/education, test and evaluation, and materiel. The results of this work will allow the Army to develop equipment, systems and training devices that maximize the close combat Soldier and small unit performancein multi-domain operations. ***FY 2025 Plans:*** Will investigate and demonstrate the ability (through methods and metrics) to quantify the effects of a subset of equipment configurations (e.g., body armor levels) on individual and small unit mobility, lethality, and survivability to inform acquisition decisions (resulting data will inform efforts to model the effects of Soldier equipment on performance);demonstrate the integration of wearable physical augmentation technology to determine effects on human-system performance; and mature strategies for optimizing cognitive performance under stress. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects administrative realignment from task Operational Unit Partnership and Soldier Touch Point within this project.	-	-	4.430
Accomplishments/Planned Programs Subtotals	9.171	7.017	7.230

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BC1 / *Human Performance AdvTech for Mobility & Lethality*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BC8 / *Training Advanced Technology (Other than STE)*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BC8: *Training Advanced Technology (Other than STE)*	-	6.826	7.684	8.073	-	8.073	23.316	32.521	32.866	33.194	0.000	144.480
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates advanced training technologies in support of the Army's need for simulations that accurately replicate and realistically represent the effects of current and future weapons systems during live and synthetic training. Integration of the live and synthetic environments into a single synthetic training environment will modernize the current Live Training Environment and allow fair fight engagements across all training environments and training devices.

This Project complements work done in Program Element (PE)0602143A (Soldier Lethality Technology) / Project BC7 (Training Technology (Other than STE).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Soldier Center (SC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Processing Technologies for Live Training	3.828	4.449	2.450
Description: This effort will improve technologies that reduce the computational burden, latency, and power consumption (battery weight) associated with training dismounted Soldiers in live training environments that leverage simulated tactical engagements. Such live training use-cases require virtual ballistic flyout calculations, casualty assessment, and visualization of terminal effects (e.g., munition impacts).			
FY 2024 Plans: Will mature and demonstrate hardware and algorithm benchmarks to validate ballistic flyout calculations and casualty assessments; demonstrate sensor fusion techniques to improve overall computational performance for ballistic flyout and casualty assessment in a distributed environment.			
FY 2025 Plans: Will verify and validate integrated sensor architecture and ballistic flyout model performance in one to two high fidelity live range exercises; verify and validate casualty assessment accuracy and latency performance against live weapon performance.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BC8 / *Training Advanced Technology (Other than STE)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding decrease reflects planned additional software development activities and fewer test events.			
Title: Synthetic Cyberspace Effects for Training ***Description:*** This effort matures, demonstrates, and validates a data exchange model for cyberspace effects and a brokering architecture to propagate those cyberspace effects across Live, Virtual and Constructive models and simulations within distributed training environments for collective training. ***FY 2024 Plans:*** Will continue to mature cyberspace data model and effects brokering architecture to incorporate cyber, electronic warfare, and Global Positioning System (GPS) effects for Brigade-level collective training; validate multi-domain use-cases and identify large-scale exercises to leverage for data collection and demonstration. Begin integration of external models to validate overall architecture decisions. ***FY 2025 Plans:*** Will verify and validate cyberspace data models and integrate into brokering effects architecture; validate performance in Cyber, Electronic Warfare (EW) and Global Positioning System (GPS) denied environments specific to Multi-Domain Operations (MDO) use cases; and analyze performance data and begin integration of mature enhancements of brokering architecture. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned addition of supporting military hardware for participation in an increased number of Cyber Range events to verify and validate technical solutions.	2.998	3.235	3.506
Title: Advanced Simulation Management Technologies ***Description:*** Develop dynamic automation capability of advanced simulation architecture to enable automatic configuration of small, medium and large scale Live/Virtual/Constructive exercises. ***FY 2025 Plans:*** Will develop hardware acceleration architecture; start implementation/integration of dynamic behavior algorithms for large scale training exercise use cases, integrate configuration and authoring components in relevant planning pre-exercise use cases; and start mature component architecture integration into a single solution for implementation in execution phase of large scale collective simulated exercises. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects administrative realignment from Program Element (PE) 0603118A Soldier Lethality Advanced Technology/Project BE9 (STE Advanced Technology).	-	-	2.117
Accomplishments/Planned Programs Subtotals	6.826	7.684	8.073

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BC8 / *Training Advanced Technology (Other than STE)*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BC9 / *Adv Soldier Sensors/Displays AdvTech for Dismounts*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BC9: *Adv Soldier Sensors/ Displays AdvTech for Dismounts*	-	25.302	27.160	24.041	-	24.041	26.106	29.209	29.527	29.823	0.000	191.168
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures, optimizes, and demonstrates fully digital sensor systems, architectures, and interfacing capabilities to fuse sensors, and network situational understanding information and targeting capabilities to enable maintained mounted and dismounted visual advantage, increased situational awareness, decreased fratricide, and decreased response times to all threats in all environments.

Research in this Project supports the Army Science and Technology Soldier Lethality, Next Generation Combat Vehicle, and Future Vertical Lift Army Modernization priorities.

This Project complements work done in Program Element (PE) 0602143A (Soldier Lethality Technology) / BD1 (Advanced Soldier Sensors/Displays Tech for Dismounts).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Communication, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Soldier Sensors/Displays Advanced Technology for Dismounts	25.302	27.160	24.041
Description: This effort will mature and demonstrate low cost Soldier-borne situational understanding systems with greater fidelity for improved maneuver and lethality, as well as integrates automated target cueing to increase probability of recognition/ identification and tracking of threats in all environments.			
FY 2024 Plans: Will optimize improved multi-plane display technologies and demonstrate parallax correction to expand use-cases while minimizing Size, Weight, and Power (SWaP); mature advanced covert depth sensing technologies to enable the next generation of digital sensor and head mounted display capabilities for dismounted Soldier situational awareness and mobility; integrate improved optics detection performance onto reduced pathfinder hardware with reduced SWaP and demonstrate in a field-relevant environment; mature sensor payload processing approaches to enable real-time course of action suggestion and automated cueing capabilities while on smaller aerial platforms for improved situational awareness and targeting against all threats; optimize			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BC9 / *Adv Soldier Sensors/Displays AdvTech for Dismounts*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
sensor configurations on host platform and validate performance of image processing techniques for improved dismounted hostile fire detection; demonstrate trajectory visualization in a representative virtual environment to quantify improvement of target engagement timelines while validating required improved orientation sensing accuracy. ***FY 2025 Plans:*** Will demonstrate next generation heads up display and algorithms with improved performance under more robust tactical operations; demonstrate advanced threat cueing modules for detection of concealed threats and reduced time to acquire; optimize display and control of small aerial platform within heads-up display system for improved situational awareness during unmanned teaming; optimize sensor configurations for small aerial platforms with embedded aided target recognition and autonomy; demonstrate final design concept and performance for optimized dismounted hostile fire detection as validation of User expectations; validate improved head and weapon orientation sensing for covert target engagement; and will validate tracking accuracy of mobile targets on the move at tactical ranges to proliferate accurate situational awareness real-time at all echelons. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease represents elimination of demonstration of improved eye tracking technologies to extend tactical use of augmented reality devices.			
Accomplishments/Planned Programs Subtotals	25.302	27.160	24.041

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BD7 / *Soldier Sys Interfaces/Integration-Sensor AdvTech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BD7: *Soldier Sys Interfaces/ Integration-Sensor AdvTech*	-	8.254	7.931	7.628	-	7.628	7.432	8.595	8.597	8.692	0.000	57.129
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project will integrate and mature technologies for sensing, processing, displaying information, interfacing with users, and cognitive improvement to enhance Soldier & Small Unit situational awareness & understanding. This Project will integrate and demonstrate battlefield, body-worn sensors, and data fusion algorithms to provide the dismounted Small Unit leader with clear, actionable information for making well informed, rapid, tactical decisions. This Project will also mature and integrate advanced dismounted Soldier robotic and autonomous systems technologies to demonstrate autonomous navigation, manned-unmanned teaming, and networked reconnaissance to improve Soldier lethality, situational awareness, and survivability during tactical operations.

Research in this Project complements several Program Elements (PEs) and Projects to include PE 0602143A (Soldier Lethality Technology) / BD6 (Soldier Sys Interfaces/Integration - Sensor Tech), PE 0603118A (Soldier Lethality Advanced Technology) / Project BC1 (Human Performance AdvTech for Mobility & Lethality) and Project BC9 (Adv Soldier Sensors/Displays AdvTech for Dismounts).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Research in this Project is performed by the Soldier Center (SC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Soldier System Interfaces & Integration (Sensor Advanced Technology)	8.254	7.931	-
Description: This effort will integrate battlefield and body-worn sensors and mature data-fusion algorithms to provide the dismounted Small Unit leader with clear, actionable information to make well informed, rapid, tactical decisions. This effort will mature and integrate advanced dismounted Soldier robotic and autonomous systems technologies to demonstrate autonomous navigation, manned-unmanned teaming, and networked reconnaissance to improve Soldier lethality, situational awareness, and survivability during tactical operations.			
FY 2024 Plans: Will optimize and mature actionable decision tools for the Integrated Visual Augmentation System (IVAS) to enhance remote sensing, equipment sensing, and human performance sensing capabilities for the Small Unit leader; conduct field demonstrations of integrated Soldier situational awareness technologies, sensors, and unmanned systems with IVAS and other networked Army platforms to improve tactical decision making and enhance Soldier Lethality for cross-domain maneuver; mature, integrate			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BD7 / *Soldier Sys Interfaces/Integration-Sensor AdvTech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
and demonstrate advanced autonomous tactical capabilities for Army SUAS (Soldier Borne Sensor (SBS) and Short Range Reconnaissance (SRR)) during Soldier field events to enhance the Squad and Platoons targeting and situational awareness; integrate and validate additional logistical delivery platforms with the small unit resupply consumption and delivery mission planning tool, for both routine and emergency logistical resupply situations and in support of contested logistics. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects an administrative realignment to task Soldier Situational Awareness Adv Tech within this project and to PE 0602143A (Soldier Lethality Technology) / Project BD6 (Sys Interfaces/ Integration - Sensor Tech)			
Title: Soldier Situational Awareness AdvTech ***FY 2025 Plans:*** Will mature and integrate leader planning and decision tools with the Nett Warrior situational awareness system to guide operational usage of physiological, equipment, and remote sensing hardware and information; mature and integrate multi-domain remote sensing tactical applications with Nett Warrior to provide operational usage and user experience of remote squad sensing status; demonstrate integrated Soldier information portrayal, sensing, and networking technologies during investigations at the Soldier Integration Facility and during field events with Soldiers in operational environments; and mature and demonstrate integrated technologies to enable multi-agent teaming for Army Small-UAS (Unmanned Aerial Systems) (SUAS) and other robotics in the lab and during Soldier operational events to enhance the Squad and Platoons reconnaissance, lethality, and situational understanding. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects administrative realignment from task Soldier System Interfaces & Integration-Sensor (Advanced Technology) within this project.	-	-	7.628
Accomplishments/Planned Programs Subtotals	8.254	7.931	7.628

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BD9 / *Soldier & Sm Unit Tactical Energy AdvTech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BD9: *Soldier & Sm Unit Tactical Energy AdvTech*	-	4.143	9.310	7.577	-	7.577	6.573	5.064	5.114	5.165	0.000	42.946
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project will demonstrate advanced Power and Energy (P&E) technologies for the dismounted Soldier to lighten equipment load, reduce resupply need, and enhance mobility. This Project will conduct Soldier and Small Unit power and energy technology maturation, integration with clothing and individual equipment, technical analysis, and operational assessment.

Work in this Project complements several Program Elements (PEs) to include PE 0603118A (Soldier Lethality Advanced Technology) / Project BD7 (Soldier Sys Interfaces/ Integration Adv Tech), Project BD8 (Soldier & Small Unit Tactical Energy Tech), and PE 0603118A (Soldier Lethality Advanced Technology) / Project BC9 (Adv Soldier Sensors/Displays Adv Tech for Dismounts).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Research in this Project is performed by the Soldier Center and the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Dismounted Soldier Power and Energy	4.143	4.269	4.554
Description: This effort matures, integrates, and demonstrates advanced Soldier P&E technologies that are used to power the dismounted Soldier and small unit's command and control, communications, computers, and sensor devices during tactical operations. This work will result in the Army being able to provide the power and energy the future Soldier requires to operate effectively, while doing so at a reduced physical burden.			
FY 2024 Plans: Will demonstrate high energy density Soldier batteries, such as Small Tactical Universal Battery (STUB) and the Conformal Wearable Battery (CWB), powering the Soldier's electronic equipment during Soldier field events; demonstrate advanced Soldier-carried power generators recharging batteries during Soldier field events; demonstrate efficient Soldier- worn power- transfer and management technologies for recharging the Soldier's batteries during Soldier field events.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BD9 / *Soldier & Sm Unit Tactical Energy AdvTech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will improve energy density and safety of the Conformal Wearable Battery (CWB); mature Soldier power generators to increase their energy efficiency and reduce weight; improve Soldier worn, portable data-acquisition systems to collect and analyze power and energy data during Soldier field assessments; conduct field demonstrations to assess the performance and operation of power and energy technologies with Soldiers during operational demonstrations. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Title: Supply Resiliency for Soldier Power ***Description:*** This effort addresses battery supply chain security issues by specifically addressing small battery standardization maturity for DoD applications to be more lethal in dismounted operations. ***FY 2024 Plans:*** Will improve and demonstrate affordable small, standardized batteries, such as Small Tactical Universal Battery (STUB), Conformal Wearable Battery (CWB) and BB-2590 that are domestically sourced, to optimize operational runtime and reduce the weight and Soldier burden; optimize system adaptors for use with small, standardized batteries operating within Soldier tactical portable devices, such as Next Generation Squad Weapon (NGSW) and Enhanced Night Vision Goggle-Binocular (ENVG-B); mature Operational Single Cell for Accessory Readiness (OCSAR) to enable safe, single cell operation in enabler devices; characterize and validate operational capabilities at field demonstrations and finalize military standards (MIL-PRF-32383) so these standardized batteries can be readily adopted. ***FY 2025 Plans:*** Will optimize domestically sourced CWB, STUB, BB-2590 and OSCAR batteries and verify and validate performance against military specifications and solve the susceptibility of the current supply chain dependencies on adversarial nations; establish domestic scale up processes to ensure availability of cells for each battery form factor and enable the reduction of battery proliferation in the field as a result of interoperable standardized batteries. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease represents conclusion of validation efforts required for each of the battery products.	-	5.041	3.023
Accomplishments/Planned Programs Subtotals	4.143	9.310	7.577

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BD9 / *Soldier & Sm Unit Tactical Energy AdvTech*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BE2 / *Joint Service Combat Feeding Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BE2: *Joint Service Combat Feeding Advanced Technology*	-	1.969	2.673	2.678	-	2.678	2.786	2.140	2.163	2.185	0.000	16.594
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates combat ration and field feeding technologies to optimize Warfighter performance, decrease the risk of exposure to chemical and biological contaminants in foods, and reduce the logistics burden to enable semi-independent operations. 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.

This Project matures and demonstrates research done in Program Element (PE) 0602143A (Soldier Lethality Technology) / Project BE3 (Joint Service Combat Feeding Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Research work in this Project is performed by the Soldier Center (SC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Joint Service Combat Feeding Advanced Technology Demonstration	1.969	2.673	2.678
Description: This effort matures and demonstrates combat ration and field feeding technologies to optimize Warfighter performance, decrease risk of exposure to chemical and biological contaminants in foods, and reduce the logistics burden to enable semi-independent operations.			
FY 2024 Plans: Will validate manufacturability of developed phenolic containing products; optimize shelf stable Amino Acid/Protein ration components by completing storage studies and sensory analysis and acceptability; food matrices in support of alternative protein ration components will be down-selected for storage studies and evaluated for food safety, acceptability, and compound stability; mature, develop, assess, and demonstrate Food Additive Manufacturing (FAM) solutions; assess industry readiness for FAM to print nutrient tailored foods; validate the effectiveness of a non-thermal concentration technology to produce a microbiologically safe juice concentrate and subsequent ration components, and conduct a limited technology demonstration to assess user acceptance; demonstrate military packaging reductions technologies and validate results to determine if they meet these critical requirements: integrity, barrier performance, durability, and sensory analysis.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BE2 / *Joint Service Combat Feeding Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will validate and demonstrate ration component formulations containing alternative protein sources against performance parameters for operational rations; validate the effects of consuming polyphenol-containing food products on warfighter performance, inflammation, and muscle recovery; demonstrate reduced volume and weight Close Combat Assault Ration (CCAR) components to support warfighter health and performance, supporting mission goals of 7 days without resupply; and perform validations of reduced packaging technologies against performance parameters or operational ration platforms. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase is an economic adjustment.			
Accomplishments/Planned Programs Subtotals	1.969	2.673	2.678

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BE5 / *Personnel & Airdrop Safety Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BE5: *Personnel & Airdrop Safety Advanced Technology*	-	6.307	6.632	6.718	-	6.718	7.368	7.372	7.453	7.528	0.000	49.378
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates equipment and innovative techniques for precision aerial delivery of cargo and personnel. Technologies support Army Modernization Priority, Soldier Lethality. Aerial delivery is a key capability for rapid force projection and global precision delivery to support the mission readiness profile for Global Response Force (GRF). These efforts are designed to advance state of the art precision delivery technologies such as parachutes; guidance, navigation, and control (GNC) components and subsystems; tracking sensors; software algorithms; and safety rigging that integrates with currently equipped aircraft, unmanned aerial systems (UAS), and advanced rotary wing aircraft. These efforts provide the Warfighter with highly accurate, timely cargo/payload delivery and resupply in all terrain and weather conditions. Precision delivery/resupply reduces vulnerability of ground Soldiers, aircraft, and aircrew. Precision aerial delivery supports remote warfare with activities such as placement of battlefield sensors and reduction of Soldier load.

Research in this Project supports key Army needs and complements the technical research in Program Element (PE) 0602143A (Soldier Lethality Technology) / Project BR9 (Personnel & Airdrop Safety Technology).

This Project also complements research done in the Science & Technology Precision, Navigation and Timing Modernization priority.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Research work in this Project is performed by the Soldier Center (SC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Personnel & Airdrop Safety Advanced Technology	6.307	6.632	6.718
Description: This effort matures and demonstrates parachute materials and designs, precision guidance, navigation software and hardware, tracking sensors, and safety devices to increase the accuracy of delivering cargo to remote locations and/or complex terrains in global positioning system (GPS) denied environments. This effort also provides technologies that increase safety during personnel insertions into theaters of operation. This effort supports capability demonstrations for mitigating the Army' s challenge of overburdened Soldiers through the use of tactical aerial resupply technologies, as well as supporting Anti-Access/Area Denial (A2/ AD) and manned-unmanned teaming (MUM-T) operational concepts by demonstrating airdrop from non-traditional platforms.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BE5 / *Personnel & Airdrop Safety Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will Integrate personnel infiltration system subcomponents and demonstrate full mission profile in live environment; Integrate and demonstrate preflight mission planning subcomponents into resupply vehicle's mission execution hardware; Validate and mature design of resupply vehicles that enhance autonomy, increase offset distances, and increase cargo weight; Demonstrate next generation static line (NGSL) performance and safety technologies, addressing increased weight capacity and improved weight distribution on the soldier. ***FY 2025 Plans:*** Will demonstrate full-scale technology for autonomous flight of delivery systems to increase offset distance, weight capacity, and autonomy of resupply operations; demonstrate integration of resupply mission planning solutions with selected resupply delivery systems; and develop assistive technologies to improve individual jumper performance and unit/infiltration team mission effectiveness. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Accomplishments/Planned Programs Subtotals	6.307	6.632	6.718

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BE9 / *STE Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BE9: *STE Advanced Technology*	-	10.352	8.342	4.976	-	4.976	-	-	-	-	0.000	23.670
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates technologies supporting the Army's Synthetic Training Environment (STE). The STE is the next generation holistic collective training capability that will train units where they will fight, with whom they will fight with, and in complex operational environments to include dense urban and sub-terrain; within the entire range of combined arms maneuver tasks in support of Multi- Domain Operations. STE Information Systems (STE-IS) delivers the Common Synthetic Environment consisting of Global Terrain/One World Terrain (OWT), Training Simulation Software (TSS), and Training Management Tools (TMT). The STE will be available where training occurs (home station, combat training centers, armories, institutions, shipboard, deployed) and will include Air and Ground Reconfigurable Virtual Collective Trainers (RVCTs), a Soldier/Squad Virtual Training (S/SVT), and a live training capability. The STE will be cloud-enabled, compatible with the Army Enterprise Network, and service-based through the Common Operating Environment, including Live and Constructive. The STE will provide the realistic repetitions necessary to fight 25 bloodless battles before the first battle.

This Project complements research done in Program Element (PE) 0602143A (Soldier Lethality Technology) / Project BE8 (Synthetic Training Environment (STE) Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas, the Army Modernization Strategy, and supports the STE Cross Functional Team efforts.

Work in this Project is performed by the Soldier Center (SC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: STE Training Management Tool	2.814	1.705	1.698
Description: This effort matures and demonstrates STE-relevant tools and technologies that automatically adapt training to the learner's skill level, conduct intelligent after action reviews, automate team training assessments, and enable the visualization of and interaction with a Mixed Reality Common Operating Picture of the battlespace.			
FY 2024 Plans: Will validate the integration of automated performance measures from both live and simulated small-unit training events in a team-competency tracking architecture; mature models and algorithms to measure squad-level competencies for integration into the STE; mature dashboards to visualize competency acquisition over time and across multiple training interactions; exploit			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BE9 / *STE Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
competency tracking and visualization technologies for small-unit after-action review and for Multi-Domain Operations mission planning and mission command at higher echelons. ***FY 2025 Plans:*** Will mature competency tracking and visualization technologies for small-unit after-action review and for Multi-Domain Operations (MDO) mission planning and mission command at higher echelons for live, virtual and constructive engagements. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects a shift in research focus from the near-term development of the STE capabilities to longer term research supporting training of multi-domain operations on complex, data-intensive battlefields.			
Title: STE One World Terrain ***Description:*** This effort matures and demonstrates tools and methods that improve the speed, fidelity and delivery of synthetic terrain and environmental data needed to support mission rehearsal and training in a representation of the globe, fully accessible through the Army network and usable by all simulation trainers. This effort also matures and develops complex representations (including megacities and subterranean) of the operational environment and the Multi-Domain battlefield in synthetic training environments. ***FY 2024 Plans:*** Will demonstrate processes, tools and software to deliver 3D synthetic content in constrained and unconstrained environments; continue to optimize 3D user interfaces for the identification, classification, and extraction of material and terrain artifacts for usage in collective training. ***FY 2025 Plans:*** Will validate and demonstrate mature terrain pipeline processes, tools and software that enables delivery of 3D synthetic content to support high fidelity live training engagements across 70% of small-unit live range use cases. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects an administrative realignment to Program Element 0603118A (Soldier Lethality Advanced technology)/ Project BC8 (Training Advanced Technology (Other than STE).	4.171	6.637	3.278
Title: STE Training Simulation Software ***Description:*** This effort matures and demonstrates technologies that support Multi-Domain Operations modeling and simulation configuration and scalability technologies for collective training. In addition, matures and demonstrates technologies that allow the synthesis of robust military behaviors that enable the scaling of STE collective training configurations and delivery to the Point	3.367	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BE9 / *STE Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
of Need through the exploitation of emerging computing and networking technologies that optimize computing architectures for integrating components (models, behaviors, data, etc.) of the Training Simulation Software (TSS).			
Accomplishments/Planned Programs Subtotals	10.352	8.342	4.976

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603118A / *Soldier Lethality Advanced Technology*	Project (Number/Name) BS8 / *Soldier Lethality Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BS8: *Soldier Lethality Advanced Technology*	-	51.750	-	-	-	-	-	-	-	-	0.000	51.750
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Congressional Interest Item funding provided for Soldier Lethality Advanced Technology.

A. Mission Description and Budget Item Justification

Congressional Interest Item funding provided for Soldier Lethality Advanced Technology.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
Congressional Add: Program Increase - Small Arms Fire Control Advanced Technology ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Small Arms Fire Control Advanced Technology	4.500	-
Congressional Add: Program Increase - ADVANCED TECHNOLOGY DEVELOPMENT FOR MDO TO SUPPORT SOLDIER LETHALITY ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ADVANCED TECHNOLOGY DEVELOPMENT FOR MDO TO SUPPORT SOLDIER LETHALITY	15.000	-
Congressional Add: Program Increase - HMD RISK REDUCTION FOR IVAS FUTURES ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for HMD RISK REDUCTION FOR IVAS FUTURES	5.000	-
Congressional Add: Program Increase - HYPER ENABLED SOLDIER LETHALITY ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for HYPER ENABLED SOLDIER LETHALITY	10.000	-
Congressional Add: Program Increase - SHOCK ATTENUATION AND BLUNT FORCE TRAUMA IMPROVEMENTS IN HEADBORNE	5.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603118A / *Soldier Lethality Advanced Technology*	**Project (Number/Name)** BS8 / *Soldier Lethality Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for SHOCK ATTENUATION AND BLUNT FORCE TRAUMA IMPROVEMENTS IN HEADBORNE		
Congressional Add: Program Increase - SPECTROSCOPY DEVICES FOR CHEM BIO DETECTION AND DEACTIVATION WITH UV-C ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for SPECTROSCOPY DEVICES FOR CHEM BIO DETECTION AND DEACTIVATION WITH UV-C	11.250	-
Congressional Add: Program Increase - Improvements to Arctic Heaters for Tents and Shelters ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Improvements to Arctic Heaters for Tents and Shelters	1.000	-
Congressional Adds Subtotals	51.750	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603119A / *Ground Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	415.104	40.597	45.880	-	45.880	47.871	59.283	58.822	63.661	0.000	731.218
BK8: *Robotics for Engineer Operations Adv Tech*	-	6.197	3.801	4.257	-	4.257	6.054	7.304	2.988	4.519	0.000	35.120
BK9: *Ground System Fluids and Fuels Adv Tech*	-	2.301	6.983	5.605	-	5.605	5.093	5.046	5.082	5.133	0.000	35.243
BL3: *Explosives Forensics Advanced Technology*	-	2.133	2.256	2.285	-	2.285	2.286	2.288	2.313	2.337	0.000	15.898
BL6: *Expedient Passive Protection Advanced Technology*	-	3.546	6.025	5.866	-	5.866	4.189	4.818	5.620	5.945	0.000	36.009
BL8: *Power Projection in A2AD Environments Adv Tech*	-	4.843	3.317	4.132	-	4.132	2.682	3.734	4.422	4.607	0.000	27.737
BM1: *Protection from Advanced Weapon Effects Adv Tech*	-	4.787	4.937	5.142	-	5.142	5.346	5.542	3.980	4.501	0.000	34.235
BO3: *MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)*	-	383.300	-	-	-	-	-	-	-	-	0.000	383.300
CJ9: *Ground Enabling University Adv Development*	-	3.754	4.214	6.048	-	6.048	6.149	6.152	6.219	6.281	0.000	38.817
CV5: *Engineer Enablers Maneuver, LOG, & Sustainment Adv*	-	2.446	3.313	4.818	-	4.818	2.705	5.568	5.543	7.470	0.000	31.863
DA2: *SAFR Alternatives for Readiness Advanced Tech*	-	1.797	2.926	3.979	-	3.979	8.523	9.791	9.941	10.040	0.000	46.997
DG2: *Advanced Development of Obscurants*	-	-	2.825	2.832	-	2.832	2.835	2.837	2.840	2.868	0.000	17.037
DI8: *Environmental Security Resilience Adv Tech*	-	-	-	0.315	-	0.315	1.258	5.251	8.972	9.150	0.000	24.946
DI9: *Comprehensive Adapt Operational Energy Adv Tech*	-	-	-	0.601	-	0.601	0.751	0.952	0.902	0.810	0.000	4.016

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*

Note

In Fiscal Year 2025 (FY25), funding in the amount of $0.315 million was realigned within PE 0603119A / Ground Advanced Technology from project DA2 / SAFR Alternatives for Readiness Advanced Tech to project DI8 / Environmental Security Resilience Adv Tech.

In FY25, project DI9 / Comprehensive Adapt Operational Energy Adv Tech is a new start within the Ground Advanced Technology program.

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and demonstrates ground movement and maneuver technologies that support and enable the Army's modernization priority for the Next Generation of Combat Vehicles. This PE also matures, integrates and demonstrates advanced technologies that are necessary and foundational for legacy and future ground platforms and ground maneuver. These technology areas include: robotic and autonomous Army Combat Engineer equipment, liquid logistics (i.e., fuels, lubricants, and oils) and related monitoring and distribution, forensic analysis of explosives and other chemical materials, rapidly deployable passive protection technologies, entry and maneuver assessment technologies and structural hardening technologies to protect personnel and critical assets from advanced weapon effects.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas in support of the National Defense Strategy.

Research is performed by the United States (U.S.) Army Futures Command and the U.S. Army Engineer Research and Development Center.

Research in this PE complements PE 0602144A (Ground Technology), PE 0602145A (Next Generation Combat Vehicle Technology), and PE 0603462A (Next Generation Combat Vehicle Advanced Technology).

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	415.846	40.597	42.661	-	42.661
Current President's Budget	415.104	40.597	45.880	-	45.880
Total Adjustments	-0.742	0.000	3.219	-	3.219
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.001	-			
• SBIR/STTR Transfer	-0.743	-			
• Adjustments to Budget Years	-	-	3.219	-	3.219

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603119A *I Ground Advanced Technology*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Project: BO3: *MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)*		
Congressional Add: *Secure Management of Energy Generation and Storage*	5.000	-
Congressional Add: *Materials and Manufacturing Technology for Cold Environments*	4.000	-
Congressional Add: *Program Increase - Rapid Entry and Sustainment for the Arctic*	10.000	-
Congressional Add: *Program Increase - Water Quality and Resiliency*	7.000	-
Congressional Add: *Program Increase - Clean Modular Hydro Technology*	20.000	-
Congressional Add: *Program Increase - Accelerator Technology for Ground Maneuver*	4.000	-
Congressional Add: *Program Increase - Impacts of Soil Structures on Hydrology*	6.000	-
Congressional Add: *Program Increase - Cross-Laminated Timber and Recycled Carbon Fiber Materials*	5.500	-
Congressional Add: *Anticipating Threats to Natural Systems*	6.000	-
Congressional Add: *Army Visual and Tactical Arctic Reconnaissance*	4.000	-
Congressional Add: *Autonomous Construction and Manufacturing*	5.000	-
Congressional Add: *Cold Weather Research*	4.000	-
Congressional Add: *Expeditionary Additive Construction*	15.000	-
Congressional Add: *Frost Heave Effects Monitoring*	6.000	-
Congressional Add: *Graphene Applications for Military Engineering*	10.000	-
Congressional Add: *Hardened Facility Standards*	5.500	-
Congressional Add: *High Power Fast Charging for Electric Vehicle Fleets*	5.000	-
Congressional Add: *Low Carbon Hydrogen Technologies*	10.000	-
Congressional Add: *Microgrid Reliability and Resiliency*	6.500	-
Congressional Add: *Military Waste Stream Conversion*	5.000	-
Congressional Add: *Power Generation for Increased Facility Resilience Pilot*	10.000	-
Congressional Add: *Power Projection*	5.000	-
Congressional Add: *Water Reuse Consortium*	10.000	-
Congressional Add: *Program Increase - ADDITIVE MANUFACTURING AND 3D PRINTING FOR DEPLOYABLE SHELTERS*	6.000	-
Congressional Add: *Program Increase - ADDITIVE MANUFACTURING FOR WEAPONS AND ARMAMENTS COMPONENTS*	10.000	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603119A *I Ground Advanced Technology*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Congressional Add: *Program Increase - ADVANCED MULTI-STACK OLED MICRODISPLAYS*	8.800	-
Congressional Add: *Bio-derived coatings for high-performance applications*	2.000	-
Congressional Add: *Expanding engineering with nature installation capacity*	5.000	-
Congressional Add: *Mass timber applications for military construction projects*	12.000	-
Congressional Add: *Novel materials for smart infrastructure systems*	6.000	-
Congressional Add: *Rapid infrastructure development and engineering*	5.000	-
Congressional Add: *Ultra-high strength steels for construction applications*	6.000	-
Congressional Add: *Always ready distributed energy*	10.000	-
Congressional Add: *Self contained power for towers and sensors*	10.000	-
Congressional Add: *Ruggedized deployable solar generators*	10.000	-
Congressional Add: *PFAS destruction industrial SCWO technology*	12.000	-
Congressional Add: *Sorbent enhanced clean hydrogen demonstration*	15.000	-
Congressional Add: *3D Printing of infrastructure - enabling cold weather construction capabilities*	5.000	-
Congressional Add: *Advanced coating development for infrastructure*	3.000	-
Congressional Add: *Arctic terrain sensing with drone platforms*	10.000	-
Congressional Add: *Cobalt free batteries*	3.000	-
Congressional Add: *Competition planning and evaluation infrastructure*	8.000	-
Congressional Add: *Delivered fuel decarbonization and resiliency*	5.000	-
Congressional Add: *Engineering practices for ecosystem design solutions*	6.500	-
Congressional Add: *Innovative design and manufacturing of advanced composites/multi material protective systems*	10.000	-
Congressional Add: *Logistically secure energy resources for resilient installation and mobility infrastructure*	5.000	-
Congressional Add: *Military Operations in permafrost environment*	3.500	-
Congressional Add: *Military training grounds research to support force readiness*	7.000	-
Congressional Add: *Operational and cyber resilient power for critical infrastructure*	8.000	-
Congressional Add: *Rapid Track repair*	3.000	-
Congressional Add: *Solid State rechargeable lithium batteries*	5.000	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Congressional Add: *Sustainable distributed electric vehicle charging station*	3.000	-
Congressional Add: *Technology pilot for reliability, resilience, and energy efficiency*	3.000	-
Congressional Add: *Wildfire engineering for sustainability and resiliency*	6.000	-
Congressional Add: *Zero emission concrete*	3.000	-
Congressional Add Subtotals for Project: BO3	383.300	-
Congressional Add Totals for all Projects	383.300	-

Change Summary Explanation

Funding increase is due to realignment for advanced obscurants from 0602144A (Ground Technology) / BL2 (Explosives Forensics Technology).

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603119A / *Ground Advanced Technology*	Project (Number/Name) BK8 / *Robotics for Engineer Operations Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BK8: *Robotics for Engineer Operations Adv Tech*	-	6.197	3.801	4.257	-	4.257	6.054	7.304	2.988	4.519	0.000	35.120
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates robotic engineer equipment capabilities that can remotely characterize the environment and operate in the battlespace for autonomous Combat Engineer actions. This Project provides technologies for Combat Engineer mission planning, creating or reducing barriers and obstacles, as well as maintaining, repairing, and constructing expedient infrastructure. These efforts will enhance Combat Engineer missions of mobility, counter mobility, and survivability through semi-autonomous or autonomous operations.

Work in this Project complements Program Element (PE) 0602144A (Ground Technology) / Project BK7 (Robotics for Engineer Operations Technology).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas.

Work in this Project is performed by the United States Army Engineer Research and Development Center Construction Engineering Research Laboratory, Information Technology Laboratory, and Geotechnical and Structures Laboratory

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Beyond-Visual-Line-of-Sight Tele-operated Engineer Operations Demonstration ***Description:*** This effort matures and demonstrates remote control and semi-autonomous behaviors on small scale construction equipment to provide information that scales to larger legacy equipment as well as assess the applicability of small scale equipment working in collaboration and coordination.	6.197	-	-
Title: Semi-Autonomous Engr Ops Demonstration ***Description:*** This effort matures and demonstrates machine tool behaviors to perform semi-autonomous shaping of the terrain through physical interaction with the environment (push, pull, lift, and dig). The effort develops the necessary decision-making, data fusion, localization, and inter-platform communication to allow semi-autonomy on commercial off the shelf (COTS) equipment. ***FY 2024 Plans:***	-	3.801	4.257

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** BK8 / *Robotics for Engineer Operations Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will implement, mature, and demonstrate the required sensor payload, onboard processing, and control algorithms on heavy Engineer equipment to enable semiautonomous operations within an area of interest; mature and demonstrate semi-autonomous execution of a simple Engineer task. ***FY 2025 Plans:*** Will demonstrate and validate semiautonomous on-site operation of heavy Engineer equipment through Soldier assessment; will demonstrate and validate semiautonomous execution of a simple Engineer task through Soldier assessment. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the planned addition of workflows for this effort as technologies are transitioned for maturation and demonstration from PE 0602144A, Project BK7 Robotics for Engineer Operations Technology.			
Accomplishments/Planned Programs Subtotals	6.197	3.801	4.257

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603119A / *Ground Advanced Technology*	Project (Number/Name) BK9 / *Ground System Fluids and Fuels Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BK9: *Ground System Fluids and Fuels Adv Tech*	-	2.301	6.983	5.605	-	5.605	5.093	5.046	5.082	5.133	0.000	35.243
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates liquid logistics technologies such as enhanced jet fuels, lubricants, oils, powertrain fluids, coolants, bulk fluid treatment, monitoring, metering, storage, and distribution in support of established Army regulations and requirements. This Project improves products and technologies to optimize fuel efficiency, meet new hardware fluid requirements, modernize fluids, ensure bulk fluid meets quality requirements, and provide bulk fluid asset visibility, to optimize logistics and reduce logistics requirements. This Project executes the demonstration of enhanced jet fuels for ground systems, enhanced performance coolants, fluids for vehicle electrification, and smart bulk fuel metering and monitoring technologies. This Project improves liquid logistics products and technologies that are critical enablers for multi-domain operations requiring semi-independent operations to enable dispersed operations to extend operational reach, prolong endurance and allow freedom of action for the Joint Force.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas.

Work in this Project is performed by the Ground Vehicle System Center (GVSC)

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Ground System Fluids and Fuels	2.301	6.983	5.605
Description: This effort focuses on reducing the logistics footprint, improving fuel efficiency, and ensuring mobility by maturing and demonstrating technologies in areas such petroleum quality monitoring, filtration, storage and distribution, hydraulic fluids; enhanced jet fuels and fuel additives, lubricants, oil, powertrain fluids and coolants. Validates candidate engine coolants that extend change intervals, reduce corrosion, and minimize incompatibility issues for military use. Establish performance requirements for new military thermal fluids that enable emerging vehicle electrification technology. Integrate smart fuel metering technology into self-correcting devices that automatically report fuel quantity and conduct fuel filter effectiveness testing to establish fuel particle contamination limits for new fuel monitoring technology. ***FY 2024 Plans:*** Will verify the fuel lubricity additive correlation from bench scale through test rig by assessing a second type of pump design; conduct field demonstration of selected engine coolants; conduct bench top testing of thermal management fluids for vehicle			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** BK9 / *Ground System Fluids and Fuels Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
electrification to evaluate and down-select fluid candidates; update smart meter design based on baseline evaluation, add tank level monitoring, and assess fuel dashboard and data transfer performance. ***FY 2025 Plans:*** Will conduct simulated service test and field demonstration of thermal management fluids for vehicle electrification. Will identify candidate lubricants for vehicle electrification applications. Will conduct hardware and software integration test for smart fuel metering. Will conduct technical performance test of fuel additive detection and quantification analyzer. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects narrowed focus on development of thermal fluids for vehicle electrification.			
Accomplishments/Planned Programs Subtotals	2.301	6.983	5.605

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603119A / *Ground Advanced Technology*	Project (Number/Name) BL3 / *Explosives Forensics Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BL3: *Explosives Forensics Advanced Technology*	-	2.133	2.256	2.285	-	2.285	2.286	2.288	2.313	2.337	0.000	15.898
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This will mature and demonstrate instrumentation and algorithms required to provide improved point, proximity, and stand-off detection of low levels of explosives and solid chemical hazards. This will enable the warfighter to integrate portable chemical and explosive hazard detection equipment. This project will also integrate explosive detection into the family of Chemical, Biological, Radiological, and Nuclear point and stand-off sensors, alternative chemical detection modalities and algorithms, that will improve the probability of detection and attribution of an explosive hazard or home-made explosive manufacturing/assembly location.

Work in this project compliments Program Element (PE) 0602144A (Ground Technology) / Project BL2 (Explosives Forensics Technology)

The cited work is consistent with the Under Secretary of Defense Research and Engineering priority focus.

Work in this Project is performed by the Chemical Biological Center (CBC)

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Detection Mechanisms for Contaminants	2.133	2.256	2.285
Description: This effort matures and demonstrates improved point and standoff detection of military and homemade explosives and their precursors, and other chemicals and hazardous materials.			
FY 2024 Plans: Will demonstrate second generation build of Portable Chemical Fingerprint Identification System (PCFIS) for trace level chemical hazard detection of contaminated surfaces; demonstrate improved explosive and chemical vapor detection utilizing first of its kind waveguide enhanced Raman spectroscopy portable device; continue advancements of novel optical and non-optical sensor methodologies for trace and forensic level information more forward in the field.			
FY 2025 Plans: Will transition the Portable Microscopy Chemical Detection System (PMCDS) for semi-autonomous detection of solid chemical hazards on surfaces. Will optimize and demonstrate the second integrated package for the waveguide enhanced Raman spectroscopy vapor detection system and provide new advanced optical and non-optical methodologies and technology for forensic level detection of chemical hazards.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** BL3 / *Explosives Forensics Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding change reflects planned lifecycle of this effort.			
Accomplishments/Planned Programs Subtotals	2.133	2.256	2.285

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603119A / *Ground Advanced Technology*	Project (Number/Name) BL6 / *Expedient Passive Protection Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BL6: *Expedient Passive Protection Advanced Technology*	-	3.546	6.025	5.866	-	5.866	4.189	4.818	5.620	5.945	0.000	36.009
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates rapidly deployable protection solutions to protect small distributed units, decision support applications and software, and tactics, techniques, and procedures to increase the survivability of personnel, critical assets, and facilities from a range of threats. Force protection technologies will be matured and demonstrated for applications in complex and urban environments to protect against advanced energetic threats, large caliber rockets and missiles, and other emerging weapons.

Work in this Project complements Program Element (PE) 0602144A (Ground Technology) / Project BL5 (Expedient Passive Protection Technology).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas.

Work in this Project is performed by the United States Army Engineer Research and Development Center Geotechnical and Structures Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Assessments of Solutions for Survivability from Emerging Threats Demonstrations	3.546	6.025	5.866
Description: This effort matures and demonstrates both legacy and newly developed expedient force protection solutions for emerging threats such as large caliber rocket and missile weapon effects and UAV threats. This effort also demonstrates algorithms for decision support applications and software, and informs tactics, techniques, and procedures (TTP's) to increase the survivability of personnel, critical assets, and facilities against emerging threats. It will enable the Warfighter to select protection schemes for survivability from emerging threats to support Multi-Domain Operations.			
FY 2024 Plans: Will optimize protective designs of expedient protective structures; will demonstrate capabilities of expedient protective structures to defeat blast and fragmentation effects of emerging threats; and will demonstrate fast-running algorithms to predict emerging threat effects.			
FY 2025 Plans: Will demonstrate and validate rapidly deployable protection systems against emerging threats, such as large caliber rockets and weaponized unmanned aerial vehicles (UAVs), to provide expedient passive protection to critical semi-fixed assets and facilities.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** BL6 / *Expedient Passive Protection Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding decrease reflects the planned workflows for this effort.			
Accomplishments/Planned Programs Subtotals	3.546	6.025	5.866

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603119A / *Ground Advanced Technology*	Project (Number/Name) BL8 / *Power Projection in A2AD Environments Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BL8: *Power Projection in A2AD Environments Adv Tech*	-	4.843	3.317	4.132	-	4.132	2.682	3.734	4.422	4.607	0.000	27.737
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates remote assessment technologies to determine entry and maneuver corridors, provides site selection tools and decision support technologies for all climates in all season conditions including aviation site- selection tools, enhanced automated route reconnaissance technologies, mobility models for extreme climates, and road capacity assessment technologies. These technologies will reduce reliance on manned on-site reconnaissance for force projection assessments and provide all-season predictions to ensure air and ground battlespace entry and maneuver. This Project also matures and demonstrates material solutions to repair, rebuild, and construct infrastructure required for movement and maneuver in highly contested, complex operational environments such as Anti-Access/Area Denial.

Work in this Project complements Program Element (PE) 0602144A (Ground Technology) / Project BL7 (Power Projection in A2AD Environments Technology).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas.

Work in this Project is performed by the United States Army Engineer Research and Development Center Geotechnical and Structures Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Entry and Sustainment in Complex Contested Environments Demonstrations ***Description:*** This effort matures and demonstrates geospatial planning tools to expand engineering analysis of ground surfaces for entry, sustainment, and maneuver operations and to automate processes for selecting suitable maneuver corridors.	3.242	-	-
Title: Engineering for Battlespace Maneuver Demonstrations ***Description:*** This effort demonstrates material solutions and techniques for expedient repair to rapidly repair and upgrade damaged infrastructure along mobility corridors and restaging areas to maintain and enhance freedom of maneuver achieving overmatch and tactical advantage in contested complex environments. ***FY 2024 Plans:*** Will demonstrate mechanical reinforcing materials for ground / soil stabilization; demonstrate matting solutions for supporting military vehicle loads over soft soils; finalize techniques for chemical soil stabilization agents. ***FY 2025 Plans:***	1.601	3.317	4.132

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** BL8 / *Power Projection in A2AD Environments Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will demonstrate planning tools for predicting route degradation and for when tasking route repair and upgrades will be required; will demonstrate suite of technologies for performing rapid route remediation to support ground maneuver operations. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned conclusion of this effort as technologies are transitioned for maturation and demonstration from PE 0602144A (Ground Technology) / Project BL7 (Power Projection in A2AD Environments Technology).			
Accomplishments/Planned Programs Subtotals	4.843	3.317	4.132

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603119A / *Ground Advanced Technology*	Project (Number/Name) BM1 / *Protection from Advanced Weapon Effects Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BM1: *Protection from Advanced Weapon Effects Adv Tech*	-	4.787	4.937	5.142	-	5.142	5.346	5.542	3.980	4.501	0.000	34.235
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates structural hardening solutions and force protection technologies to increase survivability of facilities and provide critical updates to protective design specifications and guidance. Additionally, this project matures and demonstrates passive protection technologies and provides protective design criteria advancements to mitigate attack from emerging advanced threats.

Work in this Project complements Program Element (PE) 0602144A (Ground Technology) / Project BL9 (Protection from Advanced Weapon Effects Technology).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas.

Work in this Project is performed by the United States Army Engineer Research and Development Center Geotechnical and Structures Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Defeat of Complex Attack Demonstrations ***Description:*** This effort demonstrates force protection technologies that mitigate the effects of emerging peer and near peer adversaries advanced penetration threats and high yield blast effects by optimizing high-performance, logistically feasible material solutions and processes.	4.787	-	-
Title: Protection from Advanced Penetrators Demonstration ***Description:*** This effort matures and demonstrates passive protective designs and concepts for hardened structures and critical assets that mitigate the effects of advanced precision threat weapons of peer and near peer adversaries through focused subscale to full-scale demonstrations. ***FY 2024 Plans:*** Will demonstrate protection of current structural hardening solutions against a sub-scale advanced penetrator to provide baseline performance and to identify and investigate current facility criteria deficiencies for advanced penetrating weapons. ***FY 2025 Plans:***	-	4.937	5.142

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** BM1 / *Protection from Advanced Weapon Effects Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will optimize advanced protective materials and structural members to mitigate penetration and perforation from increased velocity advanced penetrator threats. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned demonstration activities for this effort.			
Accomplishments/Planned Programs Subtotals	4.787	4.937	5.142

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603119A / *Ground Advanced Technology*	Project (Number/Name) BO3 / *MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BO3: *MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)*	-	383.300	-	-	-	-	-	-	-	-	0.000	383.300
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Congressional Interest Item funding provided for Military Engineering Technology Demonstration.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
Congressional Add: Secure Management of Energy Generation and Storage ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Secure Management of Energy Generation and Storage.	5.000	-
Congressional Add: Materials and Manufacturing Technology for Cold Environments ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Materials and Manufacturing Technology for Cold Environments.	4.000	-
Congressional Add: Program Increase - Rapid Entry and Sustainment for the Arctic ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Rapid Entry and Sustainment for the Arctic.	10.000	-
Congressional Add: Program Increase - Water Quality and Resiliency ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Water Quality and Resiliency Technologies.	7.000	-
Congressional Add: Program Increase - Clean Modular Hydro Technology ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Clean Modular Hydro Technology	20.000	-
Congressional Add: Program Increase - Accelerator Technology for Ground Maneuver	4.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** BO3 / *MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for Accelerator Technology for Ground Maneuver.		
Congressional Add: Program Increase - Impacts of Soil Structures on Hydrology ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Impacts of Soil Structures on Hydrology.	6.000	-
Congressional Add: Program Increase - Cross-Laminated Timber and Recycled Carbon Fiber Materials ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Cross-Laminated Timber and Recycled Carbon Fiber Materials.	5.500	-
Congressional Add: Anticipating Threats to Natural Systems ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Anticipating Threats to Natural Systems.	6.000	-
Congressional Add: Army Visual and Tactical Arctic Reconnaissance ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Army Visual and Tactical Arctic Reconnaissance.	4.000	-
Congressional Add: Autonomous Construction and Manufacturing ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Autonomous Construction and Manufacturing.	5.000	-
Congressional Add: Cold Weather Research ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Cold Weather Research.	4.000	-
Congressional Add: Expeditionary Additive Construction ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Expeditionary Added Construction.	15.000	-
Congressional Add: Frost Heave Effects Monitoring ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Frost Heave Effects Monitoring.	6.000	-
Congressional Add: Graphene Applications for Military Engineering	10.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** BO3 / *MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for Graphene Applications for Military Engineering.		
Congressional Add: Hardened Facility Standards ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Hardened Facility Standards.	5.500	-
Congressional Add: High Power Fast Charging for Electric Vehicle Fleets ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Electric Vehicle Fleets.	5.000	-
Congressional Add: Low Carbon Hydrogen Technologies ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Low Carbon Hydrogen Technologies.	10.000	-
Congressional Add: Microgrid Reliability and Resiliency ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Microgrid Reliability and Resiliency.	6.500	-
Congressional Add: Military Waste Stream Conversion ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Military Waste Stream Conversion	5.000	-
Congressional Add: Power Generation for Increased Facility Resilience Pilot ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Power Generation for Increased Facility Resilience Pilot	10.000	-
Congressional Add: Power Projection ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Power Projection.	5.000	-
Congressional Add: Water Reuse Consortium ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Water Reuse Consortium.	10.000	-
Congressional Add: Program Increase - ADDITIVE MANUFACTURING AND 3D PRINTING FOR DEPLOYABLE SHELTERS	6.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** BO3 / *MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for ADDITIVE MANUFACTURING AND 3D PRINTING FOR DEPLOYABLE SHELTERS		
Congressional Add: Program Increase - ADDITIVE MANUFACTURING FOR WEAPONS AND ARMAMENTS COMPONENTS ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ADDITIVE MANUFACTURING FOR WEAPONS AND ARMAMENTS COMPONENTS	10.000	-
Congressional Add: Program Increase - ADVANCED MULTI-STACK OLED MICRODISPLAYS ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ADVANCED MULTI-STACK OLED MICRODISPLAYS	8.800	-
Congressional Add: Bio-derived coatings for high-performance applications ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for bio-derived coatings for high-performance applications.	2.000	-
Congressional Add: Expanding engineering with nature installation capacity ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Engineering with Nature.	5.000	-
Congressional Add: Mass timber applications for military construction projects ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for mass timber applications for military construction projects.	12.000	-
Congressional Add: Novel materials for smart infrastructure systems ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for novel materials for smart infrastructure systems.	6.000	-
Congressional Add: Rapid infrastructure development and engineering ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for novel materials for rapid infrastructure development and engineering.	5.000	-
Congressional Add: Ultra-high strength steels for construction applications ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ultra-high strength steels for construction applications.	6.000	-
Congressional Add: Always ready distributed energy	10.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** BO3 / *MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for always ready distributed energy.		
Congressional Add: Self contained power for towers and sensors ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for self contained power for towers and sensors.	10.000	-
Congressional Add: Ruggedized deployable solar generators ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ruggedized deployable solar generators.	10.000	-
Congressional Add: PFAS destruction industrial SCWO technology ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for PFAS destruction industrial SCWO technology	12.000	-
Congressional Add: Sorbent enhanced clean hydrogen demonstration ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for sorbent enhanced clean hydrogen demonstration.	15.000	-
Congressional Add: 3D Printing of infrastructure - enabling cold weather construction capabilities ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for 3D Printing of infrastructure - enabling cold weather construction capabilities.	5.000	-
Congressional Add: Advanced coating development for infrastructure ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for advanced coating development for infrastructure.	3.000	-
Congressional Add: Arctic terrain sensing with drone platforms ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Arctic terrain sensing with drone platforms.	10.000	-
Congressional Add: Cobalt free batteries ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for cobalt free batteries.	3.000	-
Congressional Add: Competition planning and evaluation infrastructure	8.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** BO3 / *MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for competition planning and evaluation infrastructure.		
Congressional Add: Delivered fuel decarbonization and resiliency ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for delivered fuel decarbonization and resiliency.	5.000	-
Congressional Add: Engineering practices for ecosystem design solutions ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Engineering practices for ecosystem design solutions.	6.500	-
Congressional Add: Innovative design and manufacturing of advanced composites/multi material protective systems ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for innovative design and manufacturing of advanced composites/multi material protective systems.	10.000	-
Congressional Add: Logistically secure energy resources for resilient installation and mobility infrastructure ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for logistically secure energy resources for resilient installation and mobility infrastructure.	5.000	-
Congressional Add: Military Operations in permafrost environment ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Military Operations in permafrost environment.	3.500	-
Congressional Add: Military training grounds research to support force readiness ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Military training grounds research to support force readiness.	7.000	-
Congressional Add: Operational and cyber resilient power for critical infrastructure ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for operational and cyber resilient power for critical infrastructure.	8.000	-
Congressional Add: Rapid Track repair ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Rail Road Rapid Track repair.	3.000	-
Congressional Add: Solid State rechargeable lithium batteries	5.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** BO3 / *MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for Solid State rechargeable lithium batteries.		
Congressional Add: Sustainable distributed electric vehicle charging station ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for sustainable distributed electric vehicle charging station.	3.000	-
Congressional Add: Technology pilot for reliability, resilience, and energy efficiency ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for technology pilot for reliability, resilience, and energy efficiency.	3.000	-
Congressional Add: Wildfire engineering for sustainability and resiliency ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for wildfire engineering for sustainability and resiliency.	6.000	-
Congressional Add: Zero emission concrete ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for zero emission concrete.	3.000	-
Congressional Adds Subtotals	383.300	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603119A / *Ground Advanced Technology*	Project (Number/Name) CJ9 / *Ground Enabling University Adv Development*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CJ9: *Ground Enabling University Adv Development*	-	3.754	4.214	6.048	-	6.048	6.149	6.152	6.219	6.281	0.000	38.817
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Project matures and demonstrates advanced developments and technological innovations from academia, in the focus areas of ground autonomy, Artificial Intelligence / Machine Learning (AI/ML) and robotics, occupant/vehicle survivability and other ground platform technologies of importance to the Army, by maturing and demonstrating technologies with the goal of delivering technology to the warfighter more quickly. This Project matures and demonstrates advanced technologies with a focus on mid to far-term Army modernization priorities while also maintaining delivery of near-term technologies critical to the next generation combat vehicles. This Project focuses on maturation and demonstration of various advanced technologies originating from extramural applied research in academia pertaining to navigation/ routing, autonomous robotic vehicles with the use of artificial intelligence and machine learning as applied to ground mobility and maneuver, and other innovative ground enabling applied research technologies. This Project also matures and demonstrates advanced technologies leading to potential emerging capabilities in areas of strategic importance to the Army in autonomy, robotics and AI/ML, protection of both platform and occupant, and other ground platform technologies in propulsion, survivability, powertrain, etc., by bringing competitively selected Universities with research and development teams into Technical Alliances.

Work in this Project complements Program Element (PE) 0620144A (Ground Technology), PE 0602145A (Next Generation Combat Vehicle Technology) and PE 0603462A (Next Generation Combat Vehicle Advanced Technology).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas.

Work in this Project is performed by the University Technology Development Division.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Robust autonomous capabilities for ground vehicles	1.887	2.128	3.874
Description: This effort demonstrates AI/ML and autonomous mobility integrated into ground vehicles to conduct off-road maneuvers to enable the transition from teleoperation to autonomous or semi-autonomous scenarios. Research is conducted in collaboration with university partners to advance autonomous mobility and protection of both occupant and platform in optionally manned and autonomous ground vehicles.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** CJ9 / *Ground Enabling University Adv Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Matures and demonstrates multiagent air and ground vehicle teams and situational awareness, beyond existing behaviors, including teams of up to three ground vehicles and five air vehicles. Matures and demonstrates marsupial robot deployment and recovery with increased automation and intelligence. ***FY 2025 Plans:*** Will mature and demonstrate collaborative reconnaissance and surveillance between both ground vehicles and air vehicles and operations with priority switching; mature and demonstrate improvements based on lessons learned from previous Combat Vehicle Robotic (CoVeR) Engineering Evaluation Tests (EET); mature and demonstrate Army Research Lab's Semantic World Model incorporated in the Robotic Technical Kernel (RTK) or current Army robotic software package; demonstrates robotic capabilities in annual CoVeR EET; matures and demonstrates advanced marsupial deployment and recover technologies; validate a process of integrating early-stage academic solutions directly into Army navigation software. The benefits of this effort include an increase in the speed of robotic capability delivered to the Ground Vehicle Systems Center's CoVeR project and long-term reduction in required human-robot interaction. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the planned milestones for development and participation in Combat Vehicle Robotic (CoVeR) Engineering Evaluation Tests (EET).			
Title: Human-robot/AI interactions	1.867	2.086	2.174
Description: This effort matures, integrates, and demonstrates systems involving physical and cognitive levels of interactions between humans and robots, with the use of reinforcement machine learning which uses human feedback, learning from demonstrations, and safe human-aware controllers. Work is conducted in collaboration with university partners to advance autonomous mobility as well as other areas of ground platform technologies in propulsion, survivability, powertrain, sensing, and perception. ***FY 2024 Plans:*** Demonstrates AI/ML methods for robust autonomous capabilities, cooperative tactical reasoning, real-time basic feature extraction, multi-robot long-term autonomy, human-AI collaboration, human-in-the-loop ML for autonomous navigation. ***FY 2025 Plans:*** Will mature and demonstrate sensing, contact-capable navigation, and activity recognition for vehicles to move without stopping among crowds; continue to mature and demonstrate AI/ML methods for robust autonomous capabilities, cooperative tactical reasoning, real-time basic feature extraction, multi-robot long-term autonomy, human-AI collaboration, human-in-the-loop ML for			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** CJ9 / *Ground Enabling University Adv Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
autonomous navigation; Matures and demonstrates emerging technologies in human-robot interaction. The benefit of this effort is improvements to machine learning and artificial intelligence with human-robotic interactions. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Accomplishments/Planned Programs Subtotals	3.754	4.214	6.048

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603119A / *Ground Advanced Technology*	Project (Number/Name) CV5 / *Engineer Enablers Maneuver, LOG, & Sustainment Adv*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CV5: *Engineer Enablers Maneuver, LOG, & Sustainment Adv*	-	2.446	3.313	4.818	-	4.818	2.705	5.568	5.543	7.470	0.000	31.863
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates joint contested logistics operations technologies and provides capabilities to operate in disbersed battlefield operations and support sustainment operations through predicted dynamic scenario development that provides critical vulnerabilities assessment and methods/equipment to mitigate potential issues.

Work in this Project complements Program Element (PE) 0602144A (Ground Technology) / Project CV3 (Engineer Enablers Maneuver, LOG, & Sustainment Apl).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas.

Work is performed by the United States Army Engineer Research and Development Center Geotechnical and Structures Laboratory, Geospatial Research Laboratory, Coastal and Hydraulics Laboratory and Information Technology Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Sustainment Planning Tool	2.446	2.884	3.085
Description: This effort will mature and demonstrate map-based sustainment running estimates for the prepositioning of survivable material stockpiles based on synchronized ops/intel/log running estimates and informed by artificial intelligence (AI)-based edge computing analyses.			
FY 2024 Plans: Will conduct agile design review with Program Manager Mission Command to evaluate optimized estimation model within Joint Planning Services. Will further mature and optimize with authoritative data sources in advance of integrating capability to the Command Post Computing Environment (CPCE).			
FY 2025 Plans: Will demonstrate an integrated map-based mission planning Sustainment Running Estimate (SRE) toolset that allows a user to visualize sustainment routes and generate reports based on estimates and assessments. These features leverage previous work completed in the sustainment Requirements and Distribution toolset, which includes iterative improvements based on user feedback. Will leverage the Command Post Computing Environment (CPCE) Data Fabric and integration with the LOGSTAT			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** CV5 / *Engineer Enablers Maneuver, LOG, & Sustainment Adv*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
tool to provide CPCE interoperability. The SRE tools will be deployed within the DoD's Joint Planning Services platform for sustainment operations and transitioned into the CPCE Program of Record (POR). ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the planned workflows for this effort.			
Title: Planning Logistics Analysis Network System Advanced Research ***Description:*** This effort demonstrates new engineering applications and methodologies that support improved distributed logistics planning via multi-modal transportation networks, such as road, ship and train, to improve the efficiency and effectiveness of the planning decision making during contested logistics scenarios. ***FY 2024 Plans:*** Will improve system performance through integration of transportation throughput options through the nodes and routes. ***FY 2025 Plans:*** Will demonstrate beta version of route planning software for the most mature single transportation modality, producing multiple routing options for distributed logistics planning operations. Will mature additional transportation modalities as well as the interface for integration with Army Mission Command Systems. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned additional workflows for this effort as it begins to demonstrate route planning software.	-	0.429	1.733
Accomplishments/Planned Programs Subtotals	2.446	3.313	4.818

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603119A / *Ground Advanced Technology*	Project (Number/Name) DA2 / *SAFR Alternatives for Readiness Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DA2: *SAFR Alternatives for Readiness Advanced Tech*	-	1.797	2.926	3.979	-	3.979	8.523	9.791	9.941	10.040	0.000	46.997
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates cross-cutting, safer alternative advanced technologies that enable warfighter readiness. These technologies also support product availability, Soldier and worker safety, and a reduced environmental footprint in the manufacturing, maintenance, and use of ground vehicles and other Army weapon systems. The Project matures and optimizes safer alternatives in technology areas including surface finishes, coatings, solvents, refrigerants, and fire suppressants. This research addresses the growing impacts to health and readiness associated with carcinogens such as hexavalent chromium, global warming chemicals including hydrofluorocarbons (HFCs), and forever chemicals such as like per- and polyfluoroalkyl substances (PFAS). This Project enables the Army to assess and resolve these types of emerging and continually evolving risks throughout the full life cycle of Army systems.

This Project complements and transitions technologies developed under Program Element (PE) 0602144A (Ground Technology) /Project DA1 (SAFR Alternatives for Readiness Applied Research).

Work in this Project is performed by the Army Research Laboratory (ARL); the Armaments Center; the Aviation and Missile Center (AVMC); the Soldier Center (SC), and the Ground Vehicle Systems Center (GVSC)

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Safer Alternatives for Readiness (SAFR) Advanced Technology	1.797	2.926	3.979
Description: Mature and demonstrate safer alternative advanced technologies to replace hexavalent chromium, cadmium and other harmful chemicals during surface finishing; reduce the use of volatile organic compounds and other hazardous materials in coating and depainting processes; and ensure the availability of compatible next generation refrigerants and fire suppressants with low global warming potential. ***FY 2024 Plans:*** Will mature lead-free rocket motor propellants; demonstrate novel nitration methods for energetic materials; optimize more efficient fuels and lubricants to reduce emissions. ***FY 2025 Plans:*** Will demonstrate synthesis processes for emerging energetic materials; will mature alternatives to phthalates in gun propellants; and will optimize explosion suppressants that do not rely on restricted HFCs for use in crew compartments. Will demonstrate synthesis processes for emerging energetic materials using novel nitration methods; mature alternatives to endocrine disrupting			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** DA2 / *SAFR Alternatives for Readiness Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
phthalates used in gun propellants to improve the mechanical properties of the propellants; and optimize explosion suppressants that do not rely on restricted HFCs for use in crew compartments. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Accomplishments/Planned Programs Subtotals	1.797	2.926	3.979

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603119A / *Ground Advanced Technology*	Project (Number/Name) DG2 / *Advanced Development of Obscurants*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DG2: *Advanced Development of Obscurants*	-	-	2.825	2.832	-	2.832	2.835	2.837	2.840	2.868	0.000	17.037
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Project matures and demonstrates obscurant technologies with potential to enhance personnel and platform survivability by degrading threat force surveillance sensors and defeating the enemy's target acquisition devices, missile guidance, and directed energy weapons. Dissemination systems for new and improved obscurants are developed with the goal of providing efficient and safe screening of deployed forces.

Work in this project compliments Program Element (PE) 0602144A (Ground Technology) / Project DG1 (Development of Obscurants)

The cited work is consistent with the Under Secretary of Defense Research and Engineering priority focus areas.

Work in this Project is performed by Chemical Biological Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Obscuration	-	2.825	2.832
Description: This effort matures and demonstrates the dissemination of new and advanced obscurants. ***FY 2024 Plans:*** Will further explore bi-spectral, millimeter wave, and multi-spectral obscurant materials; explore cost effective methods for material drying and packaging in order to further enhance performance against current capability for potential implementation into existing obscuration systems and examining the feasibility of use in future systems currently in development. ***FY 2025 Plans:*** Will explore packaging of higher performing millimeter wave obscurants to minimize corrosion issues associated with long term storage; continue to investigate novel bi-spectral obscuration materials, as well as working to increase the performance of existing materials through alternate drying methods; further investigate the integration and dissemination methodology of novel obscurant materials. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase is an economic adjustment.			
Accomplishments/Planned Programs Subtotals	-	2.825	2.832

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** DG2 / *Advanced Development of Obscurants*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603119A / *Ground Advanced Technology*	Project (Number/Name) DI8 / *Environmental Security Resilience Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DI8: *Environmental Security Resilience Adv Tech*	-	-	-	0.315	-	0.315	1.258	5.251	8.972	9.150	0.000	24.946
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In Fiscal Year 2025 (FY25), funding in the amount of $0.315 million was realigned within PE 0603119A / Ground Advanced Technology from project DA2 / SAFR Alternatives for Readiness Advanced Tech to project DI8 / Environmental Security Resilience Adv Tech.

A. Mission Description and Budget Item Justification

This Project matures and demonstrates capabilities to inform Army Environmental Security Resilience decisions and support tools, providing new information on environmental factors to include emerging contaminates, biotechnology, extreme weather events, and natural stressors which impact Army operations or present supply-chain security concerns. Project efforts span the functional domains of strategic support area management, emergency preparedness, environmental protections, climate resilience, and analysis of future operational environment and environmental threats. This effort will demonstrate new models and decision support tools which provide actionable information that affect missions for operational planning and risk management by Army installation managers and Base Commanders around the world.

Work in this Project complements Program Element (PE) 0602144A (DI7) / Project (Environmental Security Resilience Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas, the Army Modernization Strategy, and the Army's Climate Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center Environmental Laboratory, Construction Research Engineering Laboratory, and the Cold Regions Research and Engineering Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: PFAS Risk Reduction Advanced Development	-	-	0.315
Description: This effort will mature the per- and polyfluorinated substances (PFAS) risk-based decision framework tools to enabled rapid science-based-risk decisions for Army installation managers. This effort also shares information across the Army installation community through a PFAS communications hub.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** DI8 / *Environmental Security Resilience Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will mature the functional communication modular tool set and integrate and optimize the PFAS risk-based decision framework. Will exploit case studies to optimize the modular tool set final designs. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding was realigned within PE 0603119A / Ground Advanced Technology to project DI8 / Environmental Security Resilience Adv Tech to continue efforts initiated in project DA2 / SAFR Alternatives for Readiness Advanced Tech.			
Accomplishments/Planned Programs Subtotals	-	-	0.315

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603119A / *Ground Advanced Technology*	Project (Number/Name) DI9 / *Comprehensive Adapt Operational Energy Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DI9: *Comprehensive Adapt Operational Energy Adv Tech*	-	-	-	0.601	-	0.601	0.751	0.952	0.902	0.810	0.000	4.016
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Comprehensive Adapt Operational Energy Adv Tech is a new start within the Ground Advanced Technology program in FY 2025.

A. Mission Description and Budget Item Justification

This Project will provide power control and distribution hardware (i.e., inverters and metering and monitoring equipment) that supports interoperability between the energy source program of record, such as Advanced Medium Mobile Power Source (AMMPS) and energy storage solutions at the tactical level. This project matures, demonstrates, and integrates a seamless bridge between low and medium voltage tactical generators (defined as 500kW and below), and improves decision tools to assist the Commander in choosing the optimal operational energy power storage type for their mission or force structure.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas.

Work in this Project is performed by the United States Army Engineer Research and Development Center, Construction Engineering Research Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Operational Energy Life Cycle Management for Contingency Bases Demonstrations	-	-	0.601
Description: This effort demonstrates novel operational energy storage solutions to address distributed operations in multidomain operation and reduce fuel demand of Army contingency operations. ***FY 2025 Plans:*** Will assess inverters that can transfer power between power generation sources and energy storage solutions to reduce the overall fuel demand in Army contingency operations. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned initiation of this effort.			
Accomplishments/Planned Programs Subtotals	-	-	0.601

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603119A / *Ground Advanced Technology*	**Project (Number/Name)** DI9 / *Comprehensive Adapt Operational Energy Adv Tech*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603134A / *Counter Improvised-Threat Simulation*

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	-	20.782	21.672	21.398	-	21.398	21.680	21.695	21.933	22.151	0.000	151.311
CD3: *Counter Improvised-Threat Simulation*	-	20.782	21.672	21.398	-	21.398	21.680	21.695	21.933	22.151	0.000	151.311

A. Mission Description and Budget Item Justification

This Program Element (PE) develops technology for detecting and defeating Improvised Explosive Devices (IEDs). The goal of this research is to increase the ability of deployed forces to positively identify IEDs with minimal false alarms and positively neutralize or mitigate the effects of IEDs with minimal collateral damage.

This PE is executed by the Army Futures Command (AFC) in coordination with the Under Secretary of Defense for Research and Engineering (USD/R&E) and the Defense Threat Reduction Agency (DTRA).

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	21.486	21.672	21.680	-	21.680
Current President's Budget	20.782	21.672	21.398	-	21.398
Total Adjustments	-0.704	0.000	-0.282	-	-0.282
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.704	-			
• Adjustments to Budget Years	-	-	-0.282	-	-0.282

Change Summary Explanation

The FY25 funding change from the previous PB to the current PB reflects an Army approved minor reduction.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603134A / *Counter Improvised-Threat Simulation*	Project (Number/Name) CD3 / *Counter Improvised-Threat Simulation*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CD3: *Counter Improvised-Threat Simulation*	-	20.782	21.672	21.398	-	21.398	21.680	21.695	21.933	22.151	0.000	151.311
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project develops, matures, and demonstrates technology for detecting and defeating improvised explosive devices (IEDs). The goal of this research is to increase the ability of deployed forces to positively identify IEDs with minimal false alarms and increase the rate of advance of deployed forces, as well as to identify vehicle and personnel borne IEDs at fixed sites. Additionally, the objective is to positively neutralize or mitigate the effects of IEDs with minimal collateral damage.

This Project is executed by the Army Futures Command (AFC) in coordination with the Under Secretary of Defense for Research and Engineering (USD/R&E) and the Defense Threat Reduction Agency (DTRA).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Standoff Detection of IED Threats in All Environments	9.791	10.221	-
Description: This effort develops technology to detect IED threats at standoff distances. Technologies include electro-optical, radar, light detection and ranging (LIDAR), atomic magnetometer and other technologies applicable to detecting IEDs and their components that can be integrated on dismounted Soldiers, ground, water-based and aerial systems or at fixed sites. This effort also develops technologies and network techniques to detect the electronic signature of radio-controlled IEDs. Technologies will be validated on their ability to detect IEDs and their components within infrastructure, on or under ground and water, and attached to vehicles or personnel. The goal for these technologies is to achieve high probabilities of detection while minimizing false alarms from naturally occurring and man-made entities. ***FY 2024 Plans:*** Will mature EO/IR, EM, neutron-gamma, and RF sensor technologies to improve detection performance of highly obscured IEDs in a broad range of emplacement scenarios and environments; integrate sensor technologies on Soldier-borne, ground, and aerial platforms or at fixed sites; demonstrate and assess detection of IEDs configured as vehicle borne IEDs and personnel borne IEDs in various operational conditions while improving form factor and cost considerations. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects administrative restructure to task Counter Improvised Threat Advanced Technologies within this Project.			
Title: IED Neutralization, Prevention and Mitigation	2.948	3.138	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603134A / *Counter Improvised-Threat Simulation*	**Project (Number/Name)** CD3 / *Counter Improvised-Threat Simulation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Description: This effort develops technology critical to neutralizing and mitigating the effects of IEDs at standoff distances. Technologies include directed energy sources, energetic or kinetic effectors, encasement of the threat and Soldier, platform and base protection technologies. These technologies will be demonstrated to neutralize IEDs in place and protect soldiers and equipment from the effects of IEDs. This effort also explores advanced techniques to robotically manipulate IEDs. The goal for these technologies is to achieve high probabilities of avoiding the IED's effects by friendly forces. ***FY 2024 Plans:*** Will mature and validate kinetic, jamming, and directed energy neutralization technologies to increase neutralization and mitigation performance to reduce impacts to maneuver speeds; demonstrate novel C-IED mitigation capabilities in militarily relevant scenarios in additional environments. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects administrative restructure to task Counter Improvised Threat Advanced Technologies within this Project.			
Title: Enabling C-IED Technologies ***Description:*** This effort develops technologies that support the detection, prevention, neutralization and mitigation of IED threats. Technologies exploit data sciences including sensor processing algorithms, integration of sensor data, data processing and analytics, threat forecasting, and autonomous maneuver. Techniques will be demonstrated that determine detection of IED threats and identify trends to forecast probabilities of encountering or attributing IEDs based on operational data and machine learning techniques. The goals for these technologies are to achieve high probabilities of detecting, predicting and attributing IEDs threats. ***FY 2024 Plans:*** Will demonstrate lower size, weight, and power sensor components and improved processing techniques to detect IED threats with reduced false alarms; leverage threat data from foreign partners and use existing U.S. threat data repositories to optimize, develop, and mature new IED signature attributes in varying environments for multiple sensor modalities; demonstrate artificial intelligence and machine learning techniques to increase autonomous detection capability and reduce operator burden. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects administrative restructure to task Counter Improvised Threat Advanced Technologies within this Project.	8.043	8.313	-
Title: Counter Improvised Threat Advanced Technologies	-	-	21.398

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603134A / *Counter Improvised-Threat Simulation*	**Project (Number/Name)** CD3 / *Counter Improvised-Threat Simulation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Description: This effort matures and demonstrates technology to detect IED threats at standoff distances. Technologies include electro-optical, radar, light detection and ranging (LIDAR), atomic magnetometer and other technologies applicable to detecting IEDs and their components that can be integrated on dismounted Soldiers, ground, water-based and aerial systems or at fixed sites. This effort also matures and demonstrates technologies and network techniques to detect the electronic signature of radio-controlled IEDs, as well as technology critical to neutralizing and mitigating the effects of IEDs at standoff distances. Technologies include directed energy sources, energetic or kinetic effectors, encasement of the threat and Soldier, platform and base protection technologies. Will demonstrate these technologies to neutralize IEDs in-place and protect soldiers and equipment from the effects of IEDs. This effort also matures technologies that exploit data sciences including sensor processing algorithms, integration of sensor data, data processing and analytics, threat forecasting, and autonomous maneuver. Will demonstrate techniques that detect IED threats and identify trends to forecast probabilities of encountering or attributing IEDs based on operational data and machine learning techniques. ***FY 2025 Plans:*** Will demonstrate electro-optical/infrared (EO/IR), electromagnetic (EM), and radio frequency (RF) sensor technologies coupled with automated detection algorithms for the standoff detection of IEDs across a broad range of emplacement scenarios and environments. Will continue to optimize existing and new sensor technologies on ground platforms, aerial platforms, and at fixed sites. Will validate the use of multiple sensor modalities with data processing techniques to improve detection of vehicle borne IEDs and personnel borne IEDs in various operational conditions. Will demonstrate kinetic, jamming, spoofing, and directed energy neutralization technologies to disrupt the functioning of IEDs in both stationary applications and on the move scenarios in militarily relevant scenarios. Will exploit and optimize sensor components and processing techniques to lower SWaP. Will validate artificial intelligence and machine learning techniques for autonomous detection of threats. Will demonstrate the use of "teamed" unmanned aerial vehicle and unmanned ground sensor to provide data to facilitate multiple look angles and characterize potential threats. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects administrative restructure from tasks Standoff Detection of IED Threats in All Environments, IED Neutralization, Prevention and Mitigation, and Enabling C-IED Technologies within this Project.			
Accomplishments/Planned Programs Subtotals	20.782	21.672	21.398

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603134A / *Counter Improvised-Threat Simulation*	**Project (Number/Name)** CD3 / *Counter Improvised-Threat Simulation*

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603386A / *Biotechnology for Materials - Advanced Research*

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	-	54.778	59.871	36.360	-	36.360	24.879	24.895	25.166	25.418	0.000	251.367
CP7: *Biotechnology Demonstration and Evaluation*	-	54.778	59.871	36.360	-	36.360	24.879	24.895	25.166	25.418	0.000	251.367

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and demonstrates novel biotechnological methods, processes, and materials to enhance military supply chain resilience. The Army is responsible for centrally managing funding for Tri-Service Biotechnology for a Resilient Supply Chain (T-BRSC) efforts. T-BRSC leverages bio-industrial manufacturing to ensure critical domestic supply chain resilience for defense needs through domestic production of raw materials and critical products. The Army supports this Tri-Service effort under this PE with collaboration among sister Services and select allied partners to support a robust pipeline for biotechnology related manufacturing. Advanced research projects optimize and rapidly demonstrate future novel biotechnologies for disruptive breakthrough capabilities. This PE provides bio-engineered and biosynthetic materials to ensure domestic sourcing of critical products in the defense supply chain. Also under this PE, efforts mature and demonstrate rapid prototyping methods for rapid testing of bio-derived materials as well as optimize models for the design and bio-security of bio-engineered materials for defense applications.

This PE is coordinated with PE 0602386A (Biotechnology for Materials - Applied Research).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	56.853	59.871	36.840	-	36.840
Current President's Budget	54.778	59.871	36.360	-	36.360
Total Adjustments	-2.075	0.000	-0.480	-	-0.480
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.075	-			
• Adjustments to Budget Years	-	-	-0.480	-	-0.480

Change Summary Explanation

The FY25 funding change from the previous PB to the current PB reflects an Army approved minor reduction.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603386A / *Biotechnology for Materials - Advanced Research*	Project (Number/Name) CP7 / *Biotechnology Demonstration and Evaluation*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CP7: *Biotechnology Demonstration and Evaluation*	-	54.778	59.871	36.360	-	36.360	24.879	24.895	25.166	25.418	0.000	251.367
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project collaborates with Joint Service partners to mature, optimize, and demonstrate novel biotechnologies and related methods to establish a domestic resilient supply chain for defense needs. Advanced research validates and provides bio-derived, bio-functionalized, and bio-manufactured materials. This Project matures and demonstrates high-throughput screening and small-scale prototyping, enhances material performance, and exploits biotechnologies to provide drop-in replacements and materials with enhanced properties for defense applications. Areas of focus may include high-density, high-performance fuels for high-speed weapons, bio-based propellants, optical materials, and bio-derived systems that sense and respond to the presence of contaminants.

Work in this Project compliments Program Element (PE) 0602386A (Biotechnology for Materials - Applied Research) / CP6 (Foundational Biotechnology Design and Dev) and PE 0604386A (Biotechnology for Materials - Demonstration and Validation (DEV/VAL)) / CQ9 (Biotechnology for Materials - Demonstration and Validation (DEV/VAL) Dem/Val).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Biosynthetic Material Demonstration	54.778	59.871	36.360
Description: This task matures and demonstrates novel and emerging biotechnologies related to bio-engineered or bio-manufactured materials to address vulnerabilities in the critical material supply chain for military needs.			
FY 2024 Plans: * Will utilize Tri-Service capability for rapid maturation, demonstration, and optimization of bio-products for defense applications by exploiting the use of robotics for semi-autonomous capabilities to develop new biomanufacturing platform strains. Rapidly assess the ability of new strains to provide a biotechnology solutions and biotechnologically derived materials. * Scale-up the production of biomolecules for use as energetic materials in hypersonic systems at volumes suitable for advanced prototyping and testing. Validate the performance of these materials to support enhanced weapon systems range, increased speeds, potential reusability, and supply security on relevant platforms.			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603386A / *Biotechnology for Materials - Advanced Research*	**Project (Number/Name)** CP7 / *Biotechnology Demonstration and Evaluation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
* Mature and demonstrate the bio-manufacturing process development for domestic production of high temperature resistant bio-manufactured materials necessary for new hypersonic defense systems, unmanned aerial vehicles (UAVs) and fire-resistant casings for batteries. * Improve the performance of biotechnology product production and downstream processing activities in high hazard operations. Optimize the biotechnology production data management, and process control software. * Demonstrate the production of bio-manufactured aviation and ground vehicle critical materials from in-theater waste streams. Optimize the organic solution to provide fuel in theater to maintain a capable fighting force and persist inside actively contested spaces from a sustainable and secure production system. * Demonstrate reduced logistics through biocementation technology for expeditionary basing needs. * Mature and demonstrate a biomanufactured non-hazardous solvents for use in stripping and cleaning applications for ground, air, and marine applications. * Demonstrate optical materials for agile laser protection of goggles, vision blocks, and sensor systems.			
FY 2025 Plans: Will optimize the in-line analysis of fermentation products through biomaterial machine vision; improve the performance of high throughput strain screening and purification, downstream fermentation, bio-standards validation, and scale-up through biomaterial prototyping. Continue the scale-up production of biomolecules for use as energetic materials in hypersonic systems at volumes suitable for advanced prototyping and testing; validate the performance of these materials to support enhanced weapon systems range, increased speeds, potential reusability, and supply security on relevant platforms. Continue to mature and demonstrate the bio-manufacturing process development for domestic production of high temperature-resistant bio-manufactured materials necessary for new hypersonic defense systems, unmanned aerial vehicles (UAVs) and fire-resistant casings for munitions. Demonstrate bio-based non-hazardous paint removal cleaning solvent for aircraft, ships, and ground vehicle systems.			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603386A / *Biotechnology for Materials - Advanced Research*	**Project (Number/Name)** CP7 / *Biotechnology Demonstration and Evaluation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Demonstrate a bio-based capability to sense and detect heavy metal in water for point-of-need water safety/quality testing in denied combat operational areas. Continue the demonstration of bio-manufactured aviation and ground vehicle critical materials from in-theater waste streams; optimize the organic solution to provide fuel in theater to maintain a capable fighting force and persist inside actively contested spaces from a sustainable and secure production system. Continue the demonstration of reduced logistics through agile biocementation technology for expeditionary flight-line, taxiway, rotary aircraft pads, and base logistic foundations. Demonstrate bio-derived optical materials for agile laser protection of military goggles, vision blocks, and sensor systems. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects planned lifecycle to begin PE 0604386A (Biotechnology for Materials - Dem/Val) / Project CQ9 (Biotechnology for Materials - Dem/Val).			
Accomplishments/Planned Programs Subtotals	54.778	59.871	36.360

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603457A *I C3I Cyber Advanced Development*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	41.354	28.847	19.616	-	19.616	21.377	24.598	34.201	33.607	0.000	203.600
6CY: *Autonomous Cyber Advanced Technology*	-	11.188	7.528	5.848	-	5.848	8.924	10.560	19.582	16.960	0.000	80.590
8CY: *Information Trust Advanced Technology*	-	20.028	11.187	4.188	-	4.188	3.006	4.910	5.864	6.186	0.000	55.369
9CY: *Network Access and Effects Advanced Technology*	-	8.170	10.132	9.580	-	9.580	9.447	9.128	8.755	10.461	0.000	65.673
CB4: *Offensive Cyber Operations (OCO) Mirror Adv Tech*	-	1.968	-	-	-	-	-	-	-	-	0.000	1.968

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and demonstrates technologies for offensive and defensive cyber operations in tactical environments. Projects optimize devices, techniques, services, software and algorithms to enable cyber situational understanding and Cyber Electromagnetic Activities (CEMA). For offensive cyber, efforts demonstrate integrated electronic attack (EA) and CEMA hardware and software to execute force protection (FP), EA, electronic surveillance (ES), signals intelligence (SIGINT), electronic warfare (EW) and cyber missions in a dynamic, distributed and coordinated fashion. For defensive cyber, efforts demonstrate hardware and software to protect tactical wired and wireless networks against modern cyber attacks and focuses on configuration, operation, monitoring, data integrity, and defense in bandwidth constrained tactical environments while reducing the operator workload required to conduct these functions.

This PE directly supports the Network Army Modernization Priority.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army					Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*			R-1 Program Element (Number/Name) PE 0603457A *I C3I Cyber Advanced Development*		
B. Program Change Summary ($ in Millions)	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**
Previous President's Budget	41.354	28.847	19.204	-	19.204
Current President's Budget	41.354	28.847	19.616	-	19.616
Total Adjustments	0.000	0.000	0.412	-	0.412
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	0.412	-	0.412

Change Summary Explanation

The change in FY 2025 funding from the previous PB to the current PB reflects the net effect of a realignment from PE 0603457A / C3I Cyber Advanced Development to PE 0603463A (Network C3I Advanced Technology) for mid-to-long term efforts to develop and demonstrate new Signals Intelligence (SIGINT) methods and a realignment of funding to PE 0603457A / C3I Cyber Advanced Development from PE 0602213A / C3I Applied Cyber for efforts in support of the DoD Zero Trust Strategy.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603457A / *C3I Cyber Advanced Development*	Project (Number/Name) 6CY / *Autonomous Cyber Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
6CY: *Autonomous Cyber Advanced Technology*	-	11.188	7.528	5.848	-	5.848	8.924	10.560	19.582	16.960	0.000	80.590
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project demonstrates defensive effects to adversarial use of artificial intelligence (AI) and machine learning (ML) to avoid detection and deceive our automated technologies driving the network decisions. This Project will provide defensive cyber operations (DCO) software capabilities for multi-domain operations and enable tactical network cyber defenders with machine learning (ML) and artificial intelligence (AI) capabilities.

Work in this Project complements Program Element (PE) 0602213A (C3I Applied Cyber) / Project CY6 (Autonomous Cyber Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Autonomous Cyber ***Description:*** This effort develops proof-of-concept sensors that can adapt to and autonomously react to adversary cyber-attack and develop a cyber response course of action decision aid for cyber defenders to validate suitability of actions and to speed response decisions. ***FY 2024 Plans:*** Will conduct final demonstration of hierarchical machine learning reference architecture supporting standardization of cyber capabilities that proactively react to and defend against advanced cyber threats and machine learning-enabled cyber-attacks to protect the network; conduct final assessment of the detection tools and autonomous decision-making system using adversarial attack simulation software tools to detect and self-mitigate any system vulnerabilities. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned life cycle conclusion of this Science and Technology effort.	11.188	7.528	-
Title: Predictive Intelligent Networking - Cyber ***Description:*** This effort matures and validates network micro-segmentation methods based on tactical network constraints that employ artificial intelligence (AI) based advanced zero trust security features to autonomously identify, learn, predict, and react	-	-	2.020

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603457A / *C3I Cyber Advanced Development*	**Project (Number/Name)** 6CY / *Autonomous Cyber Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
to changes in network operating conditions, enables optimized resource quarantining and ensures end-to-end network resiliency against adversarial AI-driven electronic attacks (EA), electronic warfare (EW), and cyberattacks. ***FY 2025 Plans:*** Will mature various network micro-segmentation design patterns, based on the current Department of Defense (DoD) Zero Trust Reference Architecture, to determine lowest viable level for tactical networks. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned initiation of this effort.			
Title: Network Obscuration and Deception ***Description:*** Mature and demonstrate software based cyber obscuration technologies; for use by Cyber Protection Teams (CPTs) and other cyber defenders in enterprise and tactical environments, utilizing planned Garrison and Tactical defensive Cyber Operations (DCO) Platforms; that imitate/mask networks, systems, hosts, users and files to distract/disrupt cyber attackers. ***FY 2025 Plans:*** Will mature and demonstrate first iteration of machine learning (ML) based moderate fidelity cyber obscuration capabilities positioned in advance of mission execution that can be remotely enabled as needed. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned initiation of this effort.	-	-	1.539
Title: Tactical Hardening for Quantum ***Description:*** Enable faster migration from existing PKI algorithms to Post Quantum Cryptography (PQC) algorithms that are safe from compromise by quantum computing. Demonstrate advanced encryption algorithms to secure Army tactical networks against quantum computing threats. ***FY 2025 Plans:*** Will assess hybrid certificates with combinations of the conventional algorithms and the NIST selected Post Quantum Cryptography (PQC) algorithms; evaluate advancements in state-of-the-art technologies, standards, and solutions identify where conventional crypto is used, identify migration strategies and develop migration procedures to help implement PQC migration with the least disruption to system operation. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned initiation of this effort.	-	-	2.289
Accomplishments/Planned Programs Subtotals	11.188	7.528	5.848

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603457A / *C3I Cyber Advanced Development*	**Project (Number/Name)** 6CY / *Autonomous Cyber Advanced Technology*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603457A / *C3I Cyber Advanced Development*	Project (Number/Name) 8CY / *Information Trust Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
8CY: *Information Trust Advanced Technology*	-	20.028	11.187	4.188	-	4.188	3.006	4.910	5.864	6.186	0.000	55.369
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project demonstrates enhanced awareness of the "provenance"/ origin of data traversing the network from originator to consumer (e.g. sensor to shooter) in the presence of cyber-attacks, ensuring that the data can be trusted, has not been modified or manipulated, and has been authenticated for use in real-time decision making.

Work in this Project complements Program Element (PE) 06022213A (C3I Applied Cyber) / Project 2CY (Information Trust Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Information Trust Advanced Technology	6.532	7.119	-
Description: This Project applies and demonstrates leading edge commercial technologies such as blockchain and machine learning to provide assurance that data has not been tampered with anywhere along the transmission chain from originator to consumer (e.g. sensor to shooter). This Project leverages automated algorithms to detect anomalies that may occur in the presence of cyber-attacks, such as an attempt to manipulate data traversing the network and alert decision makers. ***FY 2024 Plans:*** Will demonstrate a complimentary suite of software capabilities to ensure the integrity, authenticity and provenance of data traversing the tactical network; provide a machine learning based integrity service to ensure chain of custody, a blockchain-enabled provenance tracker software, enabling automatic modification detection, and a trust score architecture for real-time, quantitative, analytics-based trustworthiness of messages and other data in transit in the presence of cyber attacks. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned life cycle conclusion of this Science and Technology effort.			
Title: Agile Virtual Enclave	13.496	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603457A / *C3I Cyber Advanced Development*	**Project (Number/Name)** 8CY / *Information Trust Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Description: This effort matures and demonstrates a Multi-Level Security (MLS) Access Guard to reduce hardware infrastructure required for US Government owned systems and develop a Mission Partner Environment (MPE) transfer cross domain solution (CDS) to enable data sharing with coalition partners.			
Title: PKI-Modernization/Dynamic Access Control for Tactical (DAC-T) ***Description:*** This effort will mature and demonstrate cryptographic algorithms that address Program Manager (PM) Mission Command (MC) gap of native ability to support PKI digital signature and Online Certificate Status Protocol (OCSP) certificate validation for the Variable Message Format (VMF) standard MIL-STD-2045-47001D in Disconnected, Interrupted, and Low-bandwidth (DIL) Networks. Furthermore, the effort will also mature and demonstrate dynamic fine-grained access control that migrates the Army from a network-centric to data-centric access control in alignment with Advanced zero trust principles by enhancing, speeding up and automating account provisioning and access for people and non-Person entities (NPE) (e.g., sensors, devices, web services, etc.). This will significantly reduce the workload/ burden for the soldier and improve the networks security posture by enforcing least privilege & just-in-time network access. ***FY 2024 Plans:*** Will optimize PM MC cryptographic algorithms and Online Certificate Status Protocol (OCSP) certificate validation capability and conduct lab-based risk reduction to demonstrate and assess PKI Modernization impacts on Mounted Mission Command's (MMCs) ability to send digitally signed VMF messages; provide recommended courses of action to the current MIL-STD-2045-47001E. ***FY 2025 Plans:*** Will mature and demonstrate Crypto Library SW & MIL-STD-2045-47001 message parser; mature and demonstrate DAC-T Design & Technology data package and Application Programming Interface (API) for each ICAM service. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase is an economic adjustment.	-	4.068	4.188
Accomplishments/Planned Programs Subtotals	20.028	11.187	4.188

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603457A / *C3I Cyber Advanced Development*	**Project (Number/Name)** 8CY / *Information Trust Advanced Technology*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603457A / *C3I Cyber Advanced Development*	Project (Number/Name) 9CY / *Network Access and Effects Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
9CY: *Network Access and Effects Advanced Technology*	-	8.170	10.132	9.580	-	9.580	9.447	9.128	8.755	10.461	0.000	65.673
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates advanced mission management tools and workflows, to promote efficient selection and sequencing of effects to support the agile deployment and execution of Offensive Cyber Operations (OCO) / Radio Frequency (RF) Enabled capabilities in the face of ever-advancing and evolving cyber security standards and practices adopted by industry and our adversaries that impede our ability to maintain cyber freedom of maneuver in support of Multi-Domain Operations (MDO). This includes automated mission planning, staging methodologies, and tools to evaluate and compare various courses of action that are dynamically replicated within appropriate rapid response environment(s). This Project will enable both mission planners and operators to cognitively keep pace with the complexity of near-peer engagements within Multi-Domain Operations (MDO).

Work in this Project complements Program Element (PE) 0602213A (C3I Applied Cyber) / Project 3CY (Network Access and Effects Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Offensive Cyber Enabling Mission Support ***Description:*** This effort matures and demonstrates advanced mission management tools and workflows, to promote efficient selection and sequencing of effects to support the agile deployment and execution of OCO / RF Enabled capabilities.	8.170	-	-
Title: Network Exploitation Research and Development (NERD) Advanced Technology ***Description:*** This effort matures computer assisted/automated development of Offensive Cyber Operations (OCO)/Radio Frequency (RF) enabled effects against emerging and validated targets of interest (TOI) in conjunction with exploration of non-traditional attack vectors. Matures automated mission planning and staging methodologies and tools to evaluate and compare various courses of actions that are dynamically replicated within appropriate rapid response environment to enable both mission planner and operators to cognitively keep pace with the complexity of near-peer engagements within Multi-Domain Operations (MDO). ***FY 2024 Plans:***	-	10.132	9.580

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603457A / *C3I Cyber Advanced Development*	**Project (Number/Name)** 9CY / *Network Access and Effects Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will begin development of Non-Traditional Offensive Cyber Operations (OCO)/Radio Frequency (RF) enabled access and effects that account for and circumvent modern cyber security practices against expanded targets of interest; initiate development of tools to augment and automate vulnerability exploitation as well as access and effect capability development to reduce offensive cyber and RF enabled mission timelines. ***FY 2025 Plans:*** Will mature and demonstrate OCO/RF-enabled access and effects against targets of interest, enabling the commander to hold targets at risks in support of mission objectives; validate computer-assisted development to expedite access and effect, and reduce OCO/RF mission timelines; optimize concepts that reduce OCO/RF-enabled mission time to readiness through firing solution automation capabilities. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Decrease due to realignment in the amount of $0.834 million to PE 0603463A (Network C3I Advanced Technology) for mid-to-long term efforts to develop and demonstrate new Signals Intelligence (SIGINT) methods.			
Accomplishments/Planned Programs Subtotals	8.170	10.132	9.580

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603457A / *C3I Cyber Advanced Development*	Project (Number/Name) CB4 / *Offensive Cyber Operations (OCO) Mirror Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CB4: *Offensive Cyber Operations (OCO) Mirror Adv Tech*	-	1.968	-	-	-	-	-	-	-	-	0.000	1.968
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates methods, tools and techniques to enable rapid instantiation of an operationally relevant cyberspace environment supporting critical Offensive Cyber Operations (OCO) mission functions to include but not limited to development, exercise, mission rehearsal and provide technical reach back to units during operations.

Work in this Project complements Program Element (PE) 0602213A (C3I Applied Cyber) / Project 5CY (Offensive Cyber Operations (OCO) Mirror Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Offensive Cyber Operations Mirror	1.968	-	-
Description: This effort matures and demonstrates methods, tools, and techniques to enable rapid instantiation of an operationally relevant cyberspace environment supporting critical OCO mission functions to include but not limited to development, exercise, mission rehearsal and provide technical reach back to units during operations.			
Accomplishments/Planned Programs Subtotals	1.968	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603461A *I High Performance Computing Modernization Program*

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	-	293.043	255.772	239.597	-	239.597	245.350	258.877	261.701	264.317	0.000	1,818.657
DS7: *High Performance Computing Modernization Program*	-	243.043	255.772	239.597	-	239.597	245.350	258.877	261.701	264.317	0.000	1,768.657
DW5: *HIGH PERF COMP MODERN (HPCM) (CA)*	-	50.000	-	-	-	-	-	-	-	-	0.000	50.000

A. Mission Description and Budget Item Justification

The High Performance Computing Modernization Program (HPCMP) addresses the supercomputing requirements of Department of Defense (DoD) scientists and engineers by: (1) demonstrating and maturing the most advanced, leading-edge computational architectures while exploiting the resulting systems by employing complementary specialized expertise; (2) demonstrating and maturing the Defense Research and Engineering Network (DREN), which investigates, demonstrates, and matures leading-edge digital networking and security technologies to securely deliver computational capabilities to the distributed DoD Research, Development, Test, and Evaluation (RDTE) community; and (3) leveraging specialized expertise from DoD, other federal departments and agencies, industry, and academia to demonstrate and mature leading-edge software application codes. DoD Supercomputing Resource Centers (DSRCs) provide extensive computational capabilities to demonstrate and mature emerging technologies that address the supercomputing requirements of the DoD RDTE community in the areas of hardware, software, and programming environments. All HPCMP sites are interconnected to each other, the DoD High Performance Computing (HPC) RDTE community, and other major defense sites via the DREN, a research network which investigates, demonstrates, and matures (a) state-of-the-art digital networking technologies to ensure a robust distributed environment and (b) the most advanced digital security capabilities to protect the intellectual property of the DoD and its contract entities as they employ HPCMP capabilities. The HPCMP's software application effort (a) optimizes, enhances, demonstrates, and matures critical DoD physics-based and engineering software to allow scientists and engineers to execute calculations with precision and efficiency on leading-edge supercomputers, (b) demonstrates and matures immersive collaborative programming environments to improve science and engineering workflows, and (c) demonstrates and matures leading-edge computational technology from academia and industry. These synergistic activities collectively demonstrate and mature horizontal technologies that are exploited across the DoD RDTE community, ensuring the DoD maintains the most advanced research and development ecosystem in computationally-intensive modeling and design.

The research cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603461A *I High Performance Computing Modernization Program*

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	301.964	255.772	259.736	-	259.736
Current President's Budget	293.043	255.772	239.597	-	239.597
Total Adjustments	-8.921	0.000	-20.139	-	-20.139
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-8.921	-			
• Adjustments to Budget Years	-	-	-20.139	-	-20.139

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Project: DW5: *HIGH PERF COMP MODERN (HPCM) (CA)*		
Congressional Add: *Program increase*	50.000	-
Congressional Add Subtotals for Project: DW5	50.000	-
Congressional Add Totals for all Projects	50.000	-

Change Summary Explanation

Decrease funding reflect planned lifecycle for this effort.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603461A / *High Performance Computing Modernization Program*	Project (Number/Name) DS7 / *High Performance Computing Modernization Program*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DS7: *High Performance Computing Modernization Program*	-	243.043	255.772	239.597	-	239.597	245.350	258.877	261.701	264.317	0.000	1,768.657
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The High Performance Computing Modernization Program (HPCMP) addresses the supercomputing requirements of Department of Defense (DoD) scientists and engineers by (1) demonstrating and maturing the most advanced, leading-edge computational architectures and exploiting the resulting systems by employing complementary specialized expertise; (2) demonstrating and maturing the Defense Research and Engineering Network (DREN) which investigates, demonstrates, and matures leading-edge digital networking and security technologies to securely deliver computational capabilities to the distributed DoD Research, Development, Test, and Evaluation (RDTE) and acquisition engineering communities; and (3) leveraging specialized expertise from DoD, other federal departments/agencies, industry, and academia to demonstrate and mature leading-edge software application codes. DoD Supercomputing Resource Centers (DSRCs) provide extensive computational capabilities and demonstrate and mature emerging technologies that address the supercomputing requirements of the DoD RDTE and acquisition engineering communities in the areas of hardware, software, and programming environments. HPCMP sites are interconnected to each other, the DoD High Performance Computing (HPC) RDTE community, and other major defense sites via DREN, a research network which investigates, demonstrates, and matures (a) state-of-the-art digital networking technologies to ensure a robust distributed environment and (b) the most advanced digital security capabilities to effectively protect the intellectual property of the DoD and its contract entities as they employ HPCMP advanced capabilities. The HPCMP's software application effort (a) optimizes, enhances, demonstrates, and matures critical DoD physics-based and engineering software to allow scientists and engineers to execute calculations with precision and efficiency on leading-edge supercomputers, (b) demonstrates and matures immersive collaborative programming environments to improve science and engineering workflows, and (c) demonstrates and matures leading-edge computational technology from academia and industry. These synergistic activities collectively demonstrate and mature horizontal technologies that are exploited throughout the DoD RDTE and acquisition engineering communities, ensuring the DoD maintains the most advanced research ecosystem in the areas of computationally-intensive modeling and design.

The research cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Department of Defense Supercomputing Resource Centers	139.101	146.387	141.847
Description: The effort investigates, demonstrates, and matures general and special-purpose supercomputing environments that incorporate the most advanced, leading-edge computational architectures, distributed mass storage technologies, and data analysis methodologies; employs complementary specialized expertise to mature and exploit these environments; enables the			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603461A / *High Performance Computing Modernization Program*	**Project (Number/Name)** DS7 / *High Performance Computing Modernization Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
DoD RDTE and acquisition engineering communities to effectively and efficiently investigate, demonstrate, and mature a broad range of technologies through advanced computational methods. ***FY 2024 Plans:*** Will mature and demonstrate over 20 high-end computers across a full range of classifications at five geographically distributed DoD supercomputing resource centers to collectively provide between 110 and 115 quadrillion floating-point operations per second of capability. Will continue to conduct complex, tightly-coupled, large-scale, scientific and engineering simulations and analyses that mature and demonstrate capabilities for important DoD research, test, and development priorities. Will mature and demonstrate emerging data-intensive computing and persistent data services for DoD use cases. Will continue to mature new technologies for accelerating computations, storing/retrieving large volumes of data (over 200 quadrillion bytes in total), and providing on-demand and secure access to high-end computers. Will mature appropriate, approved solutions for sharing highly classified high-end computers among multiple special programs. Will mature and demonstrate seamless sharing of resources across DSRCs and transparent interfaces with cloud computing services for those DoD entities that demand a hybrid compute capability. ***FY 2025 Plans:*** Will mature and demonstrate 24 or more high-end computers across a full range of classifications at five geographically distributed DoD supercomputing resource centers to collectively provide over 120 quadrillion floating-point operations/calculations per second of capability. Will continue to conduct complex, highly-coupled, large-scale, scientific and engineering simulations and analyses that mature and demonstrate capabilities for important DoD research, development, and test priorities. Will continue to mature and demonstrate data-intensive computing, persistent data services, and data archiving/retrieval for artificial intelligence/machine learning and other DoD use cases employing large volumes of data (over 250 quadrillion bytes in total). Will continue to mature new technologies for accelerating computations and sharing of highly classified high-end computers among multiple special programs. Will continue to mature and demonstrate seamless access to resources across DSRCs and transparent interfaces with cloud computing services for those DoD entities that demand a hybrid compute capability. Will implement new high-end computing capabilities to support technology transition efforts in acquisition engineering and international collaboration. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects the adjusted scope to reduce the level of resources provided by HPCMP to stakeholder organizations.			
Title: Defense Research and Engineering Network (DREN)	52.740	55.501	56.361
Description: The DREN effort investigates, demonstrates, and matures state-of-the-art digital networking technologies to ensure a robust distributed environment among HPCMP sites, the DoD HPC RDTE and acquisition engineering communities, and other major defense sites; investigates, demonstrates, and matures the most advanced digital security capabilities to effectively			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603461A / *High Performance Computing Modernization Program*	**Project (Number/Name)** DS7 / *High Performance Computing Modernization Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
protect the intellectual property of the DoD and its contract entities as they employ HPCMP advanced capabilities; employs complementary specialized expertise to mature and exploit this environment. ***FY 2024 Plans:*** Will mature and demonstrate secure, advanced networking across a full range of classifications to provide over 1500 Gigabits per second of aggregate bandwidth to more than 215 CONUS and 12 OCONUS sites to implement computational workflows that employ various combinations of high-end computing resources, research assets, test center devices, weapon/platform prototypes, and live participants to mature and demonstrate capabilities for important DoD research, test, and engineering priorities. Will expand DREN installation in the Pacific and other regions of interest to meet test requirements in response to emerging threats. Will continue to mature and enhance the secure protection of DREN from external and internal threats to effectively protect the intellectual property of the DoD and its contract entities engaged in research, test, and engineering missions. ***FY 2025 Plans:*** Will mature and demonstrate secure, advanced networking across a full range of classifications to provide over 1600 Gigabits per second of aggregate bandwidth to more than 230 CONUS and 18 OCONUS sites to implement computational workflows that employ various combinations of high-end computing resources, research assets, test center devices, weapon/platform prototypes, and live participants to mature and demonstrate capabilities for important DoD research, test, and engineering priorities. Will continue to expand DREN installation in the Pacific and other regions of interest to meet test requirements in response to emerging threats. Will continue to mature and enhance the secure protection of DREN from external and internal threats to effectively protect the intellectual property of the DoD and its contract entities engaged in research, test, and engineering missions. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the adjusted scope planned lifecycle of this effort.			
Title: Software Applications ***Description:*** This effort optimizes, enhances, demonstrates, and matures software applications to provide for the adaptation of widely used applications and algorithms to address RDTE and acquisition engineering communities requirements. The Computational Research Engineering Acquisition Tools and Environments (CREATE) initiative demonstrates and matures advanced application codes to allow scientists and engineers to use supercomputers to design and analyze virtual prototypes of DoD ships, fixed-wing aircraft, rotorcraft, ground vehicles, and radio frequency (RF) antennas; HPCMP Institutes demonstrate and mature advanced supercomputing application codes to address critical high-impact DoD challenges (e.g. blast protection for platforms and personnel, high-power microwaves and lasers, munition sensitivities, and mobile network designs/prototypes); High Performance Computing Applications Software Initiative (HASI) projects address the need to mature and refine critical DoD software that can take advantage of new and emerging hardware advances; the Frontier initiative represents and supports	51.202	53.884	41.389

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603461A / *High Performance Computing Modernization Program*	**Project (Number/Name)** DS7 / *High Performance Computing Modernization Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
the DoD's highest-priority, highest-impact, most demanding computational work, both from a technical and mission-relevance standpoint; the Productivity, Enhancement, Technology Transfer, and Training (PETTT) initiative (1) optimizes and enhances critical DoD physics based and engineering software to allow scientists and engineers to execute scientific calculations with precision and efficiency on leading-edge supercomputers, (2) demonstrates and matures immersive collaborative programming environments to improve science and engineering workflows, and (3) demonstrates and matures leading-edge computational technology from academia and industry. ***FY 2024 Plans:*** Will mature and demonstrate 12 software applications for high-end computers to be used by over 150 DoD stakeholder organizations in air, land, and sea programs of record (PORs) as well as future concept development for DoD's highest priorities. Will mature and demonstrate software tools and environments for high-end computers and provide training to over 3000 users to improve resource effectiveness and impact. Will mature software applications for the operation of DSRC high-end computers in support of over 2000 users and operational staff. ***FY 2025 Plans:*** Will continue to mature and demonstrate 12 software applications for high-end computers to be used by over 150 DoD stakeholder organizations in air, land, and sea programs of record (PORs) as well as future concept development for DoD's highest priorities. Will continue to mature and demonstrate software tools and environments for high-end computers and provide training to over 3000 users to improve resource effectiveness and impact. Will continue to mature software applications for the operation of DSRC high-end computers in support of over 2000 users and staff. Will demonstrate new HPC tools for acquisition engineering. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects the adjusted scope to reduce the level of resources provided by HPCMP to stakeholder organizations.			
Accomplishments/Planned Programs Subtotals	243.043	255.772	239.597

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603461A / *High Performance Computing Modernization Program*	Project (Number/Name) DW5 / *HIGH PERF COMP MODERN (HPCM) (CA)*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DW5: *HIGH PERF COMP MODERN (HPCM) (CA)*	-	50.000	-	-	-	-	-	-	-	-	0.000	50.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project enables the Defense Research, Development, Test and Evaluation (RDT&E) community to resolve critical scientific and engineering problems more quickly, and with more precision, using advanced, physics-based computer simulation supported by high performance computing (HPC) technology. The computational expertise and resources enable Department of Defense (DoD) personnel to analyze phenomena that are often impossible, not cost effective, too time-consuming, or too dangerous to study any other way. The High Performance Computing Modernization Program (HPCMP) supports the requirements of the DoD's scientists and engineers in three major areas of effort: supercomputing resource centers, the Defense Research and Engineering Network (DREN), and software applications. DoD Supercomputing Resource Centers (DSRCs) provide extensive capabilities and demonstrate new technologies that address user requirements for hardware, software, and programming environments. Efforts of the DSRCs are augmented by dedicated HPC project investments (DHPIs) that address near real-time and real-time HPC requirements. All sites in the HPC Modernization Program are interconnected to one another, the user community, and major defense sites via the DREN, a research network which matures and demonstrates state-of-the-art computer network technologies. The Software Application effort optimizes and improves the performance of critical common DoD applications programs to run efficiently on advanced HPC systems, matures and demonstrates leading-edge computational technology from academic and commercial partners, and provides collaborative programming environments.

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
Congressional Add: Program increase	50.000	-
FY 2023 Accomplishments: Congressional Interest Item funding provided for High Performance Computing Modernization Program		
Congressional Adds Subtotals	50.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603462A *I Next Generation Combat Vehicle Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	467.533	217.394	175.198	-	175.198	185.579	198.631	207.126	206.895	0.000	1,658.356
BF4: *Combat Vehicle Robotics Adv Tech*	-	29.321	34.703	30.939	-	30.939	39.031	40.027	42.905	43.876	0.000	260.802
BF7: *Crew Augmentation and Optimization Adv Tech*	-	4.326	3.812	4.367	-	4.367	4.424	4.427	4.475	4.520	0.000	30.351
BG1: *Sensors for Auto Oper and Survivability Adv Tech*	-	12.328	12.726	9.592	-	9.592	9.591	12.767	12.905	13.034	0.000	82.943
BG3: *Modeling and Simulation for MUMT Advanced Tech*	-	5.816	6.276	6.456	-	6.456	6.775	6.729	7.154	6.703	0.000	45.909
BG7: *Ground Systems Active Defense (GSAD) Advanced Tech*	-	59.331	60.617	51.960	-	51.960	52.996	56.772	66.034	62.981	0.000	410.691
BG9: *Obscuration Advanced Technology*	-	2.664	-	-	-	-	-	-	-	-	0.000	2.664
BH6: *Platform Electrification and Mobility Adv Tech*	-	45.728	65.647	40.579	-	40.579	42.489	41.422	45.167	45.618	0.000	326.650
BH8: *Enhanced VETRONICS Advanced Technology*	-	10.776	10.268	13.867	-	13.867	18.958	22.447	20.007	20.227	0.000	116.550
BI3: *Sensor Protection Advanced Technology*	-	1.666	1.746	1.752	-	1.752	1.748	1.750	1.769	1.787	0.000	12.218
BI5: *Materials Application and Integration Adv Tech*	-	3.979	5.502	-	-	-	-	-	-	-	0.000	9.481
BK1: *Autonomous Mobility Adv Tech*	-	6.221	5.305	3.860	-	3.860	-	-	-	-	0.000	15.386
BK4: *Next Gen Intelligent Fire Control(NG-IFC) Adv Tech*	-	2.118	4.328	-	-	-	-	-	-	-	0.000	6.446
BK6: *Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech*	-	1.478	2.062	7.620	-	7.620	9.567	12.290	6.710	8.149	0.000	47.876

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603462A *I Next Generation Combat Vehicle Advanced Technology*							
BP6: *Ground Vehicle Advanced Technology(CA)*	-	278.450	-	-	-	-	-	-	-	-	0.000	278.450
BZ9: *Smart Targeting Environment for Lower Level Assets*	-	3.331	4.402	4.206	-	4.206	-	-	-	-	0.000	11.939

A. Mission Description and Budget Item Justification

This Program Element (PE) executes development, maturation, and demonstration for the Army's modernization priority for the Next Generation of Combat Vehicle (NCCV). This PE matures, integrates and demonstrates combat vehicle technologies that enable the Army to have a smarter, faster, more lethal, more precise, more protected, and more adaptable force. Technology development builds upon the foundational vehicle architectures to support the NGCV, to include autonomy architecture, power architecture, vehicle electronic architecture, physical architecture, lethality architecture and vehicle protection architecture. Technologies developed, matured, and demonstrated will enable leap ahead capabilities for manned, optionally manned and unmanned vehicles that deliver decisive lethality.

Research in this PE complements PE 0602141A (Lethality Technology), PE 0602144A (Ground Technology), PE 0602145A (Next Generation Combat Vehicle Technology), PE 0602146A (Network C3I Technology), PE 0603116A (Lethality Advanced Technology), PE 0603119A (Ground Advanced Technology), PE 0603463A (Network C3I Advanced Technology), PE 0604115A (Technology Maturation Initiatives), and PE 0708045A (End Item Industrial Preparedness Activities). Research in this PE also transitions to PE 0603645A (Armored Systems Modernization Adv Dev) and PE 0604017A (Robotics Development).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Research is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center, Armament Center, Ground Vehicle Systems Center, and the Geotechnical and Structures Laboratory.

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	471.434	217.394	195.971	-	195.971
Current President's Budget	467.533	217.394	175.198	-	175.198
Total Adjustments	-3.901	0.000	-20.773	-	-20.773
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.303	-			
• SBIR/STTR Transfer	-2.598	-			
• Adjustments to Budget Years	-	-	-20.773	-	-20.773

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603462A *I Next Generation Combat Vehicle Advanced Technology*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Project: BP6: *Ground Vehicle Advanced Technology(CA)*		
Congressional Add: *Program Increase - Additive Manufacturing for Jointless Hull*	20.000	-
Congressional Add: *Program Increase - ATE5.2 Engine Development*	10.000	-
Congressional Add: *Program Increase - Virtual and Physical Prototyping*	8.000	-
Congressional Add: *Program Increase - HMMWV Automotive Enhancements*	9.000	-
Congressional Add: *Program Increase - Advanced Adhesives*	5.000	-
Congressional Add: *Program Increase - Autonomous Minefield Clearance*	8.000	-
Congressional Add: *Program Increase - Carbon Fiber Tires*	5.000	-
Congressional Add: *Program Increase - Machine Learning for Advanced Lightweight Combat Vehicle Structures*	19.000	-
Congressional Add: *Program Increase - Maneuverable Lightweight Electric Weight Reducer*	7.500	-
Congressional Add: *Program Increase - Off-Road Maneuver*	5.000	-
Congressional Add: *Program Increase - Predictive Maintenance System*	2.000	-
Congressional Add: *Program Increase - Unmanned Navigational Technology*	3.000	-
Congressional Add: *Program Increase - AUGMENTED REALITY FOR DENIED ENVIRONMENTS*	7.000	-
Congressional Add: *Program Increase - AUTONOMOUS SYSTEMS FOR MILITARY GROUND VEHICLES*	3.750	-
Congressional Add: *Program Increase - CYBERSECURITY FOR AUTONOMOUS GROUND VEHICLES*	9.000	-
Congressional Add: *Program Increase - CYBERSECURITY FOR AUTONOMOUS VEHICLES*	4.200	-
Congressional Add: *Program Increase - DIGITAL ENTERPRISE TECHNOLOGY FOR OMFV*	15.000	-
Congressional Add: *Program Increase - DIGITAL TWIN*	7.000	-
Congressional Add: *Program Increase - ELECTRIC DRIVE SYSTEM*	5.500	-
Congressional Add: *Program Increase - ELECTRIFIED VEHICLE INFRARED SIGNATURE MANAGEMENT*	5.000	-
Congressional Add: *Program Increase - ELECTRON BEAM ADDITIVE MANUFACTURING OF CRITICAL METAL RING COMPONENTS*	2.000	-
Congressional Add: *Program Increase - ENHANCED LETHALITY ON ARMY SMALL MULTIPURPOSE EQUIPMENT TRANSPORT*	8.000	-
Congressional Add: *Program Increase - HMMWV OCCUPANCY PROTECTION DEVELOPMENT*	10.000	-
Congressional Add: *Program Increase - HUMAN DIGITAL TWINS AND HUMAN-MACHINE INTERACTION*	6.000	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603462A *I Next Generation Combat Vehicle Advanced Technology*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Congressional Add: *Program Increase - MODELING AND SIMULATION ACTIVITIES FOR VEHICLE DEVELOPMENT*	10.000	-
Congressional Add: *Program Increase - MODULAR ELECTRIC MOTORS*	5.500	-
Congressional Add: *Program Increase - MULTI-SERVICE ELECTRO-OPTICAL SIGNATURE CODE*	9.000	-
Congressional Add: *Program Increase - NANO-LED FABRICATION FOR AUGMENTED REALITY CONTACT LENS*	10.000	-
Congressional Add: *Program Increase - NEXT GENERATION ELECTRIFIED TRANSMISSION*	5.000	-
Congressional Add: *Program Increase - NEXT GENERATION LIGHT TACTICAL VEHICLE MANEUVER AUTONOMY*	5.000	-
Congressional Add: *Program Increase - SYNTHETIC GRAPHITE BATTERY*	10.000	-
Congressional Add: *Program Increase - VEHICLE TECHNOLOGY READINESS LEVELS*	3.000	-
Congressional Add: *Program Increase - ABRAMS MODERNIZATION*	30.000	-
Congressional Add: *Program Increase - SMALL UNIT GROUND ROBOTIC CAPABILITIES*	7.000	-
Congressional Add Subtotals for Project: BP6	278.450	-
Congressional Add Totals for all Projects	278.450	-

Change Summary Explanation

The decrease in Fiscal Year (FY) 2025 funding from the Previous President's Budget (PB) to the Current PB is due to efforts transitioning for maturation and demonstration.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BF4 / *Combat Vehicle Robotics Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BF4: *Combat Vehicle Robotics Adv Tech*	-	29.321	34.703	30.939	-	30.939	39.031	40.027	42.905	43.876	0.000	260.802
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates innovative enabling technologies that permits scalable integration of multi-domain robotic and autonomous system capabilities teamed within Army formations supporting all combat warfighting functions (close combat, reconnaissance, targeting and acquisition, etc.). Project focus areas include Platform Electronic Control and Autonomy Safety Engineering, Unmanned Maneuver Technologies, and Soldier-Robotic Interface Integration This Project integrates these technologies with other robotic and autonomous system technologies and validates technology maturity through Engineering Evaluation Testing (EET). This Project also demonstrates robotic and autonomous system technologies in relevant environments. Once capabilities mature to a technology readiness level (TRL) of 6 they are promoted into the appropriate product (safety, autonomy, control) and made available to all partners. This project will also mature and demonstrate the mission scenarios focused on small, unmanned ground vehicles as a deployable sensor, autonomous forward surveillance and autonomous battle drills. These missions will enhance autonomy, safety and control technologies and wrap back into the core products once completed.

This project is also coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology), and transitions to PE 0604017A (Robotics Development).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy (AMS).

Work in this Project is performed by the Ground Vehicle System Center (GVSC)

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Platform Electronic Control	8.786	6.229	5.225
Description: This effort optimizes the electronic, closed loop control of by-wire vehicle systems to provide stable, reliable, and predictable control in the presence of potential malicious or unintended commands for both wheeled and tracked unmanned vehicles.			
FY 2024 Plans: Will mature and continue to optimize an expanded closed-loop drive by wire (DBW) system for robotic ground systems. Will develop and optimize Robotic Vehicle Integration and Safety (RVIS) components for unmanned systems with emphasis on Modular Open System Approach (MOSA) principals. Will develop RVIS components to align with the Autonomous Ground Vehicle Reference Architecture (AGVRA) framework and known safety standards to increase the safety performance of unmanned ground			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BF4 / *Combat Vehicle Robotics Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
vehicle systems. Will demonstrate enhancements through Engineering Evaluation Testing (EET) to show technical maturity of developed components. Will continue to mature and validate Robotic and Autonomy Systems (RAS) safety standards for unmanned ground vehicle systems based on EET activities. Will continue to update Ground Vehicle Robotics Safety Board published guidelines to show they meet best practices for development of safety critical software for unmanned ground vehicle systems while incorporating lessons learned. ***FY 2025 Plans:*** Will mature and continue optimization of safety processes, components, and software focused on low level control (base vehicle platforms sensors, Drive By-Wire (DBW) systems, payload/subsystem management/monitoring) for uncrewed systems. Will expand integration of safety certified components onto uncrewed systems to improve safe mobility with positive control for uncrewed ground vehicles. These certified components and subsystems will increase reliability of the platform, mean time between failure, and improve operational safety for users and close operators. Maturation of safety components will expand utilization of Real Time Operating Systems (RTOS) and align to well defined systems safety standards to improve the necessary Level of Rigor for autonomous vehicle systems. Safety processes and components are aligned with the Autonomous Ground Vehicle Reference Architecture (AGVRA) framework and GCS Common Infrastructure Architecture (GCIA) to maintain seamless interfacing with ongoing improvement to the ARMY autonomy libraries, and user interfaces with additional maturation focus on standardizing interface to support industry autonomy stacks and components. Will mature and improve Robotic and Autonomy Systems (RAS) safety standards for uncrewed ground vehicle systems. Will expand the Ground Vehicle Robotics (GVR) Safety Council which manages, reviews, and publishes guidelines to improve on best practices for development of safety critical processes, components, and software for uncrewed ground vehicle systems. The Ground Vehicle Robotics Safety Council develops, manages, and maintains the safety processes and documentation for GVR ensuring GVR programs in the organization adhere to organizational standards and are ready for verification and validation by the test community. This will improve testing with warfighters and reduce developmental of autonomous ground systems. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding for platform electronic control is decreased in FY25 due to maturing system safety processes to focus on optimization to reduce overall development, integration, and safety risks.			
Title: Unmanned Maneuver	14.135	20.346	16.950
Description: This effort matures and demonstrates the advanced mobility performance of autonomous systems within complex, combat scenarios to allow for the completion of mission goals in individual and teaming configurations at various levels of autonomy. ***FY 2024 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BF4 / *Combat Vehicle Robotics Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will improve and demonstrate autonomous maneuver in degraded or hostile environments, enabling autonomous maneuvers in areas where sensor performance is poor (e.g. due to weather or smoke) and communications are not reliable. Will demonstrate coordinated movements using robotic or human team members. Will improve night-time operation of autonomous vehicles by reducing vehicle signatures through the implementation of passive sensing techniques. Will continue to mature the AGVRA framework by updating based on previous versions of conceptual, logical and physical data models while connecting them to exiting instantiated architectures. Will mature the safety and cyber meta-models and libraries associated with the AGVRA in order to support these evolving viewpoints. Will mature AGVRA functional model stereotypes by building functional models to demonstrate a cohesive functional model baseline. Will develop and mature the Robot Operating System - Military (ROS-M) to support the ability to register and distribute concepts including hardware, specifications, requirements, standards, and architectures associated to Robotic and Autonomous System (RAS) models within the Robotic Technology Kernel (RTK). ***FY 2025 Plans:*** Will improve and demonstrate an autonomous maneuver capabilities, with autonomous vehicles operating at speeds comparable to manned vehicles and executing comparable movement techniques in obstructed environments. Will continue to improve and demonstrate coordinated movements including both robotic platforms and Soldiers in these environments, such as collaborate zone-based surveillance. Will continue to improve performance and demonstrate autonomous maneuver in degraded or hostile environments, enabling autonomous maneuvers in areas where sensor performance is poor (e.g., due to weather or smoke) and communications are not reliable. Will improve night-time operation of autonomous vehicles by reducing vehicle signatures through implementation of passive sensing techniques developed by Autonomous Behaviors and Perception subtask.aap Will mature the Autonomous Ground Vehicle Reference Architecture (AGVRA) framework by developing conceptual, logical and physical data models while connecting them to existing instantiated architectures and mature the safety and cyber metamodels and associated libraries to support these evolving viewpoints. Will mature AGVRA functional model elements and linemature functional models to demonstrate a cohesive functional model, and advance overall mission modeling and test planning. Will implement provide cyber hardened architecture aspects into Robotic Technology Kernel (RTK), including the development of a broad mission threat model, verification plan, and penetration testing plans. Will improve and demonstrate the Interoperability implementation to account for advances in all product lines. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decreased in FY 2025 due to maturing small platform autonomy, with funding efforts realigned to Small UGV as a Deployable Sensor task.			
Title: Soldier-Robotic Interface Integration ***Description:*** This effort is a focused approach to optimize control of the unmanned systems with improved performance incorporating Manned-Unmanned Teaming enabled formations and is measured against multiple phases of the combat scenario for improved operational effectiveness and overall system performance.	4.104	5.657	5.892

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BF4 / *Combat Vehicle Robotics Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
FY 2024 Plans: Will develop an enhanced network situational awareness capability through the integration of communication and network technology into the Warfighter Machine Interface (WMI). this will create an enriched user interface development, which will allow (in a much more effective manner) the robot operator to have a greater understanding of the boto's situational awareness and its ability to maneuver. This will create a greater ability to complete the mission and successfully achieve objectives. Will focus on integration of the WMI into RVIS model. These will be visible at the EET as the SRI technologies will be linked across many of the testing events. ***FY 2025 Plans:*** Will improve and demonstrate the ability to operate three or more robotic assets from by a single operator within through the Warfighter Machine Interface (WMI). This task will develop improve the user interface minimize the by reducing the cognitive workload on a single operator and while allowing the robot operator to achieve the mission with more effective improved understanding of the robot's situational awareness, ability to maneuver and achieve the mission fully. Will integration into RVIS model. These functions will be visible validated at the Engineering Evaluation Test's (EET) as through the soldier robotic interface technologies will be linked linkage across many of the testing events. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding is increased in FY25 due to the increasing complexity of Combat Vehicle Robotics Technology Human Robotic Interaction technologies from utilizing single voice recognition to natural language processing.			
Title: Small UGV as Deployable Sensor ***Description:*** This effort improves the long range autonomy, mobility and sensing capabilities of small UGVs to expand reconnaissance in terrains and environments large systems cannot reach (i.e. culverts, underground, dense urban) and to serve as unmanned listening & observation posts. The small UGVs will deploy out of NGCV systems to enhance battlespace awareness and reduce the risk to the systems. ***FY 2024 Plans:*** Will integrate, optimize, and demonstrate advanced autonomy behaviors, including: Intelligence, Surveillance and Reconnaissance (ISR) sensors, and optimize small unmanned ground system platform and controls. Will implement and demonstrate greater autonomy behaviors for small UGVs by improving their unmanned systems teaming abilities through the enhancement of their RTK capabilities, allowing them to autonomously deploy from an unmanned combat vehicle, maneuver in rough terrain, and perform reconnaissance tasks & surveillance. Will integrate and demonstrate Artificial Intelligence (AI) enabled optical and audio Modular Mission Payload (MMP) sensors with small UGV autonomy, allowing them to optimize threat and target detection probability when performing reconnaissance and surveillance missions. Will develop and mature an optimized system control architecture to overcome the SWaP limitations of small platforms when enabled with the sensors required to perform	2.296	2.471	2.872

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BF4 / *Combat Vehicle Robotics Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
complex tasks and extended mission times. Will demonstrate these enhancements through EET ensuring the autonomous technology and integrated MMPs have been fully evaluated for system safety, performance and technical maturity. ***FY 2025 Plans:*** Will continue to integrate, optimize, and demonstrate advanced autonomy behaviors, Intelligence, Surveillance, and Reconnaissance (ISR) sensors, and optimize small, unmanned ground system platform and controls (using the Warfighter Machine Interface - WMI). Will mature and demonstrate enhanced autonomy behaviors for small Unmanned Ground Vehicles by continuing to improve the RTK capabilities for small platform teaming to autonomously deploy from an unmanned combat vehicle and maneuver in rough terrain to perform tasks ISR missions. Will integrate and demonstrate Artificial Intelligence (AI) enabled electro-optical and audio Modular Mission Payload (MMP) sensors with small UGV autonomy to optimize threat and target detection probability when performing ISR missions. Will validate maturity of enhancements through Engineering Evaluation Testing (EET) of the autonomous technology and integrated MMPs in terms of performance, and technical maturity, while ensuring safe operation. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding is increased in FY25 as the efforts in PE 0602145A / Next Generation Combat Vehicle Technology, Project BF3 / Combat Vehicle Robotics Tech accelerate matured autonomy behaviors for soldier experimentation and feedback.			
Accomplishments/Planned Programs Subtotals	29.321	34.703	30.939

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BF7 / *Crew Augmentation and Optimization Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BF7: *Crew Augmentation and Optimization Adv Tech*	-	4.326	3.812	4.367	-	4.367	4.424	4.427	4.475	4.520	0.000	30.351
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates advanced technologies to enable crew augmentation and optimization for closed hatch operations of ground vehicle platforms in a complex multi-domain operations environment. This includes integration of intelligent technologies to improve dynamic tasking and full crew interactions, machine learning to improve decision aids, early warnings, reduce response times and shorten task durations, and machine learning to optimize tasking and function. Mature technologies are incorporated onto existing or prototype Army-owned technology demonstrators so that performance of the enabling technologies can be evaluated.

Work in this Project is also coordinated with work in Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology) and PE 0602143 (Soldier Lethality Technology)

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy. Research in this Project supports the Next Generation Combat Vehicle Army Modernization Priority.

Work in this Project is performed by the Ground Vehicle System Center (GVSC)

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Crew Augmentation and Optimization Advanced Technology	4.326	3.812	4.367
Description: This effort focuses on optimizing crew station technologies while reducing crew sizes that will provide the same overall performance by exploiting human-machine interaction technologies, automation, machine intelligence and customization to permit soldiers to achieve performance beyond today's constrained ground vehicle environment. This effort focuses on the down-selection, integration, optimization, and demonstration of crew interaction technologies. It enables universal crew interfaces across multiple platforms that enhance crew interactions while reducing crew size.			
FY 2024 Plans: Will integrate, optimize, and demonstrate an initial capability for embedded training tools that facilitate soldier comprehension and utilization of autonomous systems; integrate, mature, and demonstrate technologies that automate re-allocation of tasks of vehicle crew members to reduce overall soldier cognitive load; mature and demonstrate technology aids to process and share information			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BF7 / *Crew Augmentation and Optimization Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
between crew and autonomous agents to improve vehicle and overall platoon-level situational awareness; validate platoon-level maneuver effectiveness in an operationally-relevant field demonstration. ***FY 2025 Plans:*** Will mature and demonstrate technologies that augment overall NGCV crew task load. Will demonstrate use of augmentation technology aids and virtual control to facilitate battlespace awareness of events taking place outside the vehicle in simulation of closed hatched operations, improving protection for Soldiers operating NGCVs. Will optimize NGCV crew and/or formation notifications and cuing of mid-mission events. Will integrate, optimize and demonstrate advanced crew-to-section embedded training capability for NGCV platforms. Will validate effectiveness in an operationally-relevant, field demonstration. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Accomplishments/Planned Programs Subtotals	4.326	3.812	4.367

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BG1 / *Sensors for Auto Oper and Survivability Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BG1: *Sensors for Auto Oper and Survivability Adv Tech*	-	12.328	12.726	9.592	-	9.592	9.591	12.767	12.905	13.034	0.000	82.943
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures, optimizes, and demonstrates automated, advanced multi-function sensors and integrates threat cueing capabilities for operations in full spectrum, complex environments, for next generation manned, optionally manned, and robotic platform applications. This Project will deliver sensor payloads which provide greatly increased situational awareness (e.g., pre-shot and hostile fire detection, threat classification) in all environments for manned and unmanned ground vehicle systems.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy. Research in this Project supports the Army Science and Technology modernization priorities.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Sensors with Embedded Processing	8.695	8.989	5.827
Description: Matures and demonstrates advanced, multi-spectral and multi-function sensors, and image processing capabilities with improved performance in all environments and against all threats to include low-contrast targets in camouflage or in degraded conditions. Matures and demonstrates rapid detection of concealed enemy optical threat systems (visible, midwave infrared, longwave infrared) and real-time hostile fire detection (HFD) for anti-armor threats while on the move, exploiting multi-functional imaging components and embedded processing. Enables enhanced situational awareness and targeting capabilities in complex environments via manned, optionally manned, and robotic platform applications.			
FY 2024 Plans: Will integrate advanced high speed, high sensitivity sensor components with novel uncooled infrared sensors to enable a modular uncooled infrared sensor system with low power processing and reduced size, weight, and power (SWAP); integrate optimized, far target location capability into advanced targeting system for increased performance while on-the-move; demonstrate targeting and threat detection sensors with embedded processing for detection of threats at increased range in complex environments; improve sensor-to-shooter timelines through automation of low level sensor tasking.			
FY 2025 Plans: Will develop advanced sensor components to inform future maturation of a common, modular multispectral sensor system with low power processing and reduced SWaP; mature and demonstrate precision far target location for on-the-move performance			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG1 / *Sensors for Auto Oper and Survivability Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
and reduced crew workload for legacy and next generation targeting and surveillance systems; exploit targeting and threat detection sensors with embedded processing in a laboratory environment to validate reduced user interactions and improved crew performance; optimize sensor-to-shooter timelines through automation of low-level sensor tasking and smart fusion of sensor data outputs. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects elimination of efforts to mature sensor components for a common, modular multispectral sensor system with low power processing and reduced SWAP.			
Title: Multi-Mission Payload ***Description:*** Matures and demonstrates sensor payloads for ground vehicle based unmanned aerial systems to detect line of sight, and beyond line of sight threats and complex obstacles such as personnel and vehicles in all environments. ***FY 2024 Plans:*** Will demonstrate polarization sensors co-located with existing electro-optic/infrared (EO/IR) sensors and advanced lasers on a rotary wing small unmanned aerial system (sUAS) to enhance detection of a wider range of threats and to improve target location capabilities in complex terrain and temperate environments; demonstrate real-time feature extraction and target detection capabilities on-board the sUAS to detect near peer threats while suppressing clutter to reduce false alarms ***FY 2025 Plans:*** FY 2025 Plans: Will optimize polarized sensors and demonstrate with embedded detection algorithms and a ground penetrating radar sensor with synthetic aperture radar processing to accurately identify locations of near peer threats from small UAS systems. Will provide threat data and their precise locations onto the tactical network from the sUAS in real time to support maneuver decisions for improved survivability of US combat vehicles. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase is an economic adjustment.	3.633	3.737	3.765
Accomplishments/Planned Programs Subtotals	12.328	12.726	9.592

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BG3 / *Modeling and Simulation for MUMT Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BG3: *Modeling and Simulation for MUMT Advanced Tech*	-	5.816	6.276	6.456	-	6.456	6.775	6.729	7.154	6.703	0.000	45.909
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates modeling and simulation (M&S) tools/technologies to assess and improve freedom of movement for ground forces and supports vehicle developers by addressing challenges for robotic and ground vehicles. This Project matures and demonstrates obstacle detection capabilities for autonomous systems operating in complex environments. This Project also matures and demonstrates real-time mobility decision support tools, vehicle-terrain interaction models for autonomous convoy operations, simulation tools for vehicle mobility in highly altered terrain, and M&S tools for predicting the performance of autonomous vehicles. These M&S technologies can be integrated across Army vehicle platforms as required.

Work in this Project is coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology) / Project BG2 (Modeling and Simulation for MUMT Technology).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center Geotechnical and Structures Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Simulation Tools for Combat Vehicle Robotics (CoVeR) Demonstrations ***Description:*** This effort matures and demonstrates M&S tools to support the development of autonomous ground vehicle platforms and components for successful maneuver in unstructured and mission relevant environments. This effort demonstrates M&S capabilities to evaluate hardware and software technologies enabling battlefield autonomy in complex and challenging environments.	5.816	-	-
Title: Autonomous Vehicle/Terrain Interactions Demonstration ***Description:*** This effort matures and demonstrates the Virtual Autonomous Navigation Environment (VANE) to robustly simulate multiple vehicles/teaming behaviors operating in complex formations and complex, unstructured environments. This effort provides the capabilities to computationally assess manned/unmanned vehicle maneuvering through cross-country environments ensuring battlefield overmatch. ***FY 2024 Plans:***	-	6.276	6.456

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG3 / *Modeling and Simulation for MUMT Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will integrate robust, high-fidelity, physics-based sensor models into the Virtual Autonomous Navigation Environment (VANE) M&S tool. Will demonstrate high-fidelity M&S tools integrated with Software-in-the-Loop capabilities to simulate and predict simple, coordinated manned-unmanned teaming movements. Will demonstrate the rapid generation of relevant geospacial world scenes. ***FY 2025 Plans:*** Will integrate and demonstrate high-fidelity M&S tools coupled with software-in-the-loop capabilities simulating and predicting human/machine interactions of collaborative MUM-T movements. Will demonstrate advanced vehicle terrain interface and soft-soil terramechanics for ground vehicle systems operating and highly altered terrain/environments. Will integrate and demonstrate real-time, physics-based thermal sensor modeling capabilities in operational environments. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned increase of workflows for this effort as technologies are transitioned for maturation and demonstration.			
Accomplishments/Planned Programs Subtotals	5.816	6.276	6.456

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BG7: *Ground Systems Active Defense (GSAD) Advanced Tech*	-	59.331	60.617	51.960	-	51.960	52.996	56.772	66.034	62.981	0.000	410.691
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates protection and survivability technologies to increase the survivability of ground vehicles and the protection of the Soldiers who depend on them. The tasks will focus on component maturation and demonstration and transfer products for demonstration as holistic (vehicle level) solutions. The Project will mature and demonstrate technologies to defeat threats throughout the timeline of a threat engagement; from obscuring a target, to actively defeat a threat and through mitigating its effects after engagement. These technologies include the active employment of smoke, physical and electronic active protection, advanced and adaptive armors, advanced and active blast mitigation systems and adaptive interior protection.

This Project will be coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology) and transitions to PE 0604852A (Suite of Vehicle Protection Systems - EMD).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Ground Vehicle System Center (GVSC) and Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Radar and Soft-Kill (A-RASK) Suite	6.567	6.836	6.620
Description: This effort matures and demonstrates next generation vehicle radar technologies and holistic electronic warning and soft-kill countermeasure techniques to support a layered modular active protection suite and ensure the survivability of ground combat platforms in all-weather day or night conditions with 360 degree situational awareness and threat Anti-Tank Guided Missile (ATGM) defeat.			
FY 2024 Plans: Will continue development of universal threat detection sensor hardware and algorithms to detect priority ATGM threats; complete models of the system and subsystem components and analyze performance of the technology against emerging threat performance parameters; evaluate models to identify methods for optimizing the system and subsystem components; develop additional soft-kill countermeasure techniques for emerging classes of ATGM threats.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will mature soft-kill countermeasure techniques to defeat laser-guided ATGM threats; Will determine optimized sensor configuration for detection of unknown/unexploited threats; Will improve threat detection algorithms to include additional emerging threat classes and increase accuracy of threat tracking; Will demonstrate representative hardware with enhanced algorithms for detection of unknown/unexploited threats in in relevant environment. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Title: Soft-Kill System Development ***Description:*** This effort matures and demonstrates soft-kill system technologies to protect combat vehicles from current and emerging ATGM threats at increased stand-off distances with an unlimited magazine and low collateral hazard. This capability will also improve situational awareness to vehicle occupants by detecting and alerting when threats have been fired. Technologies will be optimized and integrated on combat vehicles using the Modular Active Protection System (MAPS) Framework and Controller. They will be demonstrated in a relevant environment. ***FY 2024 Plans:*** Will integrate the soft-kill system onto a ground combat vehicle; validate the soft-kill system performance through hardware-in-the-loop (HWIL) lab evaluation and physical live-fire demonstration, including demonstrating 360 degree field of regard and on-the-move capabilities; demonstrate the ability to defeat multiple ATGM classes. ***FY 2025 Plans:*** Will begin development and maturation of next increment of soft-kill subsystems to address additional threats. Will environmentally harden the system, begin upgrading to the latest revision of the Modular Active Protection System Framework. Improve optimization of subsystems for space, weight, and power (SWAP) and begin virtual and lab demonstrations to assess subsystem performance and robustness in preparation for system integration. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** The funding decrease reflects a shift in focus from testing efforts of previous increment capability to maturation design updates for the next increment capabilities.	15.046	16.867	12.833
Title: Survivability Capability Characterization and Demonstration ***Description:*** This effort evaluates, validates, and demonstrates emerging protection technologies to characterize and assess their performance and maturity and potential for transition to Product Manager (PdM) Vehicle Protection System (VPS). ***FY 2024 Plans:***	2.354	2.389	2.456

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will evaluate selected survivability subsystem for performance and platform integration feasibility; coordinate desired technical knowledge and provide to transition partner, informing our acquisition stakeholders so they can determine the viability of technology insertion on selected platform(s); continue to identify available survivability subsystems for uniqueness and applicability to current ground vehicle platforms requirements. ***FY 2025 Plans:*** Will complete Survivability subsystem/system demonstration, provide documentation and reports for selected survivability subsystems, and transition relevant information to stakeholders. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Title: Sensors for Adaptive Armor ***Description:*** This effort matures and demonstrates sensor technology to enable an adaptive armor system using the MAPS Framework and Controller on a combat vehicle platform. This effort matures real-time processing software, continuously refines the threat trajectory prediction algorithm and integrates sensors with an adaptive countermeasure for threat defeat to the MAPS Framework and Controller to ensure the activation of adaptive armor to protect against incoming threats.	1.476	-	-
Title: APS Residuals Protection Maturation and Complex Threat Attack Protection (CTAP) ***Description:*** This effort contributes to the Army's ground vehicle survivability by maturing, integrating, and demonstrating advanced technologies which physically defeat incoming threats. These technologies involve passive and reactive mechanisms that work seamlessly with active protection systems in order to increase the overall efficiency of the system. This effort will mature and demonstrate armor components that defeat residual blast and fragmentation from hard-kill active protection systems engagements with kinetic threats in order to protect vehicle occupants and critical subsystems. This effort also matures and demonstrates armor and occupant protection components that provide threat defeat for advanced and emerging threats with complex defeat mechanisms. ***FY 2024 Plans:*** Will mature and demonstrate component technologies developed under PE 0602145A, Project BG 6, Advanced Concepts for Active Defense for vehicle and occupant protection against advanced and emerging threats with complex defeat mechanisms; mature and package these component designs for vehicle integration including durability; demonstrate hardened component's threat defeat performance through exposure to environmental conditions (e.g. MIL-STD-810); validate that the packaged component's physical parameters such as size and weight are able to meet vehicle system-level design constraints. ***FY 2025 Plans:***	7.313	9.471	6.735

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will build upon prior year's work, at the system level for demonstration, to integrate packaged component designs for protection against advanced and emerging threats which employ complex defeat mechanisms. Will mature and optimize designs through integrated system-level environmental and automotive durability testing, followed by ballistic testing, to validate performance against system-level requirements. Will validate compliance with the Modular Active Framework. Will provide capstone demonstrations of capabilities against pacing threat defeat in a relevant environment. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects reduced test and demonstration activities planned in FY25.			
Title: Controls and Architecture ***Description:*** This effort provides the basis for holistic (vehicle level) active defense by ensuring compatibility of active defense subsystems and systems. This effort matures and demonstrates the effectiveness and efficiency of the controls and architecture for active defense systems. The focus will be to enable the integration of multiple emerging survivability technologies into safe and secure configurations. This effort will optimize size, weight, and power - cooling (SWaP-C) performance for the system components. ***FY 2024 Plans:*** Will perform system-level demonstration of the initial base kit hardware and software products in a lab environment; continue to optimize software against established layered survivability technologies and ensure minimal impact to fielded technology; report and define requirements for collaborative active defense. ***FY 2025 Plans:*** Will complete laboratory demonstration and transition deliverables to program office. Will document designs for advancements of next phase of active defense technologies. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** The funding decrease is in accordance with the project plan to transition layered survivability technologies.	5.520	5.560	2.565
Title: Hard Kill Active Protection System (HK APS) Development, Integration, and Demonstration ***Description:*** This effort matures, integrates, and demonstrates a HK APS capable of defeating Rocket Propelled Grenades (RPGs), Anti-Tank Guided Missiles, and Recoilless Rifles ensuring the platform's ability to shoot, move and communicate after an engagement. The system will be compliant to the Modular APS Framework (MAF). This effort will optimize an HK APS that includes the following subsystems; counter-measure, launcher, and sensors (active/passive). Will demonstrate HK APS capabilities in a virtual and live fire demonstration in a relevant operational environment.	21.055	19.494	19.809

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Counter-measure (CM): Matures and demonstrates CM designs that includes the following aspects: blast size, time of flight, velocity, engagement distance, accuracy, and SWaP-C. Analysis will be conducted for each counter-measure component as well as at the sub-system level. Demonstrations will be performed in the following environments: virtual, hardware in the loop, and live fire. Launcher: Matures and demonstrates launcher designs that considers the following aspects: SWaP-C, engagement speed and accuracy, number of launchers, material composition and reliability. The most mature and suitable launcher for the project will be demonstrated in the following environments: virtual, hardware in the loop, and live fire. Sensors: Matures and demonstrates overall sensor suite design (active/passive) that considers the following aspects; radar frequency, power, weight, volume, algorithms, accuracy, search range, tracking and identification time, and passive cueing integration and optimization. The most mature and suitable sensor suite (active/passive) for the project will be demonstrated in the following environments: virtual, hardware in the loop, and live fire. Integration: Demonstrate the matured HK APS sub-systems on a platform in the following environments: virtual, hardware in the loop, and live fire. This will also analyze subsystem and system performance characteristics against Integrated Product Team (IPT) stakeholder requirements. Develop a performance baseline for future hard kill system evaluations. ***FY 2024 Plans:*** Will execute a system-level Preliminary Design Review including the Countermeasure (CM), Launcher and Sensor sub-systems - all of which draw from the baselines established in the sub-system Preliminary Design Reviews; progress to conducting individual Critical Design Reviews for the CM, Launcher, and Sensor sub-systems with industry and government experts; improve and optimize an HK APS simulation to represent the system in a relevant environment and conduct overall system performance analysis; conduct demonstrations of CM and Sensor sub-system capabilities in a System Integration Laboratory setting; improve integration plan for the sub-systems into a unified HK APS onto the demonstration platform. ***FY 2025 Plans:*** Will provide Interface Control Documents at the sub-system level, including those for the Countermeasure, Launcher, Fire Control Solution, and Radar. Will update the system-level Interface Control Document based on sub-system finalization completing the Final Design Review package in order to baseline the system architecture. Will develop radar subsystem components for integration and testing. Will conduct testing-validation and demonstration of Countermeasure sub-system capabilities. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase is an economic adjustment.			
Title: Integrated Signature Management	-	-	0.942

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BG7 / *Ground Systems Active Defense (GSAD) Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Description: This effort provides the capability for ground vehicle systems to achieve increased standoff from threat system detection and targeting, enabling freedom of maneuver and the option to strike first, through the use of novel technology. This effort matures and demonstrates signature management technology that is integrated into the vehicle system, as opposed to ad hoc appliques that do not consider all other vehicle requirements. This effort will optimize a system level solution that considers size, weight, power consumption, and cost impacts to the platform. This effort will provide a demonstration of the improvement in signature management capability in an operationally-relevant environment. ***FY 2025 Plans:*** Will build upon FY2024 effort under 6221450A/BG6. Will mature selected component integrated signature management technologies transitioned from PE 0602145A/BG6 Advanced Concepts for Active Defense, by validating individual component performance and integrating the technologies into a physical system for preliminary design review. Will optimize system design through system-level modeling and simulation. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** This effort is new for FY25 with funding realigned from Project Element (PE) 0602145A / BG6 Advanced Concepts for Active Defense Technology to focus on maturing the signature management technology.			
Accomplishments/Planned Programs Subtotals	59.331	60.617	51.960

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BG9 / *Obscuration Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BG9: *Obscuration Advanced Technology*	-	2.664	-	-	-	-	-	-	-	-	0.000	2.664
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Project matures and demonstrates obscurant technologies with potential to enhance personnel and platform survivability by degrading threat force surveillance sensors and defeating the enemy's target acquisition devices, missile guidance, and directed energy weapons. Dissemination systems for new and improved obscurants are developed with the goal of providing efficient and safe screening of deployed forces. Synthetic Biology Manufacturing technologies in this project will provide Department of Defense (DoD) with the ability to manufacture products such as explosive alternatives and defense-only critical chemicals & materials.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is related to and fully coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology).

Work in this Project performed by the Chemical and Biological Center (CBC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Obscuration ***Description:*** This effort matures and demonstrates the dissemination of new and advanced obscurants.	2.664	-	-
Accomplishments/Planned Programs Subtotals	2.664	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BH6 / *Platform Electrification and Mobility Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BH6: *Platform Electrification and Mobility Adv Tech*	-	45.728	65.647	40.579	-	40.579	42.489	41.422	45.167	45.618	0.000	326.650
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures, integrates and demonstrates technologies to electrify both manned and unmanned Next Generation Combat Vehicle (NGCV) platforms. Electrification of these platforms will enable advanced onboard electrified payloads such as directed energy weapons, reduce battlefield fuel consumption, and provide new capabilities such as burst acceleration, extended silent mobility and silent watch. This Project will also mature, integrate and demonstrate technologies to increase electric power such as a high voltage/temperature generator and high power/ temperature power electronics as well as technologies to reduce power demands including composite rubber band track and adaptive hydro-strut suspension.

This Project matures, integrates and demonstrates energy storage and charging technologies and addresses associated domestic supply chain challenges. This Project also continues work between the Department of Energy and the Department of the Army with a focus on energy storage for electrification, providing an emphasis on developing advanced technologies that enable military ground vehicles to become significantly more energy efficient. The combined efforts in this project will have a positive impact toward reducing Army impact on climate change.

Work in this Project complements Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology) / Project BH5 (Platform Electrification and Mobility Tech)

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Ground Vehicle System Center (GVSC)

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Platform Electrification Technologies	11.652	13.636	4.283
Description: This effort matures and integrates components and sub-systems in order to demonstrate a modular electrification architecture that scales across light to heavy weight classes of combat vehicles.			
FY 2024 Plans: Will integrate components for electric drive cooling system, including fluid pumps, heat exchangers, fans, and interconnecting components. Will optimize platform electrification system performance in the system integration laboratory. Will validate performance under full range of military conditions. Will improve electrification architecture robustness during faults and degraded			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH6 / *Platform Electrification and Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
modes possible from battlefield damage. Will improve recharge rate of a modular high voltage energy storage system. Will integrate technology from non-traditional vendors to improve performance of composite track system technology with longer lasting compounds at higher weight carrying capacities to increase mobility ***FY 2025 Plans:*** Will demonstrate traction motor system for heavy combat vehicle weight class. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects the planned lifecycle of this effort with only traction motor work continuing in FY25.			
Title: Advanced Mobility Technologies ***Description:*** This effort matures and demonstrates a reduced weight composite running gear system for medium combat vehicle applications which increases operational effectiveness and reduces fuel consumption. ***FY 2024 Plans:*** Will validate segmented composite running gear and track systems to prove out component performance and supportability improvements. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects planned conclusion of this effort.	5.949	1.699	-
Title: Advanced Vehicle Power Technology Alliance - Electrification Technology ***Description:*** This effort matures and develops advanced energy storage technologies to improve power and energy performance and safety for vehicles. Higher energy stored with less space and weight increases vehicle efficiency and range. Ensures electrified ground vehicles have enough power for mobility, silent watch, and enables capabilities such as advanced protection, lethality and network capabilities. This effort is a partnership with the Department of Energy. ***FY 2024 Plans:*** Will demonstrate commercial based advanced energy storage system on a combat vehicle to enable all-electric capability. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** The decrease in funding reflects completion of this effort.	2.166	2.406	-
Title: System/Vehicle Integration and Test ***Description:*** This effort integrates advanced mobility, platform electrification components and electrification architecture technologies into surrogate platforms and demonstrates the performance, scalability and modularity of the system approach which	3.910	8.950	2.148

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH6 / *Platform Electrification and Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
will provide the capabilities of silent mobility, improved mobility performance, improved operational duration without re-supply, and provides power to enable integration of advanced protection, lethality and network capabilities. ***FY 2024 Plans:*** Will complete system-level integration and laboratory testing over the full range of military operating conditions; mature control system software to enable in-vehicle testing. Will integrate components into surrogate vehicle demonstrator. ***FY 2025 Plans:*** Will demonstrate silent operation extension technology in the system level integration lab. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease is due to completion of demonstration with component level maturation for follow-on effort realigned to enhanced combat hybrid capability.			
Title: Scalable Electrification & Control Architecture Technology ***Description:*** This effort validates component-level performance and integrates the power distribution and control components to implement a common, scalable, electrified vehicle power architecture to enable analyze layered survivability technologies, high voltage batteries, fast vehicle charging from the grid, and silent mobility on combat platforms from 15 to 50 tons. ***FY 2024 Plans:*** Will improve subsystem performance incorporating the new hardware (high voltage power distribution and high voltage power converter); optimize subsystem software to fully take advantage of the new capabilities and use-cases they enable. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects planned conclusion of this effort.	3.471	4.224	-
Title: Robotic Combat Vehicle Silent Watch and Mobility Range Extension Advanced Technology ***Description:*** This effort matures and demonstrates JP8 reformer components and sub-systems that provide extended silent watch and mobility as part of a modular electrification architecture supporting robotic combat vehicles. The Army's robotic combat vehicles are expected to have increased silent watch and silent mobility requirements that are not met by current technologies. ***FY 2024 Plans:*** Will demonstrate JP8 reformer and metal supported solid oxide fuel cell system in a medium robotic combat vehicle for increased silent watch and mobility; conduct system level design of power dense range extender. ***FY 2024 to FY 2025 Increase/Decrease Statement:***	1.984	3.545	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH6 / *Platform Electrification and Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
In Fiscal Year (2024), this effort is completed.			
Title: Parallel Hybrid Electric Combat System ***Description:*** This effort is focused on developing and demonstrating a parallel hybrid electric capability for tracked combat veicles that will enable silent mobility and improved fuel efficiency.	1.767	-	-
Title: Tactical and Wheeled Vehicles Hybrid Electric System ***Description:*** This effort is part of the climate change initiative to reduce vehicle platform carbon emissions through development of hybrid electric, anti-idle and multi-vehicle power networking capabilities for tactical and wheeled platforms. ***FY 2024 Plans:*** Will validate subsystems for the electrically controlled clutch and multi-vehicle networking node. Will validate integration software and supervisory control system in a systems integration laboratory. Will integrate components into a tactical vehicle system evaluation. ***FY 2025 Plans:*** Will optimize hybrid-electric system and light combat and tactical vehicle performance in the system integration laboratory and on vehicle; . Will validate performance under full range of military conditions; . Will improve electrification architecture robustness during faults and degraded modes possible resulting from battlefield damage; . Will demonstrate capability of the light combat and tacticalvehicle in a tactical microgrid technology demonstration. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects planned completion of this effort.	6.282	5.767	1.726
Title: Battery Technologies for Supply Chain Security ***Description:*** This effort researches technologies that mitigate battery supply chain security issues as it relates to common military form factors that are critical to military ground vehicle electrification and other Army battery applications. This effort is part of a coordinated effort to conduct assessments of technologies across the Defense Advanced Battery Supply Chain along with DoD battery technology projects in PEs 0603342D8Z, 0605798D8Z, 0603680D8Z, 0607210D8Z, 0605805Z, 0603724N, and 0901212N. This effort matures and demonstrates an import/export power capability that will allow combat vehicles to interface with the existing electrical grid in a compact, highly efficient package that is installed and carried in the vehicle.? It will also support interfacing to microgrid hardware for dispersed operations and flexible power on the battlefield.? This investment would reduce fuel consumption and increase operational range, furthering the enhancement of reducing the logistic burden of fuel and towed power generation.	8.547	16.656	8.517

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH6 / *Platform Electrification and Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
FY 2024 Plans: Will provide an advanced high voltage battery testing capability that can be leveraged to exploit commercial automotive energy storage technologies for military applications. Enhanced capability will be used to validate commercial automotive battery technologies in military specific environmental conditions to develop a gap analysis of how the commercial battery will survive in a military unique environment. This gap analysis will allow for design optimization of commercial technologies to facilitate improved system performance in military vehicle applications. Will exploit testing capability to validate and demonstrate scale-able battery technologies for various DOD vehicle applications. Will optimize and mature 6T common form factor Li-ion (Lithium ion) battery technology and packaging to demonstrate alternative uses for the standardized battery to accelerate the electrification of other Army and DOD platforms. Will validate system level safety testing to provide an accelerated pathway for Li-ion 6T implementation. Will leverage industrial base assessment to design and develop Li-ion 6T battery technologies with higher percentages of domestically sourced cells and materials. ***FY 2025 Plans:*** Will continue to exploit the Li-ion 6T, Small Tactical Universal Battery (STUB), Conformal Wearable Battery (CWB), and BB2590 form factor to cultivate new applications for this technology to increase standardization and volume to and reduce costs. Will optimize the vehicle import/export power system for power density and further compatibility with the grid and microgrid systems. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease is due to significant reduction in testing and more focused supply chain investment.			
Title: Combat Vehicle Hybrid Electric Capability Demonstration ***Description:*** This effort is part of the climate change initiative to reduce vehicle platform carbon emissions through development and demonstration of hybrid electric and battery dominant vehicles. This effort matures technology to perform rapid recharging of electric vehicles in battlefield environments. This effort demonstrates capabilities applicable to both wheeled tactical vehicles and tracked combat vehicles. ***FY 2024 Plans:*** Will validate parallel hybrid design architectures for medium combat tracked vehicle platforms. Will perform concepting studies and analysis of potential technology solutions to improve vehicle performance, offer silent mobility, and improve fuel efficiency. Will conduct soldier operated demonstrations and gather feedback to refine hybrid system operations. Will evaluate a mobile system to include power generation and distribution to combat/tactical electrified vehicles. ***FY 2025 Plans:***	-	8.764	6.973

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH6 / *Platform Electrification and Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will improve performance of the parallel hybrid design architecture for medium combat tracked vehicle platforms; integrate hardware for implementation of the parallel hybrid architecture; optimize the system controls during component validation to improve efficiency and mobility for future parallel hybrid tracked vehicles. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort after early demonstrations of commercial technologies.			
Title: Next Generation Power Conversion and Distribution Electronics ***Description:*** This effort increases performance, reduces the cost, and simplifies the design of next generation power conversion and power distribution electronics. By utilizing materials and techniques such as 4th generation (Gen 4) Silicon Carbide (SiC) in power electronics, this effort will explore the capabilities of this next generation semiconductor in areas such as higher voltage architectures, solving thermal management challenges, and increasing power conversion efficiency while reducing the Size, Weight, and Power (SWaP). This will significantly improve the transition potential of vehicle electrification components and will enable further vehicle electrification/hybridization of military ground vehicles. ***FY 2025 Plans:*** Will use digital engineering to initiate the maturation of power conversion and power distribution components using Gen 4 SiC; utilize modeling, simulation, and analysis to quantify improvements of Gen 4 SiC for both power electronics and power architectures. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Increase to support new research efforts for next generation power conversations and distribution electronics.	-	-	3.150
Title: Extreme Energy Density Energy Storage Technology ***Description:*** Mature, integrate and validate battery performance of multiple-cell battery modules to enable an Extreme Density Energy Storage Systems for hybrid electric drive combat platforms. Also includes efforts with Department of Energy (DoE) to consider army vehicle applications in their development efforts. ***FY 2025 Plans:*** Will mature and evaluate battery module performance for high energy battery systems for battery dominate electrified combat platforms. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Increase to support new research efforts in extreme energy density energy storage technology.	-	-	2.952
Title: Advanced Running Gear and Suspension System Technology	-	-	1.072

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH6 / *Platform Electrification and Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Description: This effort matures, integrates, and demonstrates an advanced track and suspension system for heavy combat vehicle applications which offers significantly reduced system weight, maintenance, noise and vibration over conventional systems as well as increased operational effectiveness on- and off-road and lower platform fuel consumption. ***FY 2025 Plans:*** Will improve and mature performance of composite track system technology with longer lasting compounds at higher weight carrying capacities; optimize and mature external suspension system design to increase mobility performance at higher weight carrying capacities. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Increase to support new research efforts in advanced running gear and suspension system technology.			
Title: Electric Propulsion System Technology ***Description:*** This effort matures, integrates, and demonstrates the propulsion system and sub-systems required to power heavy combat vehicles with hybrid-electric propulsion systems. It also develops the support hardware and auxiliary systems to allow integration and thermal management of electrified components and energy storage for heavy combat vehicles. ***FY 2025 Plans:*** Will begin develop component- level improvement and integration to ensure system level requirements can be met; Will mature and integrate a hub drive system to support an Advanced Electric Drive system. Will mature supporting auxiliary and cooling subsystems to allow operation of electrified components and energy storage. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Increase supports new research efforts in electric propulsion system technology.	-	-	9.081
Title: Extreme Energy Density Storage Technology ***Description:*** This effort matures and develops advanced energy storage technologies to improve power and energy performance and safety for vehicles. Higher energy stored with less space and weight increases vehicle efficiency and range. Ensures electrified ground vehicles have enough power for mobility, silent watch, and enables capabilities such as advanced protection, lethality and network capabilities. This effort is a partnership with the Department of Energy. ***FY 2025 Plans:*** Will evaluate and mature beyond Li-ion battery technologies with increased energy and improved safety. ***FY 2024 to FY 2025 Increase/Decrease Statement:***	-	-	0.677

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH6 / *Platform Electrification and Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Increase supports new research efforts in extreme energy density storage technology.			
Accomplishments/Planned Programs Subtotals	45.728	65.647	40.579

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040 / 3				R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*				Project (Number/Name) BH8 / *Enhanced VETRONICS Advanced Technology*				
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
BH8: *Enhanced VETRONICS Advanced Technology*	-	10.776	10.268	13.867	-	13.867	18.958	22.447	20.007	20.227	0.000	116.550
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures, integrates, and demonstrates vehicle electronics hardware such as computers, sensors, communications systems, displays, and vehicle command/control/driving mechanisms as well as vehicle software to enhance crew performance, increase vehicle fuel efficiency, reduce Size, Weight, and Power (SWaP) burdens and reduce vehicle maintenance costs. This Project also advances open system architectures (power and data) for military ground vehicles to enable common interfaces, standards and hardware implementations. This will align Program Executive Office Ground Combat Systems (PEO-GCS's) Common Infrastructure Architecture (GCIA) with current combat platform modernization efforts and inform future GCIA iterations. The overall vehicle system architecture approach provides an open architecture such as the Vehicle Integration for Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance / Electronic Warfare (C4ISR/EW) Interoperability (VICTORY), to allow platforms to accept future technologies without the need for significant re-design as new technologies are developed and integrated. Additionally, this project matures infrastructure that enables the ease of integration of autonomous subsystem technologies into future and existing tactical and combat vehicle architectures. Technical challenges include software and algorithm development for increased levels of automation for both manned and unmanned systems, secure vehicle data networks, interoperability of intra-vehicle and inter-vehicle systems, and implementation of advanced user interfaces. Overcoming these technical challenges enables improved and increased span of collaborative vehicle operations, efficient workload management, commander's decision aids, embedded simulation for battlefield visualization and fully integrated virtual test/evaluation.

Research in this Project is coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Ground Vehicle Systems Center (GVSC)

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Enhanced - Vehicle Electronics (E-Vetronics)	10.776	10.268	13.867
Description: This effort addressed technical and integration challenges in the areas of vehicle architecture and systems integration. Specifically, this effort focused on maturing and demonstrating a common ground vehicle open architecture with distributed display processing architecture, computing hardware capable of being re-configured to adapt to changes in Input / Output (I/O) needs, advanced network video distribution, advancements in slip ring technology, tactical situational awareness (SA), cooperative engagement and mission package integration through open architecture components and software. These efforts enabled future vehicle capabilities, reduced dependencies on proprietary solutions, and supported increased market			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BH8 / *Enhanced VETRONICS Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
competition through open architecture components and software. This effort created the electronics architecture for future ground combat vehicles to enable software and hardware commonality and reduce system integration timing and cost. ***FY 2024 Plans:*** Will mature the ground vehicle common architecture, tactical situational awareness, and advanced digital visual network lines of efforts; optimize mission package integration for key network functions within the common network architecture and validate components; mature and demonstrate open system architecture products to include objective hardware available to conduct bench level demonstration; optimize the electronics architecture for future ground combat vehicles to enable software and hardware commonality and reduce system integration timing and cost. ***FY 2025 Plans:*** Will mature and demonstrate key network functions within the common on-vehicle network architecture; demonstrate an integrated Ground Combat Systems (GCS) Common Infrastructure Architecture (GCIA) instantiation to validate an implementation of GCIA hardware and software; optimize the ground vehicle common architecture to Technology Readiness Level (TRL) 6 for incremental transition to PEO GCS for refinement of the GCIA architecture; initiate the maturation of the architecture to address further capabilities such as cyber, on-board high-performance computing for artificial intelligence (AI), and thermally efficient electronics. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned acceleration of capabilities for GCIA and an increase in the number of capabilities in alignment with current combat platform modernization efforts.			
Accomplishments/Planned Programs Subtotals	10.776	10.268	13.867

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BI3 / *Sensor Protection Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BI3: *Sensor Protection Advanced Technology*	-	1.666	1.746	1.752	-	1.752	1.748	1.750	1.769	1.787	0.000	12.218
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates novel sensor protection capabilities which dramatically reduce the susceptibility of our thermal electro-optic/infrared (EO/IR) sensors to ever increasing threats on the battlefield. This Project enables continuation of the mission despite potential threat laser engagements. Low-cost modular solutions will be demonstrated that can be applied across current and planned EO/IR targeting, surveillance, and situational awareness sensor systems against existing and emerging threats in support of combined arms maneuver.

Research in this Project is coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology), 0602143A (Soldier Lethality Technology), 0603465A (Future Vertical Lift Advanced Technology) and 0603118A (Soldier Lethality Advanced Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy. Research in this Project supports the Army Modernization Priorities.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Sensor Protection Advanced Technology	1.666	1.746	1.752
Description: This effort will mature and demonstrate sensor protection and signature reduction capabilities which better ensure sensors are difficult to detect, dazzle, and damage by current and future laser threats.			
FY 2024 Plans: Will optimize optical coating processes and materials for high performance cooled infrared systems to reduce reflections and improve signature management; mature and demonstrate a laser ID algorithm that detects an adversarial laser incident in a high performance IR sensor's imagery and reports the associated adversary laser band that is detected.			
FY 2025 Plans: Will mature, demonstrate, and deliver high transmission in-dewar optics with advanced coatings for improved performance and signature management. Will optimize laser ID algorithm to detect a laser incident and automatically select or tune a filter to provide protection.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BI3 / *Sensor Protection Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding increase is an economic adjustment.			
Accomplishments/Planned Programs Subtotals	1.666	1.746	1.752

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BI5 / *Materials Application and Integration Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BI5: *Materials Application and Integration Adv Tech*	-	3.979	5.502	-	-	-	-	-	-	-	0.000	9.481
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures, integrates, and demonstrates lightweight novel materials, integrated computational materials engineering methods, and new manufacturing processes and methodologies. These materials and technologies enable the Army to address critical areas of survivability, mobility, and transportability within the Next Generation Combat Vehicle (NGCV).

This Project also continues the efforts originally started under Advanced Vehicle Power Technology Alliance (AVPTA) between the Department of Energy and the Department of the Army with a focus on developing advanced materials technologies that enable military ground vehicles to become significantly more energy efficient. The AVPTA, though no longer chartered, has developed a relationship between DoE and DA that continues to accelerate the conceptualization and transition to deployment of inventive and creative energy-saving concepts that the Nation needs to achieve energy security. In support of lighter military vehicles which are more fuel-efficient and capable in expeditionary scenarios, this project will mature and integrate lightweight materials and joining technologies to provide superior mobility and protection of both vehicles and occupants.

Research in this Project is coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Ground Vehicle System Center (GVSC)

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: System Design Optimization for Lightweighting	3.212	4.757	-
Description: This effort improves technologies, tools, and advanced manufacturing techniques in support of the Army's mission to increase mobility, protection, and transportability while reducing weight. This effort focuses on maturing and demonstrating technologies to decrease ground vehicle weight while optimizing performances and enabling the Army trade space for enhanced capabilities. The technologies being demonstrated are in the fields of material maturation, design optimization, operational metrics, joining technologies, and additive manufacturing.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BI5 / *Materials Application and Integration Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will mature rapid screening methods for novel, high-entropy alloys and evaluation of the process to predict the likelihood of their successful maturation; complete initial stage of integrated computational materials engineering (ICME) development resulting in the use of new technical capabilities and toolsets to understand and optimize at a component level (rather than at a fundamental or finite element level); validate ICME efforts by evaluating materials to develop robust material properties, further improving modeling and simulation for virtual prototyping; mature advanced testing methods at sub-scale, which will lead to faster results than conventional testing, thus accelerating novel material screening and maturation cycles; manufacture two alloy weld wires that can be used in wire additive processes to produce high strength components with the potential to replace high strength steel castings; complete Directed Energy Deposition (DED) design guidelines to evaluate candidate parts for advanced manufacturing processes, process parameters for the operation of the equipment as well as mechanical and materials performance metrics for part qualification and justification. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Decrease is due to effort completion in FY24.			
Title: Advanced Vehicle Power Technology Alliance - Materials ***Description:*** This effort matures and demonstrates lightweight materials and joining technologies in support of lighter military vehicles which are more fuel-efficient and expeditionary with superior mobility and protection of both vehicles and occupants. Lighter materials/constructions and advances in joining technologies such as multi-material and dissimilar material joining will lead to lightweight military vehicle structures. ***FY 2024 Plans:*** Will evaluate materials for integration into battery containment, powertrain weight and/or space claim reduction, and multifunctional structural energy storage to enable increased vehicle electrification of ground vehicles. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Decrease is due to effort completion in FY24.	0.767	0.745	-
Accomplishments/Planned Programs Subtotals	3.979	5.502	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BK1 / *Autonomous Mobility Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BK1: *Autonomous Mobility Adv Tech*	-	6.221	5.305	3.860	-	3.860	-	-	-	-	0.000	15.386
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates data-based Artificial Intelligence and Machine Learning (AI/ML) technologies to increase autonomy and mobility and perform teamed operations with manned and unmanned air and ground vehicles in a military relevant environment through data collection on relevant platforms. Data collection will involve both simulation and live collection. Simulation will provide a baseline to correctly collect, clean, and analyze data that meets the need for improving algorithms for both formation control and unmanned aerial vehicle map input for unmanned ground vehicle mobility, while reducing costs. Live data will start with Surrogate platforms in local areas. The Project will use AI/ML techniques to mature and demonstrate intelligent formation control to be used in complex, off-road terrain without the need for a global positioning system (GPS). Data will be collected from mounted platforms utilizing sensors to improve algorithms for relative and absolute positioning, undistributed formation control, and increased speeds of unmanned platforms. The utility of the military-relevant data will be demonstrated through a datahub which is designed specifically for robotic data types, formats and sizes. The datahub infrastructure is a unique solution to handle such ground vehicle data needs and will be able to optimize the outcome of the collected data. Also, the Project will use AI/ML techniques to optimize intelligent autonomous ground platform planning team with Unmanned Aerial Systems (UAS). Data collected from air vehicles will be converted to maneuverable information for unmanned ground platforms with the identification of obstacles, go/no-go areas, terrain classification, and optimal suggested paths.

Research in this Project is coordinated with Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology) / Projects BF3 (Combat Vehicle Robotics Tech) and BF4 (Combat Vehicle Robotics Adv Tech)

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Ground Vehicle System Center (GVSC)

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Machine Learning Data Collection	1.726	1.558	1.907
Description: This effort matures and demonstrates techniques and technologies for mass unmanned ground vehicle data collection to be used towards Army research in autonomy and mobility with machine learning efforts.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BK1 / *Autonomous Mobility Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will optimize and demonstrate the datahub (project data environment) infrastructure to properly interface with ML and AI development environments to leverage the unique, military-relevant collected and hosted data in the project for the development of new robotic and autonomous ground vehicle capabilities for improved mobility and maneuver. ***FY 2025 Plans:*** Will create and document detailed final report with results, conclusions, and recommendations in addition to data packages supporting potential ATP to transition partners. Will further collect and ingest maneuver data and customize datahub for hosting maneuver-relevant data. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects efforts to complete final year deliverables on this task.			
Title: UAS Mapping ***Description:*** This effort matures and demonstrates the use of combined UAS and ground system (UGV) data with ML techniques to develop intelligent unmanned ground system path planning. Data collected from UAS will be converted to maneuverable information for unmanned ground platform to help with the identification of enemy positions, go/no-go areas, terrain classification, and optimal suggested paths.	1.581	-	-
Title: Formation Control ***Description:*** This effort uses ML techniques to develop intelligent formation control for manned and unmanned ground vehicles to be used on maintained roads and in contested environments under electronic warfare (EW) and GPS-denied conditions. Data will be collected from mounted platforms utilizing special internal and external sensors to develop and demonstrate algorithms for exact positioning, undistributed formation control, and increased speed. ***FY 2024 Plans:*** Will optimize the performance of the ML models for multi-vehicle maneuver to approach manned-vehicle formation control performance in relative and absolute positioning and under specific mission goals and context. ***FY 2025 Plans:*** Will prepare and document results and conclusions including specifics for data collection and modeling for maneuver and formation control applications. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort which concludes in FY25.	2.914	3.747	1.953
Accomplishments/Planned Programs Subtotals	6.221	5.305	3.860

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BK1 / *Autonomous Mobility Adv Tech*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BK4 / *Next Gen Intelligent Fire Control(NG-IFC) Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BK4: *Next Gen Intelligent Fire Control(NG-IFC) Adv Tech*	-	2.118	4.328	-	-	-	-	-	-	-	0.000	6.446
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project will mature and demonstrate armament specific hardware, algorithms and architectures to support the Next Generation Combat Vehicle with the necessary fire control on future manned and unmanned platforms.

Research in this Project is related to and fully integrated with the efforts funded in Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy. Research in this Project supports the Next Generation Combat Vehicle Army Modernization Priority.

Research in this Project is performed by the Armaments Center (AC)

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Next Generation Intelligent Fire Control	2.118	2.328	-
Description: This effort will deliver armament specific hardware, algorithms and architectures to support the Next Generation Combat Vehicle with the necessary fire control on future manned and unmanned platforms. ***FY 2024 Plans:*** Will optimize, mature and demonstrate fire control hardware and software to address current and future turreted systems' performance requirements. Will demonstrate improvement to operator's decision-making time by using advanced algorithms to optimize engagement priority in a target rich environment. Will optimize model characteristics by assessing performance against specified targets and scenarios. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects planned completion of workflows in FY2024			
Title: Integration Compliant Fire Control Lethality Architecture	-	2.000	-
Description: This effort will deliver armament fire control hardware and software that will be compliant to integrate with Next Generation Combat Vehicle architecture for direct fire platforms.			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BK4 / *Next Gen Intelligent Fire Control(NG-IFC) Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
FY 2024 Plans: Will mature and?demonstrate armament specific hardware and software algorithms, and open architectures for future manned and unmanned direct fire platforms. Will integrate fire-control software into open architecture Armament Mission Computer fire control hardware. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects planned completion of workflows in FY2024			
Accomplishments/Planned Programs Subtotals	2.118	4.328	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BK6 / *Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BK6: *Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech*	-	1.478	2.062	7.620	-	7.620	9.567	12.290	6.710	8.149	0.000	47.876
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates technologies for large caliber direct fire light-weight armament systems that will exceed the current capability of 120 millimeter (mm) direct fire cannons and be optimized for future operational environment with cross-domain engagement capability. Specifically, this Project integrates and demonstrates technologies for rapid fire on-the-move at all elevations (direct & indirect), compact ammunition design with advanced ignition, advanced recoil mitigation to reduce impulse and allow integration onto lighter platforms, automated ammunition handling and reloading. This Project also supports open architecture to enable supervised autonomy and remote operation and integrates intelligent fire control to address multi-domain targets from manned and unmanned platforms.

Work in this Project is related to and fully integrated with the efforts funded in Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology) and PE 0604115A (Technology Maturation Initiatives).

Work in this Project complements Program Element (PE) 0602145A (Next Generation Combat Vehicle Technology) / Project BK5 (Adv Direct In-Direct Armament Sys (ADIDAS) Tech) and Program Element (PE) 0603464A (Long Range Precision Fires Advanced Technology) / Project CE9 (Armaments Advanced Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy. Research in this Project supports the Next Generation Combat Vehicle Army Modernization Priority.

Work in this Project is performed by the Armaments Center (AC)

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Large Caliber Armament System (LCAS)	1.478	2.062	-
Description: This effort matures and demonstrates a next generation, automated, lightweight 120-mm armament system design for Next Generation Combat Vehicle, providing tank-like lethality for light to medium-weight optionally manned platforms.			
FY 2024 Plans: Will optimize technologies for improving lethal performance of direct fire projectiles against emerging threats. Will mature direct fire projectile component technologies and methodologies to increase munition effectiveness against emerging threats.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BK6 / *Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding decrease reflects planned completion of workflow in FY2024			
Title: Advanced Lethality Armament System for Large Caliber Advanced Tech ***Description:*** This effort demonstrates increased lethality solutions for current and future large caliber direct fire armament systems focused on exceeding performance of current 120mm direct fire weapons. ***FY 2025 Plans:*** Will demonstrate large caliber direct fire cannon component level technologies that increase: lethality against armored targets, probability of hit, and rate of fire. Will demonstrate compatibility with advanced ignition systems and automated ammunition handling. Will provide improved logistics and platform supportability via improved automation technologies. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** This effort initiates in FY 2025.	-	-	7.620
Accomplishments/Planned Programs Subtotals	1.478	2.062	7.620

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BP6 / *Ground Vehicle Advanced Technology(CA)*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BP6: *Ground Vehicle Advanced Technology(CA)*	-	278.450	-	-	-	-	-	-	-	-	0.000	278.450
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Congressional Interest Item funding provided for Ground Vehicle Advanced Technology.

A. Mission Description and Budget Item Justification

Congressional Interest Item funding provided for Ground Vehicle Advanced Technology.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
Congressional Add: Program Increase - Additive Manufacturing for Jointless Hull ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Additive Manufacturing for Jointless Hull	20.000	-
Congressional Add: Program Increase - ATE5.2 Engine Development ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ATE5.2 Engine Development	10.000	-
Congressional Add: Program Increase - Virtual and Physical Prototyping ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Virtual and Physical Prototyping	8.000	-
Congressional Add: Program Increase - HMMWV Automotive Enhancements ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for HMMWV Automotive Enhancements	9.000	-
Congressional Add: Program Increase - Advanced Adhesives ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Advanced Adhesives	5.000	-
Congressional Add: Program Increase - Autonomous Minefield Clearance ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Autonomous Minefield Clearance	8.000	-
Congressional Add: Program Increase - Carbon Fiber Tires	5.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BP6 / *Ground Vehicle Advanced Technology(CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for Carbon Fiber TIres		
Congressional Add: Program Increase - Machine Learning for Advanced Lightweight Combat Vehicle Structures ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Machine Learning for Advanced Lightweight Combat Vehicle Structures	19.000	-
Congressional Add: Program Increase - Maneuverable Lightweight Electric Weight Reducer ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Maneuverable Lightweight Electric Weight Reducer	7.500	-
Congressional Add: Program Increase - Off-Road Maneuver ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Off-Road Maneuver	5.000	-
Congressional Add: Program Increase - Predictive Maintenance System ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Predictive Maintenance System	2.000	-
Congressional Add: Program Increase - Unmanned Navigational Technology ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Unmanned Navigational Technology	3.000	-
Congressional Add: Program Increase - AUGMENTED REALITY FOR DENIED ENVIRONMENTS ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Augmented Reality for Denied Environments	7.000	-
Congressional Add: Program Increase - AUTONOMOUS SYSTEMS FOR MILITARY GROUND VEHICLES ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for AUTONOMOUS SYSTEMS FOR MILITARY GROUND VEHICLES	3.750	-
Congressional Add: Program Increase - CYBERSECURITY FOR AUTONOMOUS GROUND VEHICLES ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for CYBERSECURITY FOR AUTONOMOUS GROUND VEHICLES	9.000	-
Congressional Add: Program Increase - CYBERSECURITY FOR AUTONOMOUS VEHICLES	4.200	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BP6 / *Ground Vehicle Advanced Technology(CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for CYBERSECURITY FOR AUTONOMOUS VEHICLES		
Congressional Add: Program Increase - DIGITAL ENTERPRISE TECHNOLOGY FOR OMFV ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for DIGITAL ENTERPRISE TECHNOLOGY FOR OMFV	15.000	-
Congressional Add: Program Increase - DIGITAL TWIN ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Digital Twin	7.000	-
Congressional Add: Program Increase - ELECTRIC DRIVE SYSTEM ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Electric Drive System	5.500	-
Congressional Add: Program Increase - ELECTRIFIED VEHICLE INFRARED SIGNATURE MANAGEMENT ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ELECTRIFIED VEHICLE INFRARED SIGNATURE MANAGEMENT	5.000	-
Congressional Add: Program Increase - ELECTRON BEAM ADDITIVE MANUFACTURING OF CRITICAL METAL RING COMPONENTS ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ELECTRON BEAM ADDITIVE MANUFACTURING OF CRITICAL METAL RING COMPONENTS	2.000	-
Congressional Add: Program Increase - ENHANCED LETHALITY ON ARMY SMALL MULTIPURPOSE EQUIPMENT TRANSPORT ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ENHANCED LETHALITY ON ARMY SMALL MULTIPURPOSE EQUIPMENT TRANSPORT	8.000	-
Congressional Add: Program Increase - HMMWV OCCUPANCY PROTECTION DEVELOPMENT ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for HMMWV OCCUPANCY PROTECTION DEVELOPMENT	10.000	-
Congressional Add: Program Increase - HUMAN DIGITAL TWINS AND HUMAN-MACHINE INTERACTION	6.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BP6 / *Ground Vehicle Advanced Technology(CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for HUMAN DIGITAL TWINS AND HUMAN-MACHINE INTERACTION		
Congressional Add: Program Increase - MODELING AND SIMULATION ACTIVITIES FOR VEHICLE DEVELOPMENT ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for MODELING AND SIMULATION ACTIVITIES FOR VEHICLE DEVELOPMENT	10.000	-
Congressional Add: Program Increase - MODULAR ELECTRIC MOTORS ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Modular Electric Motors	5.500	-
Congressional Add: Program Increase - MULTI-SERVICE ELECTRO-OPTICAL SIGNATURE CODE ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for MULTI-SERVICE ELECTRO-OPTICAL SIGNATURE CODE	9.000	-
Congressional Add: Program Increase - NANO-LED FABRICATION FOR AUGMENTED REALITY CONTACT LENS ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for NANO-LED FABRICATION FOR AUGMENTED REALITY CONTACT LENS	10.000	-
Congressional Add: Program Increase - NEXT GENERATION ELECTRIFIED TRANSMISSION ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for NEXT GENERATION ELECTRIFIED TRANSMISSION	5.000	-
Congressional Add: Program Increase - NEXT GENERATION LIGHT TACTICAL VEHICLE MANEUVER AUTONOMY ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for NEXT GENERATION LIGHT TACTICAL VEHICLE MANEUVER AUTONOMY	5.000	-
Congressional Add: Program Increase - SYNTHETIC GRAPHITE BATTERY ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Synthetic Graphite Battery	10.000	-
Congressional Add: Program Increase - VEHICLE TECHNOLOGY READINESS LEVELS	3.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BP6 / *Ground Vehicle Advanced Technology(CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for VEHICLE TECHNOLOGY READINESS LEVELS		
Congressional Add: Program Increase - ABRAMS MODERNIZATION ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ABRAMS Modernization	30.000	-
Congressional Add: Program Increase - SMALL UNIT GROUND ROBOTIC CAPABILITIES ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Small Unit Ground Robotic Capabilities	7.000	-
Congressional Adds Subtotals	278.450	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	Project (Number/Name) BZ9 / *Smart Targeting Environment for Lower Level Assets*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BZ9: *Smart Targeting Environment for Lower Level Assets*	-	3.331	4.402	4.206	-	4.206	-	-	-	-	0.000	11.939
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates mission targeting support software and algorithms, to include Electronic Warfare capabilities, leveraged from the Defense Advanced Research Project Agency (DARPA) System-of-System Enhanced Small Unit (SESU), current force, and Science and Technology (S&T) in order to enable small units to continuously build and share targeting data and access strike assets in multi-domain operations.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy. Research in this Project supports the Next Generation Combat Vehicle Army Modernization Priority.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Small Targeting Environment for Lower Level Assets (STELLA)	3.331	4.402	4.206
Description: This effort matures and demonstrates integrated target search and electronic warfare data dissemination algorithms to speed the overall targeting process. This improved process will utilize automated target search algorithms based on mission parameters to reduce processing time and interface with systems for detecting concealed targets and setting target priority. It will fuse local data processing and payload data to increase accuracy for target engagement, optimize data dissemination algorithms based on local network conditions, and streamline interfaces for small units to access joint strike assets.			
FY 2024 Plans: Will develop electronic warfare capability datasets to be used in conjunction with pairing of effects. Will mature pairing of electronic warfare target effects in coordination with kinetic effects. Will evaluate additional electronic warfare system use cases and develop end-to-end system demonstrations. Will conduct larger-scale, field-based demonstration activities to ensure project meets threshold metrics. Will conduct additional Soldier Touchpoint evaluations to refine front-end user interfaces. Will pursue information assurance activities and generation of necessary artifacts for authority to operate on military networks.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603462A / *Next Generation Combat Vehicle Advanced Technology*	**Project (Number/Name)** BZ9 / *Smart Targeting Environment for Lower Level Assets*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will demonstrate novel mission planning approaches leveraging real-time situational awareness of the battlespace. Will provide software demonstration of initial threat alert concept using simulation data. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change is consistent with the planned lifecycle of this effort.			
Accomplishments/Planned Programs Subtotals	3.331	4.402	4.206

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603463A *I Network C3I Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	174.768	105.549	94.424	-	94.424	116.536	144.591	146.835	147.571	0.000	930.274
AM7: *Modular RF Communications Advanced Technology*	-	10.059	-	1.993	-	1.993	13.319	12.802	12.942	0.236	0.000	51.351
AM9: *Protected SATCOM Advanced Technology*	-	30.859	14.200	5.511	-	5.511	14.199	15.630	8.023	6.199	0.000	94.621
AN4: *Non Traditional Waveforms Advanced Technology*	-	5.823	5.215	17.488	-	17.488	16.062	18.075	19.931	18.843	0.000	101.437
AN8: *COE - Every Receiver is a Sensor Advanced Tech*	-	1.371	6.539	5.480	-	5.480	4.486	5.192	5.237	6.105	0.000	34.410
AO1: *UNT - Every Receiver is a Sensor Advanced Tech*	-	-	3.170	4.179	-	4.179	4.684	8.199	6.717	13.815	0.000	40.764
AO7: *EW for Maneuver Operations (EMO) Adv Tech*	-	5.968	3.152	-	-	-	-	3.168	3.742	3.779	0.000	19.809
AQ5: *Sensor CE-Integrated Sensor Architecture Adv Tech*	-	0.625	1.955	-	-	-	-	1.981	2.003	2.023	0.000	8.587
AQ8: *High Tempo Data Driven Decision Tools Adv Tech*	-	6.472	3.602	3.791	-	3.791	7.940	7.942	10.823	10.901	0.000	51.471
AR6: *Understanding the Environment as a Threat Adv Tech*	-	2.709	-	-	-	-	-	-	-	-	0.000	2.709
AT8: *Network-Enabled GeoSpatial-GEOINT Services AdvTech*	-	4.501	4.760	3.764	-	3.764	7.943	9.128	3.134	4.716	0.000	37.946
AU1: *Tactical GeoSpatial Information Capabilities ATech*	-	5.869	2.112	2.722	-	2.722	3.433	7.992	6.128	7.464	0.000	35.720
AU4: *Geospatially Enabled Operational Design Adv Tech*	-	12.186	10.953	10.813	-	10.813	5.133	6.435	8.194	8.276	0.000	61.990

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army												Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603463A *I Network C3I Advanced Technology*							
AV8: *Navigation Warfare (NAVWAR) Advanced Technology*	-	1.949	6.029	3.988	-	3.988	6.036	5.352	10.955	15.494	0.000	49.803
AW6: *Modular GPS Independent Sensors Advanced Tech*	-	10.131	12.343	11.282	-	11.282	5.010	5.940	10.300	6.829	0.000	61.835
BP4: *ELECTRONIC WARFARE ADVANCED TECHNOLOGIES (CA)*	-	52.500	-	-	-	-	-	-	-	-	0.000	52.500
CI7: *Mobile & Survivable Command Post (MASCP) Adv Tech*	-	12.813	18.691	9.978	-	9.978	13.248	16.340	19.242	19.951	0.000	110.263
CJ8: *Assured PNT Communications Advanced Tech*	-	10.933	11.783	13.435	-	13.435	15.043	17.268	16.182	19.331	0.000	103.975
DB6: *Pathfinder 3D Advanced Technology*	-	-	1.045	-	-	-	-	3.147	3.282	3.609	0.000	11.083

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and demonstrates technologies to provide an Army tactical network and enabling infrastructure that support operations in any environment, to include where the electromagnetic spectrum is denied or degraded. This is accomplished through the exploitation and optimization of components and systems for robust, low signature communications and data networks; assured positioning, navigation, and timing in contested environments; converged and coordinated cyber and electronic warfare activities; resilient mission command on the move; and the collection, processing, and dissemination of information for intelligence, surveillance, and reconnaissance in a common operating picture.

Work in this PE complements PE 0602146A (Network C3I Technology), PE 0602143A (Soldier Lethality Technology), PE 0602145A (Next Generation Combat Vehicle Technology), PE 0602147A (Long Range Precision Fires Technology), PE 0602148A (Future Vertical Lift Technology), PE 0602150A (Air and Missile Defense Technology), PE 0602213A (C3I Applied Cyber), PE 0603118A (Soldier Lethality Advanced Technology), PE 0603462A (Next Generation Combat Vehicle Advanced Technology), PE 0603464A (Long Range Precision Fires Advanced Technology), PE 0603465A (Future Vertical Lift Advanced Technology), and PE 0603466A (Air and Missile Defense Advanced Technology).

This PE is directly aligned with the Network and Assured Positioning, Navigation, and Timing (APNT) Army Modernization priorities.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Research is performed by the U.S. Army Engineer Research and Development Center (ERDC).

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603463A *I Network C3I Advanced Technology*

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	177.917	105.549	107.608	-	107.608
Current President's Budget	174.768	105.549	94.424	-	94.424
Total Adjustments	-3.149	0.000	-13.184	-	-13.184
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.823	-			
• SBIR/STTR Transfer	-2.326	-			
• Adjustments to Budget Years	-	-	-13.184	-	-13.184

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Project: BP4: *ELECTRONIC WARFARE ADVANCED TECHNOLOGIES (CA)*		
Congressional Add: *Program Increase - Assured Position, Navigation, and Timing Technology*	5.000	-
Congressional Add: *Program Increase - Alternative Navigation for GPS-Denied Landing Environments*	4.500	-
Congressional Add: *Program Increase - Next Generation Command Posts*	7.000	-
Congressional Add: *Program Increase - ADVANCE MATERIALS FOR COMMAND POST OF THE FUTURE*	1.500	-
Congressional Add: *Program Increase - ADVANCED PRECISION, NAVIGATION AND TIMING FOR LANDING ENVIRONMENTS*	2.500	-
Congressional Add: *Program Increase - HUMAN GEOGRAPHY REPOSITORY FOR COMMERCIAL CIVIL AFFAIRS*	5.000	-
Congressional Add: *Program Increase - MULTI-PLATFORM RECEIVER-SENSOR TECHNOLOGY*	20.000	-
Congressional Add: *Program Increase - SMALL SATELLITE HIGH ALTITUDE LAUNCH, INTEGRATION, TEST, AND EVALUATION*	7.000	-
Congressional Add Subtotals for Project: BP4	52.500	-
Congressional Add Totals for all Projects	52.500	-

Change Summary Explanation

Funding realigned to research Electronic Warfare (EW) distributed payloads, initiate Signals Intelligence (SIGINT) modernization, develop algorithms and techniques to distribute Positioning, Navigation, and Timing (PNT) across Army platforms, and to partially fund Precision Strike Missile (PRsM) Inc 4.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) AM7 / *Modular RF Communications Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AM7: *Modular RF Communications Advanced Technology*	-	10.059	-	1.993	-	1.993	13.319	12.802	12.942	0.236	0.000	51.351
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In Fiscal Year (FY) 2024, funding in this Project has a Skip Year.

A. Mission Description and Budget Item Justification

This Project matures developed techniques, methods, and standards for automation and intelligence to optimally broadcast data among available radio frequency (RF) and networking technologies. This Project will predict that a change in the network is needed and automatically make that change (transport, waveform mode, routing) prior to the network failing or being degraded. This Project provides a resilient transport agnostic network to the user.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AM6 (Modular RF Communications Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Modular Radio Frequency (RF) Communications Advanced Technology ***Description:*** This effort optimizes autonomous networking protocols to automate the PACE communication plan to initialize, adapt, and continue operations under changing environments and threats.	10.059	-	-
Title: Predictive Intelligent Networking Adv Tech ***Description:*** This effort matures and demonstrates methods to enable the tactical network with artificial intelligence (AI) to autonomously identify, learn, predict, and react to changes in network operating conditions and threats to ensure end-to-end network resiliency against adversarial AI-driven electronic attacks (EA), electronic warfare (EW), and cyberattacks. ***FY 2025 Plans:***	-	-	1.993

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AM7 / *Modular RF Communications Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will develop internal and external facing Application Programming Interfaces (APIs) for integration into Program of Record (POR) systems; optimize and mature algorithms from Modeling and Simulation (M&S) for Mobility Prediction and Network Optimization work. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned initiation of this effort. In Fiscal Year (FY) 2025 this Project is realigned from Program Element (PE) 0602213A (C3I Applied Cyber) / Project CY6 (Autonomous Cyber Technology).			
Accomplishments/Planned Programs Subtotals	10.059	-	1.993

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) AM9 / *Protected SATCOM Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AM9: *Protected SATCOM Advanced Technology*	-	30.859	14.200	5.511	-	5.511	14.199	15.630	8.023	6.199	0.000	94.621
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates technologies and components to increase resiliency of Wideband Satellite Communications (SATCOM) in contested and congested electromagnetic environments. This Project improves resiliency through science & technology investigation. This Project complements technologies that provide obfuscation of radio frequency (RF) spectrum signature in order to counter enemy electronic surveillance capabilities.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Projects AM8 (Protected SATCOM Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Protected SATCOM Advanced Technology and Resilient Tactial Networking and Comms	30.859	14.200	-
Description: This effort matures and demonstrates technologies and components to increase resiliency of Wideband SATCOM in contested and congested electromagnetic environments. This effort improves resiliency through science & technology investigation. Will complement technologies that provide obfuscation of RF spectrum signature in order to counter enemy electronic surveillance capabilities.			
FY 2024 Plans: Will mature, optimize, and demonstrate select SATCOM technologies that contribute to SATCOM resiliency; will mature and demonstrate OTM satellite ground terminal technology that supports operation over multiple satellite constellations with low available SWAP, leading to Army communications resiliency through diversity for tactical vehicles; and mature and demonstrate ATH satellite ground terminal technology that supports operation over multiple satellite constellations simultaneously, leading to Army communications resiliency through diversity for Army TOCs.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AM9 / *Protected SATCOM Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding change reflects the planned life cycle conclusion of this Science and Technology effort. In Fiscal Year (FY) 2025, this project is restructured to Program Element (PE) 0602146A (Network C3I Technology) / Project AM8 (Protected SATCOM Technology).			
Title: Multi-Orbit Modem (MOM) Advanced Technology ***Description:*** This effort matures, optimizes and demonstrates Satellite Communications (SATCOM) ground terminal modem and management technology components to enable operation over multiple satellite constellations to increase performance and resiliency of wideband SATCOM in contested and congested electromagnetic environments. Modem components will include a software based terminal controller for modem management, repository of modem waveforms, and supporting network management. This effort develops resiliency through a flexible modem technology investigation and is complementary with Protected SATCOM efforts focused on antenna development. ***FY 2025 Plans:*** Will mature, optimize, and demonstrate select SATCOM technologies that contribute to SATCOM resiliency; will mature and demonstrate OTM satellite ground terminal technology that supports operation over multiple satellite constellations at multiple frequency bands. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned initiation of this effort.	-	-	5.511
Accomplishments/Planned Programs Subtotals	30.859	14.200	5.511

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) AN4 / *Non Traditional Waveforms Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AN4: *Non Traditional Waveforms Advanced Technology*	-	5.823	5.215	17.488	-	17.488	16.062	18.075	19.931	18.843	0.000	101.437
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project demonstrates non-traditional waveforms and technologies for resilient communications in contested environments providing anti-jam, low probability of intercept, and low probability of detection for the dismounted and vehicular user. This Project also optimizes technologies not typically applied to the tactical environment, such as millimeter wave communications and directional networking with coherent combining of radio frequency signals, to maintain networked communications in and under contested and congested electromagnetic spectrum environments.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AN3 (Non Traditional Waveforms Technology) and Project AO4 (Energy Efficient Devices Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Non Traditional Waveforms Advanced Technology	5.823	-	-
Description: This effort demonstrates non-traditional waveforms and technologies for resilient communications in contested environments providing anti-jam, low probability of intercept, and low probability of detection for the dismounted and vehicular user. This effort optimizes technologies not typically applied to the tactical environment, such as millimeter wave communications and directional networking with coherent combining of radio frequency signals, to maintain networked communications in and under contested and congested electromagnetic spectrum environments.			
Title: Relay for Aerial to Non-line-of-sight Ground Environments (RANGE)	-	5.215	12.925
Description: This effort matures and demonstrates as next-generation aerial communications relay payloads to maintain communications coverage in Non-Line-of-Sight (NLOS) environments. The technology will provide flexibility to enable the communications relay to support both currently fielded radios and emerging/future radios including those with anti-jam and low probability of detection capabilities.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AN4 / *Non Traditional Waveforms Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will mature and demonstrate small form factor aerial relay communications payloads capable of enabling both low-band (e.g. L/S/C) and high-band (e.g. millimeter-wave) operations; optimize communications components for directional systems and demonstrate communications relay performance while reducing size, weight, and power of the aerial communications payload by aligning with Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Modular Open Suite of Standards (CMOSS) standards. ***FY 2025 Plans:*** Will mature scalable and modular small-form-factor aerial relay communications payloads to include system prototyping of multiple system variants; perform lab-based assessments to validate sub-system and integrated system performance; implement and validate communications waveforms/protocols on system; mature and demonstrate CMOSS adapter card; perform initial field testing in an outdoor environment; mature a radio communications system that has the flexibility to support not only high bandwidth, low latency commercial communication systems (e.g. 5G, Wi-Fi) but also tactical waveforms with the ability to seamlessly switch between tactical and commercial communications methods based on mission needs and security considerations without the need for multiple hardware systems. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned maturation and validation of multiple tactical communication system prototypes of multiple size variants to be used in different use cases depending on available size, weight, and power of end user platforms, within the CMOSS standards, culminating in iterative demonstrations.			
Title: Spectrum Superstorm ***Description:*** This effort matures commercial technical effects technology with an emphasis on blue force communications deconfliction, high fidelity pattern of life generation, and orchestration software. This effort provides the capability to create a radio frequency (RF) "smoke screen" for the network that will overwhelm adversary electronic support capability resulting in increased difficulty to find and fix targets based on their RF signature.? This capability has applications at Division and below and the CEMA cell efforts to create periods of spectrum dominance during the dominate phase of conflict. ***FY 2025 Plans:*** Will mature system design characteristics in both preliminary design review and critical design reviews; optimize system size, weight, and power; demonstrate multiple technical effects device in a laboratory environment. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned initiation of this effort.	-	-	4.563
Accomplishments/Planned Programs Subtotals	5.823	5.215	17.488

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AN4 / *Non Traditional Waveforms Advanced Technology*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Tec hnology*	Project (Number/Name) AN8 / *COE - Every Receiver is a Sensor Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AN8: *COE - Every Receiver is a Sensor Advanced Tech*	-	1.371	6.539	5.480	-	5.480	4.486	5.192	5.237	6.105	0.000	34.410
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project optimizes automated exploitation and fusion analysis tools, applications, and software services that harvest, correlate and fuse tactical receiver sources with new and emerging data sources to improve understanding of the threat picture and more efficiently support near-real time Situational Understanding of the battlefield.

Work in this Project complements Program Element (PE) 0603463A (Network C3I Advanced Technology) / Project AO1 (UNT - Every Receiver is a Sensor Advanced Tech) and PE 0602146A (Network C3I Technology) / Project AN7 (COE - Every Receiver is a Sensor Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Intelligence, Surveillance and Reconnaissance Optimization for Multi-Domain Operations Support Advanced Tech	1.371	6.539	3.038
Description: This effort will use automated threat process to focus sensor collection requirements. Collection plans are to be synchronized across echelons optimizing scheduling and placement of sensor assets from both national and joint capabilities. Effort enables cooperative multi-sensor, multi-intelligence (INT) collection orchestrations by leveraging All Domain Overhead Collection Operations (AOCO) family of standards. Effort develops prototype software to demonstrate autonomous cross cue of multi-INT sensors and analytics.			
FY 2024 Plans: Will mature and integrate sensor optimization algorithms with collection orchestration tools to reduce timeline for sensor selection and tasking; mature and demonstrate standardized messaging and interfaces for tasking Army, national, and joint sensor assets; mature Intelligence Surveillance and Recognizance (ISR) collection orchestration software tools to enable near-real-time cross-cueing of sensors to improve target detection, tracking, and identification.			
FY 2025 Plans: Will demonstrate ISR collection orchestration software tools to execute cooperative sensing and near-real-time cross cueing of Army, national, and joint sensors to improve target detection, tracking, and identification during Multi-Domain Operations (MDO).			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AN8 / *COE - Every Receiver is a Sensor Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding decrease reflects conclusion of primary development phase, which included development and integration of multiple subsystems necessary to demonstrate collection optimization across Army, national, and joint assets. Funding decrease reflects administrative realignment to task Virtual Orchestration of Kinetic Non-Kinetic Targeting Advanced Technology within this project.			
Title: Virtual Orchestration of Kinetic Non-Kinetic Targeting Advanced Technology ***Description:*** This effort will provide Army Commanders the full range of multi-domain options by integrating kinetic and non-kinetic targeting and effects into the mission execution and mission planning cycles. Effort will develop software tools to augment the kinetic targeting process, to include non-kinetic engagement. ***FY 2025 Plans:*** Will mature target development workflow tools to incorporate non-kinetic effects planning into the target development process with alignment to the Attack Guidance Matrix (AGM) and the Target Selection Standards (TSS); mature target weapons pairing analytics to improve recommendations for kinetic and non-kinetic engagements. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned initiation of the effort. Funding increase reflects administrative realignment from task Intelligence, Surveillance and Reconnaissance Optimization for Multi Domain Operations Support Advanced Tech within this project.	-	-	2.442
Accomplishments/Planned Programs Subtotals	1.371	6.539	5.480

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) AO1 / *UNT - Every Receiver is a Sensor Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AO1: *UNT - Every Receiver is a Sensor Advanced Tech*	-	-	3.170	4.179	-	4.179	4.684	8.199	6.717	13.815	0.000	40.764
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project demonstrates high fidelity Cyber-Electromagnetic Activity (CEMA) situational understanding by exploiting tactical receivers with sufficient capabilities as sensors. This Project also optimizes real-time radio frequency mapping of the tactical environment in support of network operation and decision making.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AN9 (UNT - Every Receiver is a Sensor Technology) and Project AN7 (COE - Every Receiver is a Sensor Technology); and PE 0603463A (Network C3I Advanced Technology) / Project AN8 (COE Every Receiver is a Sensor Advanced Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Multi Int Modernization Combined Architecture (MIMCA) Advanced Technology	-	3.170	3.177
Description: This effort develops technologies and methodologies to overcome the interference experienced in current co-located, multifunction systems that hinders the efficient, effective execution of simultaneous Electronic Warfare (EW), signals intelligence and cyber missions. This effort will improve resourcing, scheduling and collaboration so that sensor systems can self-optimize, identify spectrum conflicts and fully utilize all available assets scheduling to enable simultaneous use of the spectrum on a threat dense battlefield.			
FY 2024 Plans: Will leverage advanced machine language-based resource schedulers to dynamically optimizes resource allocation on EW platforms to increase simultaneity; leverage advanced Radio Frequency (RF) payload that can accommodate an advanced scheduler, implement novel interference mitigation components, and can self-optimize based on real-time feedback from shared resources to compensate for Battle Damage Assessment (BDA) or adaptive Electronic Attack (EA).			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AO1 / *UNT - Every Receiver is a Sensor Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will mature and demonstrate advanced scheduling technology to dynamically optimize resource allocation to complete multifunction missions; exploit commercial interference mitigation technology to increase efficient use of RF spectrum resources and simultaneity on multifunction platforms. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase is an economic adjustment.			
Title: Army SIGINT Modernization Advanced Technology ***Description:*** This effort will mature and demonstrate radio frequency (RF) signal analysis and processing techniques that automate detection, identification, and exploitation of high priority peer/near-peer adversary military signals, significantly increasing autonomous detection and parameterization of unknown signal operating instructions. The effort will improve robustness against realistic congested RF environments and will be suitable for size, weight, and power constrained tactical edge environments. ***FY 2025 Plans:*** Will mature RF signal detection and classification techniques against peer/near-peer adversary threats, improving robustness against realistic congested RF environments and suitability for size, weight, and power (SWAP) constrained tactical edge environments; use modeling and simulation to demonstrate and optimize signal detection performance and ranges for fixed-site/ on-the-move platforms. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned initiation of this effort.	-	-	1.002
Accomplishments/Planned Programs Subtotals	-	3.170	4.179

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) AO7 / *EW for Maneuver Operations (EMO) Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AO7: *EW for Maneuver Operations (EMO) Adv Tech*	-	5.968	3.152	-	-	-	-	3.168	3.742	3.779	0.000	19.809
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

There is no Fiscal Year (FY) 2025 budget request. Work in this project is planned to be completed in FY24.

A. Mission Description and Budget Item Justification

This Project matures and demonstrates distributed, coordinated Electronic Warfare (EW) capabilities designed to extend effective range, reduce susceptibility to localization, and introduce errors into adversary ISR systems to facilitate multi-domain operations (MDO). This Project will mature Electronic Warfare (EW) resources to mitigate Electronic Protection (EP), against a finite set of threat capabilities, present in Anti-Access Area Denial (A2/AD) threats to achieve improved freedom of maneuver.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AP5 (Electronic Warfare Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Stand-in Advanced RF Effects Advanced Technology ***Description:*** This effort matures and demonstrates highly advanced hardware and software to improve power-on-target for EW systems against certain threat systems.	2.991	-	-
Title: Tactical Force Signature Effects (TForSE) Advanced Technology - Counter ISR Techniques ***Description:*** This effort matures and demonstrates Electronic Warfare capabilities against adversary counter-fire sensors and Intelligence, Surveillance, and Reconnaissance (ISR) systems leveraging high fidelity hardware-in-the-loop, modeling and simulation (M&S), and representative systems. ***FY 2024 Plans:*** Will use representative adversary sensor systems in a field demonstration environment, validate combined performance of decoy hardware and countermeasure techniques to reduce the effectiveness of adversary ISR and counterfire capabilities, impacting	2.977	3.152	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AO7 / *EW for Maneuver Operations (EMO) Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
their ability to localize blue emissions and therefore target blue platforms for kinetic weapons engagements; demonstrate and document tactical placement of EW platforms to optimize countermeasure effects and to create larger regions of uncertainty. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects planned life cycle conclusion of this Science and Technology Effort. In Fiscal Year (FY) 2025, funding is realigned to Program Element (PE) 0602146A (Network C3I Technology) / Project AQ2 (EW Techniques Technology).			
Accomplishments/Planned Programs Subtotals	5.968	3.152	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) AQ5 / *Sensor CE-Integrated Sensor Architecture Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AQ5: *Sensor CE-Integrated Sensor Architecture Adv Tech*	-	0.625	1.955	-	-	-	-	1.981	2.003	2.023	0.000	8.587
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In Fiscal Year (FY) 2025, this Project is terminated.

A. Mission Description and Budget Item Justification

This Project matures and demonstrates capabilities that enable and enhance sensor interoperability across disadvantaged and disparate networks.? It leverages and furthers the existing architectures consisting of standards, interfaces, and services. Enabling operationally relevant data to efficiently move across the network and ensures data is available for the Command & Control (C2) systems, integration into Tactical Operations Centers (TOC), ingestion into decision support aides and is actionable at the tactical edge.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Sensor CE - Integrated Sensor Architecture	0.625	1.955	-
Description: This effort matures and demonstrates an agile and adaptive interoperability sensor architecture that allows a system to dynamically discover and leverage other systems on a network without any specific or prior knowledge across limited, heterogeneous resources and against a peer adversary. The goal of this effort is to develop standards, models, and protocols that provide a common language for sensor systems to connect, publish their capabilities and needs, and interact with other systems, even on disadvantaged networks. The benefits of this effort are increased sensor collaboration, reduced decision timelines, reduced soldier load, and reduced integration costs.			
FY 2024 Plans: Will mature the subscription services and demonstrate scalability to multiple sensors across a disadvantaged network; improve upon performance metrics; mature and optimize approaches to de-conflict multiple target indicators; validate de-confliction approach of sensors and shooter across a network representing Multi Domain Operations (MDO).			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AQ5 / *Sensor CE-Integrated Sensor Architecture Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
In Fiscal Year (FY) 2025, this Project is terminated.			
Accomplishments/Planned Programs Subtotals	0.625	1.955	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) AQ8 / *High Tempo Data Driven Decision Tools Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AQ8: *High Tempo Data Driven Decision Tools Adv Tech*	-	6.472	3.602	3.791	-	3.791	7.940	7.942	10.823	10.901	0.000	51.471
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates data driven decision tools that help develop Situational Understanding (SU) for Commanders. It enhances decision-making and accurately assesses and integrates cross-warfighting functional area impacts with all the domains in Multi-Domain Operations (MDO), and thereby enhances mission effectiveness by improving decision cycles. This Project matures and integrates methods to optimize the Army's Command and Control (C2) services and data architecture to strengthen data-driven decisions.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AQ7 (High Tempo Data Driven Decision Tools Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: High Tempo Data Driven Decision Tools Advanced Technology	3.237	-	-
Description: This effort matures and demonstrates data driven decision tools tailored to reflect specific mission / information needs of the commander and individual staff members comprised of the following: software that facilitates the exchange of cyber data and mission information between the cyber electromagnetic activities (CEMA) cell, the S-6 and other staff officers (e.g., S-3, S-2, Fire Support Officer (FSO)), helping to assess higher-level impacts of lower-level events, and capturing the information as part of models for possible re-use; and software that dynamically populates the Common Operating Picture (COP) with visualizations designed for exploration and understanding of the impact of the cyber domain on the current mission.			
Title: RoadRunner Advanced Technology	3.235	3.602	3.791
Description: This effort matures and demonstrates stakeholder prioritized capabilities that fuse intel and ops perspectives that drive decisions to enable dominance in complex Multi-Domain Operations. Effort will deliver applications which improve command post warfighter functions through information and decision dominance. Proposals are selected in budget year and year of execution to meet stakeholder prioritized capabilities.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AQ8 / *High Tempo Data Driven Decision Tools Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will validate and provide improved strategies for friendly versus enemy engagements while reducing cognitive burden with minimal impact to time constrained force on force interactions; exploit non-obvious insights, self and adversary vulnerabilities, and tactical opportunities using real time decision support tools during planning and execution phases. ***FY 2025 Plans:*** Will integrate Development, Security, and Operations (DevSecOps) technologies onto existing mission command and intel platforms coexisting with Innovation requirements efforts; mature red-teaming capabilities to identify application vulnerabilities and deploy software patches; develop adaptive threat order of battle, optimize strategies using digitized plans, and prioritization with real time battle damage assessment. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects an economic adjustment.			
Accomplishments/Planned Programs Subtotals	6.472	3.602	3.791

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) AR6 / *Understanding the Environment as a Threat Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AR6: *Understanding the Environment as a Threat Adv Tech*	-	2.709	-	-	-	-	-	-	-	-	0.000	2.709
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates tools that provide capability to inform the Solider of different routes through a complex urban landscape. Optimizes tools that balance exposure to environmental threats with mission constraints to provide a risk versus reward capability of operating in different areas of the urban theater. This Project matures and demonstrates predictive software accurately integrating the risks of physical, chemical, and biological threats in an urban environment into route planning tools.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AR5 (Understanding the Environment as a Threat Technolo).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Environmental Threat Technology Demonstrations for route planning ***Description:*** This effort matures and demonstrates a software tool that informs and balances the risk of exposure to environmental threats with maneuver constraints along potential routes. The software integrates the risks associated with different environmental matrices in complex urban environments and includes the capability for routing in off-road scenarios.	1.008	-	-
Title: Hazard Prediction Demonstration ***Description:*** This effort matures and demonstrates a mission planning platform that provides Soldiers with a predictive visualization technology to identify, track and plan for industrial or commercial chemical/environmental threats in operational environments.	1.001	-	-
Title: Subsurface Forensics Demonstration ***Description:*** This effort matures and demonstrates sensing technologies for TIC/Ms to detect illicit activities with authentic wastewater treatment influent.	0.700	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AR6 / *Understanding the Environment as a Threat Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Accomplishments/Planned Programs Subtotals	2.709	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) AT8 / *Network-Enabled GeoSpatial-GEOINT Services AdvTech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AT8: *Network-Enabled GeoSpatial-GEOINT Services AdvTech*	-	4.501	4.760	3.764	-	3.764	7.943	9.128	3.134	4.716	0.000	37.946
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project accelerates and exploits the tactical value of emerging field generated, mission relevant 3-dimensional (3D) geospatial data supporting mission planning, mission rehearsal and tactical situational awareness. Integrates and demonstrates the geo-registration, feature extraction, change detection, data visualization and transmission capabilities developed in the applied research portion of this Project. Tools developed for the exploitation of 3D datasets will be integrated into a streamlined workflow requiring low levels of expertise, putting advanced processing capabilities in the hands of the Soldier. This Project also includes demonstrations of tactical enhancements and the integrated ability to rapidly share mission critical 3D information in support of planning and execution.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AT7 (Network-Enabled GeoSpatial and GEOINT Services Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center Geospatial Research Laboratory, Cold Regions Research and Engineering Laboratory, and Information Technology Laboratory.

.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: 3D Terrain Automated Geospatical Co-Registration and Change Detection ***Description:*** This effort matures, integrates and demonstrates the design and formulation of new urban terrain data models, frameworks and processes to automate the transformation of tactical unit generated source data (e.g. Light Detection and Ranging (LiDAR), imagery, and full motion video derived data) to new model constructs for rapid and accurate geo-registration of features (manmade infrastructure).	2.703	-	-
Title: Optimization of Geospatial Data for Tactical Visualization-Demonstration ***Description:*** This effort matures and demonstrates new open source software, data models and processes to generate a vision based geospatial foundation layer to enable end-users systems to visualize real-time mission critical geospatial content at the	1.798	1.838	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AT8 / *Network-Enabled GeoSpatial-GEOINT Services AdvTech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
required level-of-detail (LOD) and enable position-navigation self-localization capability applicable to end-user devices at required accuracies optimized for the device, application, and mission. ***FY 2024 Plans:*** Will demonstrate advanced delivery of vision-based Position Navigation (PN) self localization from optimized geospatial data on end user devices at required accuracies. Will demonstrate reduced network bandwidth requirements though implementation of 3D Level-of-Detail (LOD) architectures and provide rigorous Figure of Merit assessment for integration to vision-based position/ navigation methods. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned life cycle conclusion of this Science and Technology effort.			
Title: Geospatial - Intelligence Community Merge Demonstration ***Description:*** This effort matures an approach to automatically search Intelligence Community (IC) databases to discover and extract relevant attributes to be added as new metadata to adaptively scaled 3D terrain features and/or geographic areas. Geospatial and relevant intelligence data will be merged together, discoverable, and capable of user-selected query from a single computing environment. An enhanced 3D common operating picture will be demonstrated providing a more comprehensive understanding of the Operational Environment for greater situational awareness and decision making. ***FY 2024 Plans:*** Will advance Application Programming Interface (API) connectivity to relevant selected Intelligence Community (IC) databases to complement and enrich 3D terrain by extracting relevant attributed added as new metadata to adaptively scaled 3D terrain features and/or geographic areas. ***FY 2025 Plans:*** Will demonstrate machine to machine API for database scraping to search, discover and extract relevant geospatial attributes. Will demonstrate software for retrieval of large geospatial datasets to end user devices in low bandwidth situations to enable Soldiers on the tactical edge to provide soldier-derived contextualization to the data. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the planned milestones to mature and demonstrate a prototype geospatial solution for automated workflows.	-	2.138	2.717
Title: Geospatially Relevant Intuitive Propagation Services for Complex Environments Demonstration ***Description:*** This effort matures and demonstrates a novel expert propagation framework for assessing sensor performance in complex terrain, with integrated battlefield sensor data and environmental predictive modeling (weather and terrain influences)	-	0.784	1.047

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AT8 / *Network-Enabled GeoSpatial-GEOINT Services AdvTech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
into intuitive displays for analysts, planners, and collection managers. The resulting technology will optimize collection asset employment against adversaries as well as providing situational awareness of friendly units', multi-modal signature footprint (e.g. radio frequency, thermal, acoustic). This effort will significantly reduce the analyst cognitive load, and fill an important need for fused, validated, environment and terrain-aware analyses for multi-modal sensors in support of C2, Intelligence and Protection Warfighting Functions. ***FY 2024 Plans:*** Will advance use cases within the Common Operating Environment to enable an automated and integrated system to predict and visualize sensor performance caused by environmental conditions effects. ***FY 2025 Plans:*** Will demonstrate multi-modality software to take real-time cues from the sensor network and publish sensor performance results back to the Sensor Compute Environment producing geospatial data discoverable within Army devices. Will integrate fractional line of sight algorithms into the sensor performance modeling environment. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the planned milestones to mature and demonstrate capabilities integrated with sensor networks.			
Accomplishments/Planned Programs Subtotals	4.501	4.760	3.764

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) AU1 / *Tactical GeoSpatial Information Capabilities ATech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AU1: *Tactical GeoSpatial Information Capabilities ATech*	-	5.869	2.112	2.722	-	2.722	3.433	7.992	6.128	7.464	0.000	35.720
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates next generation geospatial analytical tools for three-dimensional (3D) complex environments applicable to low echelon and tactical edge exploitation. These new capabilities will allow deployed units to enhance/update provisioned (baseline) standard, sharable, geospatial foundation (SSGF) data through automated analytics on multi-sourced spatial data resulting in streamlined, high fidelity terrain analysis products. Reducing data gaps and processing timelines will greatly increase Soldier situational awareness and support faster decision making in complex terrain.

Work in this Project complements Program Element (PE) 0602146A Network C3I Technology / Project AT9 (Tactical GeoSpatial Information Capabilities Techn).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center Geospatial Research Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: 3D Terrain Analysis ***Description:*** This effort integrates and demonstrates software models and workflows provisioned on the geospatial and GEOINT workstations for improved capabilities to generate, process and exploit terrain products enabling situational awareness and rapid decision making at the tactical edge.	3.819	-	-
Title: Previously Advanced Airborne Light Detection and Ranging (LIDAR) ***Description:*** This effort integrates and demonstrates enhanced Geiger-mode LiDAR hardware/software, for advanced testing of protocols, equipment, and products for enhanced high-altitude/wide area terrain data collection, to support tactical operations.	2.050	-	-
Title: Geospatial Analytics and Prediction Demonstration ***Description:*** This effort integrates and demonstrates automated/semi-automated geospatial tools implementing spatial/temporal data analysis, creation of predictive scenarios, anomaly detection and cross-scale and local-scale analysis of terrain. ***FY 2024 Plans:***	-	2.112	2.722

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AU1 / *Tactical GeoSpatial Information Capabilities ATech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will advance high-resolution 3D building-scale mapping workflow including interiors, exteriors and surrounding urban terrain. Will initiate designs for preliminary software tools for spatial, temporal and cross-scale analysis of terrain. ***FY 2025 Plans:*** Will demonstrate and mature mapping workflows for high-resolution building-scale 3D imagery collection (interiors, exteriors and surrounding urban terrain), with optimized processing. Will expand designs for software tools for spatial, temporal and cross-scale analysis of terrain, using overhead imagery sources. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the planned milestones for development of automated/semi-automated geospatial tools.			
Accomplishments/Planned Programs Subtotals	5.869	2.112	2.722

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) AU4 / *Geospatially Enabled Operational Design Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AU4: *Geospatially Enabled Operational Design Adv Tech*	-	12.186	10.953	10.813	-	10.813	5.133	6.435	8.194	8.276	0.000	61.990
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project demonstrates, integrates and transitions to Mission Command Systems, a geospatially enabled collaborative planning environment, accessible across echelons, with capabilities that support Army Design Methodology (ADM) by providing the ability to perform conceptual planning and problem framing, supporting a greater understanding and visualization of the dynamic operational environment, a shared understanding of the operations purpose across echelons, and enhanced products to drive detailed budget planning and operational assessment processes, enhancing the collaborative interaction between commanders, staffs, and unified action partners.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AU3 (Geospatially Enabled Operational Design Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center Geospatial Research Laboratory and Information Technology Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Geospatially Operational Design (GEOD) - Demonstration ***Description:*** This effort integrates and demonstrates automation technologies to digitally visualize, create and assess critical elements of the Operational Environment required to inform the Operational Design functions, including collaborative conceptual framing of the problem.	5.076	-	-
Title: Integration of intel and logistics Multi Echelon Planning ***Description:*** This effort demonstrates a suite of analytical and visualization tools designed to facilitate analysis of multiple courses of action through modeling and simulation (M&S) and wargames to support development of alternate Courses of Action (COAs) and approval of the operational plan. ***FY 2024 Plans:***	4.035	3.109	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AU4 / *Geospatially Enabled Operational Design Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will demonstrate advanced suite of analytical and visualization tools to facilitate Courses of Action (COA) analysis through modeling and simulation (M&S) and wargames to improve coordination and increase efficiencies in the Military Decision Making Process (MDMP). ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned life cycle conclusion of this Science and Technology effort.			
Title: Automated intelligence Preparation of the Battlefield (IPB) Demonstrations ***Description:*** This effort develops and demonstrates a collaborative, adaptive planning capability that allows planners to employ resources leveraging geospatial, terrain, environmental effects, and authoritative data from distributed information databases in order to collaborate in the development and assessment of courses of action, visualize potential outcomes, make decisions and develop and disseminate plans and orders. ***FY 2024 Plans:*** Will demonstrate analytical tools within Joint Planning Services (JPS) platform for the generation of digestible Intelligence Preparation of the Battlefield (IPB) information to increase understanding of operational environment and threats in support of the military planning process. ***FY 2025 Plans:*** Will mature and demonstrate automated analytical tools that allow IPB products which support the Military Decision Making Process (MDMP) to be processed and integrated into the digital plans inside Joint Planning Services (JPS) and the common command and control software/Command Post Computing Environment. Will optimize advanced algorithms to extract authoritative data supporting seamless integration with Intel analysis tools that generate IPB products. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the planned milestones for development of automated tools.	3.075	3.160	5.363
Title: GEOInt Ops Integration of tactical operational and strategic orders ***Description:*** This effort will demonstrate a suite of automated tools designed to facilitate rapid and efficient dissemination of orders and real-time visibility of subordinate planning as it relates to key tasks from higher echelons and desired end state down to Battalion. ***FY 2024 Plans:***	-	4.684	5.450

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AU4 / *Geospatially Enabled Operational Design Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will demonstrate through agile design reviews with Program of Record automated tools within Joint Planning Services (JPS) platform to allow rapid creation and dissemination of digital orders and reduce cognitive burden and gain efficiencies in the military planning process. ***FY 2025 Plans:*** Will mature and demonstrate automated analytical tools that allow IPB products which support the Military Decision Making Process (MDMP) to be processed and integrated into the digital plans inside Joint Planning Services (JPS) and the common command and control software/Command Post Computing Environment for Plans and Operations orders down to Battalion through tools that automatically populate planning tasks and ensure alignment with Commander's intent. Will demonstrate a flexible data model that will result in a real-time dashboard for integration of plans and orders to generate automated Operational Orders (OPORDs) and Fragmentary Orders resulting in time savings and reduction of cognitive burden. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects the planned milestones for development of automated tools.			
Accomplishments/Planned Programs Subtotals	12.186	10.953	10.813

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) AV8 / *Navigation Warfare (NAVWAR) Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AV8: *Navigation Warfare (NAVWAR) Advanced Technology*	-	1.949	6.029	3.988	-	3.988	6.036	5.352	10.955	15.494	0.000	49.803
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates capabilities allowing the Army to monitor, understand, and control the Navigation Warfare (NAVWAR) environment. This requires an integrated approach to Electronic Protection (EP), Electronic Support (ES), and Electronic Attack (EA) to rapidly characterize the NAVWAR environment, deny Positioning, Navigation, and Timing (PNT) based capabilities to our adversaries, and maintain Army capabilities.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AW1 (Autonomous Navigation Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: PNT Situational Awareness (SA) Advanced Technology	1.949	-	-
Description: This effort demonstrates real time PNT Situational Awareness for a Common Operating Picture (COP) on selected Computing Environment (CE); improves fusion algorithms for at least two types of PNT SA sensors (terrestrial, air, space); generates an Interface Control Document (ICD) for PNT SA messages; allow open integration and reference implementation for PNT SA stored data for distribution on various platforms.			
Title: Intelligent Electronic Protect (IEP) Advanced Technology	-	6.029	3.988
Description: This effort matures and demonstrates hardware and software capabilities that will enable an Assured Position Navigation and Timing (APNT) system to function as a Navigation Warfare (NAVWAR) sensor. The IEP enabled APNT system will be able to detect and identify information about jamming and spoofing threats in the Global Positioning System (GPS) environment, protecting units from spoofing and increasing the number and availability of NAVWAR sensors in the field. The proliferation of NAVWAR sensors allows the Electronic Warfare Planning and Management Tool (EWPMT) to create a NAVWAR Common Operating Picture with greater accuracy and coverage, allowing Commanders to make more informed decisions about maneuver and allowing for more accurate and successful fires missions.			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AV8 / *Navigation Warfare (NAVWAR) Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
FY 2024 Plans: Will mature machine learning (ML) techniques to enable detection and classification capabilities in an IEP enabled APNT system for use on ground vehicle platforms; exploit the machine learning techniques to allow use of existing GPS receiver hardware as a NAVWAR sensor; optimize artificial intelligence (AI)/ML techniques to understand the changes in the environment and utilize appropriate modes to counter interference events; mature the APNT system (hardware and software) to exploit this new NAVWAR data to improve overall anti-spoof protection; demonstrate initial machine learning techniques and hardware improvements at end of FY24 field test event. ***FY 2025 Plans:*** Will optimize machine learning (ML) techniques to enhance electronic sensing in an IEP enabled APNT system; provide capabilities that will allow software defined GPS receiver hardware to function as NAVWAR sensors; exploit NAVWAR data to provide protection through algorithm development, enabling communication between NAVWAR and APNT subsystems. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects planned focus on specific needs and technologies within the effort as it continues to progress. In Fiscal Year (FY) 2025, funding is realigned to Program Element (PE) 0602146A (Network C3I Technology) / Project AW5 (Modular GPS Independent Sensors Technology).			
Accomplishments/Planned Programs Subtotals	1.949	6.029	3.988

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) AW6 / *Modular GPS Independent Sensors Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AW6: *Modular GPS Independent Sensors Advanced Tech*	-	10.131	12.343	11.282	-	11.282	5.010	5.940	10.300	6.829	0.000	61.835
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates a resilient, soldier-integrated precision navigation and timing solution, providing precision geolocation, geospatial survey information, global positioning system (GPS) spoofing awareness and countermeasures to dismounted warfighters in GPS-denied/degraded environments. It develops capabilities to enable open and flexible Position Navigation and Timing (PNT) systems architecture with unlimited data rights for the Army's dismounted systems.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project AW1 (Autonomous Navigation Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center and the Army Applications Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Soldier-Integrated Positioning, Navigation, and Timing (PNT)	2.476	3.003	3.606
Description: This effort implements a standards-based, open PNT architecture solution for rapid commercial of the shelf (COTS) and emerging technology integration; incorporates artificial intelligence approaches to aggregate multiple organic and networked sensor inputs for improved PNT accuracy and reliability; demonstrates Simultaneous Localization and Mapping (SLAM) based-algorithms incorporating alternative PNT inputs; and demonstrates alternative PNT sensors and approaches, including radio frequency time differencing, signals of opportunity, inertial, gravimetric, and imagery.			
FY 2024 Plans: Will continue to exploit and provide technology discovery for network ranging, flexible and modular Radio Frequency (RF) antenna designs. Will incorporate artificial intelligence approaches and will mature alternate PNT sensors to improve PNT accuracy and reliability.			
FY 2025 Plans: Will optimize and fully integrate previously developed COTs technologies into final hardware, software, and modular open systems architecture.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** AW6 / *Modular GPS Independent Sensors Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
The integration of multiple technologies prior to the start of the deliverables due in FY26 accounts for the increase of funding.			
Title: Soldier Integrated Positioning Navigation and Timing - Modular Architecture & Integrated Demonstrators	7.655	9.340	7.676
Description: This effort optimizes, improves, and demonstrates the modular architecture for PNT capabilities; matures and integrates alternative PNT sensors modules, including signals of opportunity, inertial, barometric, vision-based navigation modules; matures, integrates, demonstrates and validates a final Modular Handheld; integrates and demonstrates PNT technologies with interfacing Soldier systems. Results from this effort will be a fused PNT solution that will operate in a GPS denied environment. ***FY 2024 Plans:*** Will integrate PNT sensors, algorithms, anti-jam capabilities, vision aided navigation, network ranging and other alternative navigation technologies with existing Soldier-borne device and demonstrate capability at a Soldier touch-point in a relevant environment; assess performance and mature interfaces and messaging necessary to distribute accurate position and timing across wirelessly connected Soldier-borne devices; integrate low-cost timing technologies into a modular open systems architecture Soldier Integrated technology demonstrator. ***FY 2025 Plans:*** Will optimize and fully integrate PNT sensors for Soldier-borne device; mature final software, hardware, and specification components; demonstrate final hardware, software, and Modular Open Systems Architecture at FY25 Demonstrator Soldier Touch Point; provide integrity scoring and power management strategies for PNT sensors implemented into final demonstrator. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects planned milestones for refining target areas of interest and finalizing technological advancements. In Fiscal Year (FY) 2025, funding is realigned to PE 0602146A (Network C3I Technology) / Project AW5 (Modular GPS Independent Sensors Technology).			
Accomplishments/Planned Programs Subtotals	10.131	12.343	11.282

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) BP4 / *ELECTRONIC WARFARE ADVANCED TECHNOLOGIES (CA)*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BP4: *ELECTRONIC WARFARE ADVANCED TECHNOLOGIES (CA)*	-	52.500	-	-	-	-	-	-	-	-	0.000	52.500
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Congressional Interest Item funding provided for Electronic Warfare Advanced Technologies.

A. Mission Description and Budget Item Justification

Congressional Interest Item funding provided for Electronic Warfare Advanced Technologies.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
Congressional Add: Program Increase - Assured Position, Navigation, and Timing Technology ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for APNT Technology	5.000	-
Congressional Add: Program Increase - Alternative Navigation for GPS-Denied Landing Environments ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Alternative Navigation for GPS-Denied Landing Environments	4.500	-
Congressional Add: Program Increase - Next Generation Command Posts ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Next Generation Command Posts	7.000	-
Congressional Add: Program Increase - ADVANCE MATERIALS FOR COMMAND POST OF THE FUTURE ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for ADVANCE MATERIALS FOR COMMAND POST OF THE FUTURE	1.500	-
Congressional Add: Program Increase - ADVANCED PRECISION, NAVIGATION AND TIMING FOR LANDING ENVIRONMENTS	2.500	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** BP4 / *ELECTRONIC WARFARE ADVANCED TECHNOLOGIES (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for ADVANCED PRECISION, NAVIGATION AND TIMING FOR LANDING ENVIRONMENTS		
Congressional Add: Program Increase - HUMAN GEOGRAPHY REPOSITORY FOR COMMERCIAL CIVIL AFFAIRS ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for HUMAN GEOGRAPHY REPOSITORY FOR COMMERCIAL CIVIL AFFAIRS	5.000	-
Congressional Add: Program Increase - MULTI-PLATFORM RECEIVER-SENSOR TECHNOLOGY ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for MULTI-PLATFORM RECEIVER-SENSOR TECHNOLOGY	20.000	-
Congressional Add: Program Increase - SMALL SATELLITE HIGH ALTITUDE LAUNCH, INTEGRATION, TEST, AND EVALUATION ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for SMALL SATELLITE HIGH ALTITUDE LAUNCH, INTEGRATION, TEST, AND EVALUATION	7.000	-
Congressional Adds Subtotals	52.500	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) CI7 / *Mobile & Survivable Command Post (MASCP) Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CI7: *Mobile & Survivable Command Post (MASCP) Adv Tech*	-	12.813	18.691	9.978	-	9.978	13.248	16.340	19.242	19.951	0.000	110.263
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Project matures and demonstrates technologies to support scalable, survivable, mobile Command Posts (CP). Technologies addressed will use the Brigade CP as a baseline while providing the opportunity for solutions to scale up or down to Army tactical echelons. Research in this Project includes integrating anti-jam (AJ) and low probability of intercept (LPI)/low probability of detection (LPD) communications focused on enabling the CP to disperse, form & reform, and employ technologies for signal remoting; optimizing power generation and storage for distributed CP operations; reducing computing infrastructure footprint, size, weight, and power (SWAP), manpower, and complexity; maturing technologies to reduce CP emissions and have situational awareness of those signatures to improve CP node employment; maturing electro-magnetic spectrum (EMS) emulation technologies to improve survivability options; and optimizing emerging electronic-textiles and composite materials for CP structures.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project CI3 (Mobile and Survivable Command Post (MASCP) Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) Center and Soldier Center (SC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: CP Modularity and Dispersion Advanced Technology	2.331	9.741	7.324
Description: Increases the ability for Commanders to move and disperse the Command Post (CP) through improved intra-CP communications, modular CP hardware to include distributed power systems, and network solutions leveraging open systems architectures to support information flow in distributed, intermittent, and latent (DIL) environments. This effort will eliminate centralized points of failure and critical nodes that constrain CP mobility and survivability. Areas of technology development include be distributed tactical cloud architecture, mesh network security architecture, high performance computing, integrated power, and distributed collaborative technologies.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** CI7 / *Mobile & Survivable Command Post (MASCP) Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will continue demonstration of wireless antenna remoting capability, specifically for Internet Protocol (IP) and legacy radio systems; optimize modulation and de-modulation performance of antenna remoting for both legacy and IP systems; mature and demonstrate advanced directional communications transport for congested and contested environments, improving anti-jam and low probability of detection of the dispersed command post; improve performance of dispersed collaboration for multi-node command post operations; improve the performance of vehicle mounted power systems and control mechanisms to provide efficient electrical power for dispersed command post operations; exploit Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Electronic Warfare (EW) Open Suite of Standards (CMOSS) capable systems for compatibility and to reduce size, weight, and power. ***FY 2025 Plans:*** Will mature and demonstrate energy storage solutions with auxiliary power units as vehicle- mounted power systems to provide resilience and versatility for dispersed CP operations; mature and demonstrate solutions for secure mesh local area networks for dispersed CPs; improves performance of dispersed staff collaboration technologies; validate efficacy of disaggregated CP computing infrastructure; validates antenna remoting capability through low probability of detection communications. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease corresponds to a decrease in scope related to demonstration of solutions under development.			
Title: Signature Management and Reduction Advanced Technology ***Description:*** Provides advanced technologies to reduce and manage electromagnetic spectrum signatures of CP platforms and command post components. ***FY 2024 Plans:*** Will improve real-time spectrum situation awareness of radio frequency emissions at each command post node; optimize coordination of collected spectrum emissions from each command post node during dispersed operations to validate spectrum operating picture; improve software application performance across multiple command post nodes providing situational awareness of CP emission status. ***FY 2025 Plans:*** Will mature and demonstrate algorithms to specifically identify communications systems and rogue signals emanating from dispersed CPs to enhance the situational awareness of our effective signature as seen by our adversaries. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects completion of command post node dispersal emission collection. In Fiscal Year (FY) 2025 funding is realigned to PE 0603463A (Network C3I Advanced Technology) / Project AO1 (UNT - Every Receiver is a Sensor).	6.693	5.068	2.654
Title: Advanced Technology Supporting Camouflage, Concealment, and Deception	3.789	3.882	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** CI7 / *Mobile & Survivable Command Post (MASCP) Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Description: This effort demonstrates innovative camouflage, concealment and deception technologies, for expeditionary assets (i.e. mission command platforms, battle management centers and supporting equipment), in order to defeat advanced and emerging adversary Intelligence, Surveillance and Reconnaissance (ISR) threats, and to reduce the probability of detection in multi-domain operations. Matures physics-based models for material and system performance that support probability of detection metrics in the multi-domain operational environment. ***FY 2024 Plans:*** Will demonstrate large format advanced camouflage solutions to include material and deployment solutions to conceal high value assets form detection against peer threats and a LiDAR detection capability; validate and verify ability to address signature management performance in a relevant environment. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned life cycle conclusion of this Science and Technology effort. Funding restructured to Program Element (PE) 0602146A (Network C3I Technology) / Project CI3 (Mobile and Survivable Command Post (MASCP) Tech).			
Accomplishments/Planned Programs Subtotals	12.813	18.691	9.978

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) CJ8 / *Assured PNT Communications Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CJ8: *Assured PNT Communications Advanced Tech*	-	10.933	11.783	13.435	-	13.435	15.043	17.268	16.182	19.331	0.000	103.975
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project provides prototyping and development of Space-enabled, High Altitude (HA), Counter-Surveillance and Reconnaissance, and quantum technologies to support wide-area, responsive deep area sensing required for beyond line of sight (BLOS) targeting and enable freedom of maneuver, significantly reducing Sensor to Shooter (S2S) timelines and increasing lethality and force protection. This Project provides Army forces access to commercial and National space assets and develops algorithms that process space and near space sensor data in real and near real time for integration into battlefield operating systems. The payoff of this work will be demonstrated advanced technologies for space-enabled capabilities for more secure, rapid communications, deep target sensing for deep strike lethality, and freedom of maneuver.

Work in this project complements Program Element (PE) 0602146A (Network C3I Technology) / Project CG3 (Assured PNT Communications Applied Research)/and Program Element (PE) 0602182A (C3I Applied Research) / Project CZ6 (Assured PNT Enabling Technologies).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Space and Missile Defense Technical Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Assured Positioning Navigation and Timing (APNT) Communications Advanced Technology	10.933	11.783	-
Description: This effort matures and demonstrates technologies required for smaller, more responsive and direct access to space and HA deep-sensing sensors and tactical communication capabilities for soldiers at the tactical edge. Research will augment, improve, exploit, and optimize existing commercial and Department of Defense (DoD) technologies and networks. This effort will validate software, hardware, and algorithms used to enable Space-Based and HA platform based capabilities in support of the Army's Modernization Priorities. This effort will exploit commercial advances and opportunities in integrating Space/HA sensors or Deep Sensing capabilities and payload management toward future Army concepts. Develop/demonstrate critical technical elements for a LEO-based global high-speed network backbone enabling highly networked, resilient, and persistent DoD payloads to provide over the horizon sensing, signals, and communication, with continuous surveillance of ground, surface, and air domains.			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** CJ8 / *Assured PNT Communications Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
FY 2024 Plans: Will develop High Altitude (HA) data communications payload with ability to communicate with Proliferated Low Earth Orbit (P-LEO) satellite constellation. Will continue toward demonstration of classified capability with preparation for military utility assessment. For Alternate Navigation capability development, will delivery payload and integrate with satellite bus. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects administrative realignment to add tasks HAYFINS, Deep Sensing Technologies, and Quantum Sensing within this project.			
Title: HAYFINS ***Description:*** This effort matures and demonstrates a ground-based system supporting Space and Autonomy Modernization priorities by fusing protection technologies with legacy systems that provide multi-modal capabilities to the Army to enhance freedom of maneuver supporting Multi-Domain Operations (MDO). This provides a tailored selection and application of multi-layered active and passive measures. ***FY 2025 Plans:*** Will evaluate a prototype system in a relevant environment and conduct threat analysis, Modeling and Simulation, and system design for follow-on capabilities. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects administrative realignment from the Assured Positioning Navigation and Timing (APNT) Communications Advanced Technology task within this project.	-	-	5.653
Title: Deep Sensing Technologies ***Description:*** This effort enables timely and operationally relevant connectivity between aerial and space based assets, as well as mesh networks, to collect space-based intelligence information in support of deep sensing operations. The impact to the Army is improved situational awareness, tipping and queuing of sensors, and support for long-range precision fires across multiple domains. ***FY 2025 Plans:*** Will provide an electronically steerable antenna for integration onto the fuselage of the HADES prototype aircraft that will facilitate aerial and space connectivity to enable intelligence and targeting data from commercial and national assets. Will mature hardware and software in accordance with Sensor Computing Environment Standards to automate tipping and queuing of sensors. ***FY 2024 to FY 2025 Increase/Decrease Statement:***	-	-	5.326

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** CJ8 / *Assured PNT Communications Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding increase reflects administrative realignment from the Assured Positioning Navigation and Timing (APNT) Communications Advanced Technology task within this project.			
Title: Quantum Sensing ***Description:*** This effort matures quantum sensing technologies for application to Army missions and demonstrates capabilities to validate applications to the Army sensing missions. ***FY 2025 Plans:*** Will mature and optimize quantum sensing technologies applicable to Army sensing missions. Will validate Quantum based RF/EO architectures for enhancing Army sensor performance standards. Particular interests include radar, deep sensing missions, LPI/LPD signals acquisition and transmission, environmental characterization and traditional component sensitivity enhancements. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects administrative realignment from the Assured Positioning Navigation and Timing (APNT) Communications Advanced Technology task within this project.	-	-	2.456
Accomplishments/Planned Programs Subtotals	10.933	11.783	13.435

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603463A / *Network C3I Advanced Technology*	Project (Number/Name) DB6 / *Pathfinder 3D Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DB6: *Pathfinder 3D Advanced Technology*	-	-	1.045	-	-	-	-	3.147	3.282	3.609	0.000	11.083
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates a geospatial rapid position and navigation solution in Global Positioning System (GPS) degraded and denied environments. Research focuses on using onboard sensors and high-resolution digital terrain geospatial alternative solution based upon Visual Three-Dimensional (3-D) Terrain Referencing and Navigation (VTRAN). This Project will result in the linkage of air and ground assets integrating sensory and (One World Terrain and Reference) geospatial data within the modular GPS Independent Sensors architecture. This Project provides critical alternatives to maneuver forces for position and navigation in a multi-domain operational environment.

Work in this Project complements Program Element (PE) 0602146A (Network C3I Technology) / Project CV4 (Pathfinder 3D Applied Technology).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the United States Army Engineer Research and Development Center Geospatial Research Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: PATHFINDER 3D Demonstration	-	1.045	-
Description: This effort will demonstrate and integrate novel Visual Terrain Reference & Navigation (VTRAN) algorithms, onboard sensors, and 3-Dimensional digital terrain to derive position and orientation estimates and apply those to modular Position Navigation and Timing (PNT) integrators. ***FY 2024 Plans:*** Will demonstrate local routing capabilities, sensors and a basic inertial accuracy for Visual Terrain Reference and Navigation (VTRAN) to test integrated foundation geospatial data including One World Terrain and analogs, sensory sources (from both air and ground) to derive state estimation for a robotic semi-autonomous system. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects the adjusted scope and planned delay to demonstrate geo-localization from Soldier-equipped passive sensor systems.			
Accomplishments/Planned Programs Subtotals	-	1.045	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603463A / *Network C3I Advanced Technology*	**Project (Number/Name)** DB6 / *Pathfinder 3D Advanced Technology*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603464A / *Long Range Precision Fires Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	225.921	153.024	164.943	-	164.943	139.503	100.485	81.874	73.862	0.000	939.612
AE8: *Land-Based Anti-Ship Missile (LBASM) Advanced Tech*	-	11.826	-	-	-	-	-	-	-	-	0.000	11.826
AF2: *Long Range Maneuverable Fires (LRMF) Advanced Tech*	-	30.663	62.661	88.512	-	88.512	76.455	-	2.021	12.209	0.000	272.521
AG3: *Extended Range Cannon Artillery (ERCA) Adv Tech*	-	3.232	-	-	-	-	-	-	-	-	0.000	3.232
AG5: *Extended Range Artillery Munition Suite Adv Tech*	-	26.915	23.484	-	-	-	-	-	-	-	0.000	50.399
AG7: *Energetic Materials and Adv Processing Adv Tech*	-	1.908	-	-	-	-	-	-	-	-	0.000	1.908
BO8: *Long Range Precision Fires Advanced Tech (CA)*	-	102.000	-	-	-	-	-	-	-	-	0.000	102.000
BY2: *Advanced Hypersonic Technology*	-	35.184	64.136	43.241	-	43.241	19.748	32.419	31.024	28.429	0.000	254.181
CE9: *Armaments Advanced Technology*	-	-	-	5.326	-	5.326	7.999	13.371	13.796	10.541	0.000	51.033
CZ8: *PrSM Modular Payload Advanced Development*	-	14.193	2.743	27.864	-	27.864	35.301	54.695	35.033	22.683	0.000	192.512

Note

Armaments Advanced Technology is a new start within the Long Range Precision Fires Advanced Technology program in FY 2025.

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and demonstrates Long Range Precision Fires (LRPF) technologies to destroy, neutralize, or suppress the enemy by cannon artillery and missile fire and enable integration of fire support assets into combined arms operations. Major Focus Areas for LRPF Science and Technology include: Missiles, Cannon Artillery, and Supporting LRPF Technologies covering Strategic, Operational and Tactical Lines of Effort. LRPF Missiles Advanced Development matures and demonstrates a broad range of Missile technologies to enhance Army integrated LRPF capabilities at extended range. Cannon Artillery Advanced Development matures and demonstrates critical technologies to increase range, precision, and both point and area effects for cannon artillery. Supporting LRPF

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603464A *I Long Range Precision Fires Advanced Technology*

Technologies Advanced Development matures and demonstrates a broad range of component technologies to address weapon cost drivers and enhance performance of future LRPF munitions and systems.

Research in this Program Element (PE) complements PE 0602147A Long Range Precision Fires Technology.

This PE is directly aligned to the Army Long Range Precision Fires (LRPF) Modernization Priority.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	202.830	153.024	127.982	-	127.982
Current President's Budget	225.921	153.024	164.943	-	164.943
Total Adjustments	23.091	0.000	36.961	-	36.961
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	26.169	-			
• SBIR/STTR Transfer	-3.078	-			
• Adjustments to Budget Years	-	-	36.961	-	36.961

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Project: BO8: *Long Range Precision Fires Advanced Tech (CA)*		
Congressional Add: *Program Increase - Hypervelocity Projectile Extended Range*	25.000	-
Congressional Add: *Program Increase - Maneuvering Submunitions for Precision Strike Missile*	9.000	-
Congressional Add: *Program Increase - AFT COMBUSTOR RAMJET PROPULSION*	10.000	-
Congressional Add: *Program Increase - DEVELOPMENT AND TESTING OF PROPELLANTS USING ADVANCED MANUFACTURING*	5.000	-
Congressional Add: *Program Increase - HYPERSONIC AND STRATEGIC MATERIALS AND STRUCTURES*	8.000	-
Congressional Add: *Program Increase - HYPERSONIC METAL ALLOYS*	2.000	-
Congressional Add: *Program Increase - MISSILE MULTI AGENT EXTENSIBLE ENGAGEMENT SERVICES*	15.000	-
Congressional Add: *Program Increase - SUPER RAMJET ARTILLERY MISSION*	8.000	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603464A *I Long Range Precision Fires Advanced Technology*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Congressional Add: *Program Increase - XM1155 GUIDED FLIGHT PROJECTILE*	20.000	-
Congressional Add Subtotals for Project: BO8	102.000	-
Congressional Add Totals for all Projects	102.000	-

Change Summary Explanation

Increase in FY25 funding was realigned from PE 0603465 Future Vertical Lift, PE 0602002 Army Agile Innovation and Development, PE 0603041 All Domain Convergence and PE 0205778A Guided Multiple-Launch Rocket System (GMLRS).

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603464A / *Long Range Precision Fires Advanced Technology*	Project (Number/Name) AE8 / *Land-Based Anti-Ship Missile (LBASM) Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AE8: *Land-Based Anti-Ship Missile (LBASM) Advanced Tech*	-	11.826	-	-	-	-	-	-	-	-	0.000	11.826
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project directly supports Long Range Precision Fires Modernization Priority capabilities by maturing and demonstrating critical technologies to detect, engage, and defeat moving land or maritime surface targets under all conditions.

Research in this Project complements Program Element (PE) 0602147A (Long Range Precision Fires Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Land Based Anti-Ship Missile (LBASM) Advanced Technology	11.826	-	-
Description: Matures and demonstrates technologies that enable high-mobility artillery rocket system (HIMARS) and multiple-launch rocket system (MLRS) rocket/missile artillery systems to destroy enemy air defenses in the land and the maritime domains.			
Accomplishments/Planned Programs Subtotals	11.826	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603464A / *Long Range Precision Fires Advanced Technology*	Project (Number/Name) AF2 / *Long Range Maneuverable Fires (LRMF) Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AF2: *Long Range Maneuverable Fires (LRMF) Advanced Tech*	-	30.663	62.661	88.512	-	88.512	76.455	-	2.021	12.209	0.000	272.521
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project directly supports Long Range Precision Fires Modernization Priority capabilities by developing, maturing and demonstrating next generation Multi-Domain Operations extended range weapon system technology for Precision Strike Missile to increase survivability, penetration, and range in complex Anti Access/Area Denial (A2/AD) and denied environments. This Project also includes both the maturation and demonstration of advanced extended range missile technology and autonomous, unmanned launcher technology. The combination of these technologies offers the potential to dramatically increase force projection through increases in range, firepower, and magazine depth.

Work in this Project complements Program Element (PE) 0602147A (Long Range Precision Fires Technology) / Project AF1 (Long Range Maneuverable Fires (LRMF) Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Long Range Maneuverable Fires (LRMF) Advanced Tech	30.663	62.661	88.512
Description: Matures and demonstrates next generation Multi-Domain Operations extended range weapon system technology for Precision Strike Missile to increase survivability, penetration, and range in complex A2/AD and denied environments. Includes maturation and demonstration of advanced extended range missile technology and autonomous, unmanned launcher technology.			
FY 2024 Plans: Will mature system detailed design that integrates combined cycle extended range missile propulsion engine and other critical component technologies such as navigation, guidance and control subsystems and perform subsystem and system level testing through laboratory, wind tunnel, and field tests. Mature development of modeling and simulation and hardware in the loop (HWIL) capability for evaluation of component design and system performance predictions. Will complete system level integration and test of an autonomous unmanned launcher and conduct field demonstrations of vehicle autonomy and remote launch pod control and munition live fire.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603464A / *Long Range Precision Fires Advanced Technology*	**Project (Number/Name)** AF2 / *Long Range Maneuverable Fires (LRMF) Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will conduct a series of integrated booster and ramjet demonstrations of propulsion engine concepts to validate performance of the air-breathing propulsion for long range fires; optimizes and matures models to simulate integrated objective system performance; matures seeker/sensor integration for optimal performance and precision; improves survivability by exploiting intel-based red-force models and analysis. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase due to development, demonstrations and validations of prime contractor integrated propulsion hardware in FY 2025.			
Accomplishments/Planned Programs Subtotals	30.663	62.661	88.512

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603464A / *Long Range Precision Fires Advanced Technology*	Project (Number/Name) AG3 / *Extended Range Cannon Artillery (ERCA) Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AG3: *Extended Range Cannon Artillery (ERCA) Adv Tech*	-	3.232	-	-	-	-	-	-	-	-	0.000	3.232
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project directly supports Long Range Precision Fires (LRPF) Modernization Priority capabilities. This Project matures and demonstrates artillery technologies including light weight cannon and mount structures, high efficiency recoil cylinders, common lower power fire control hardware, improved fire control software, and improved sensor to shooter communications which will increase range and accuracy without an increase in platform weight. This Project also develops a collaborative environment with analytic capabilities to support Fires and Intel Soldiers.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Research in this Project is performed by the Armaments Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Synchronized High Op-Tempo (SHOT) Targeting for LRPF ***Description:*** This effort develops a collaborative environment with analytic capabilities to support Fires and Intel Soldiers in organizing planning products, and analytics that automate data discovery and development of targets and streamlining workflows that support Course of Action development.	3.232	-	-
Accomplishments/Planned Programs Subtotals	3.232	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603464A / *Long Range Precision Fires Advanced Technology*	Project (Number/Name) AG5 / *Extended Range Artillery Munition Suite Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AG5: *Extended Range Artillery Munition Suite Adv Tech*	-	26.915	23.484	-	-	-	-	-	-	-	0.000	50.399
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In Fiscal Year (FY) 2025, this Project is terminated.

A. Mission Description and Budget Item Justification

This Project directly supports Long Range Precision Fires Modernization Priority capabilities. This Project matures and demonstrates extended range artillery technologies including advanced projectile propulsion and guidance technologies to increase range and accuracy.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Armaments Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Extended Range Artillery Munition Suite Advanced Technology	25.113	20.272	-
Description: Matures and optimizes long range unitary artillery projectile systems in the areas of range, precision, counter-measure, and payload technologies. ***FY 2024 Plans:*** Will demonstrate advanced range extension through in flight propulsion systems, optimized aeroballistic airframe geometries and precision technologies. Will optimize airframe architectures for integration of components to enable target seeking missions. Will demonstrate extended range munition concepts for conventional coordinate- seeking and cargo munitions. Will optimize payload integration for extended range gun-launched airframes to include sub-munition dispensing techniques and survivability. Will optimize extended range projectile airframes to maximize range and effectiveness across current and developmental weapon platforms and propelling charge systems. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects planned life cycle conclusion of this effort.			
Title: Optionally Manned Artillery Advanced Technology	1.802	3.212	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603464A / *Long Range Precision Fires Advanced Technology*	**Project (Number/Name)** AG5 / *Extended Range Artillery Munition Suite Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Description: Develop automated cannon artillery solutions for fuze-setting, firing, as well as rearming to exponentially increase rate of fire and out-pace future near-peer, high operational-tempo (OPTEMPO) engagements, and reduce Soldier burden. ***FY 2024 Plans:*** Will demonstrate technologies to improve the rate of fire of artillery systems including automated fuze setting, automated re-arm and re-supply, and fire control and diagnostics. Will validate modeling and simulation concepts that will increase the speed and performance of cannon artillery systems. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** In Fiscal Year (FY) 2025, this Project is terminated.			
Accomplishments/Planned Programs Subtotals	26.915	23.484	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603464A / *Long Range Precision Fires Advanced Technology*	Project (Number/Name) AG7 / *Energetic Materials and Adv Processing Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AG7: *Energetic Materials and Adv Processing Adv Tech*	-	1.908	-	-	-	-	-	-	-	-	0.000	1.908
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project directly supports Long Range Precision Fires Modernization Priority capabilities. This Project matures and demonstrates the performance of energetic materials ranging from medium caliber through large caliber weapons.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Scale-up of Insensitive Energetic Materials ***Description:*** This effort matures and demonstrates the performance and insensitivity of energetic materials ranging from 25mm medium caliber (direct fire) through 155mm large caliber (indirect fire) weapons.	1.908	-	-
Accomplishments/Planned Programs Subtotals	1.908	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603464A / *Long Range Precision Fires Advanced Technology*	Project (Number/Name) BO8 / *Long Range Precision Fires Advanced Tech (CA)*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BO8: *Long Range Precision Fires Advanced Tech (CA)*	-	102.000	-	-	-	-	-	-	-	-	0.000	102.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Congressional Interest Item funding provided for Long Range Precision Advanced Technology.

A. Mission Description and Budget Item Justification

Congressional Interest Item funding provided for Long Range Precision Advanced Technology.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
Congressional Add: Program Increase - Hypervelocity Projectile Extended Range ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Hypervelocity Projectile Extended Range	25.000	-
Congressional Add: Program Increase - Maneuvering Submunitions for Precision Strike Missile ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Maneuvering Submunitions for Precision Strike Missile	9.000	-
Congressional Add: Program Increase - AFT COMBUSTOR RAMJET PROPULSION ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for AFT COMBUSTOR RAMJET PROPULSION	10.000	-
Congressional Add: Program Increase - DEVELOPMENT AND TESTING OF PROPELLANTS USING ADVANCED MANUFACTURING ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for DEVELOPMENT AND TESTING OF PROPELLANTS USING ADVANCED MANUFACTURING	5.000	-
Congressional Add: Program Increase - HYPERSONIC AND STRATEGIC MATERIALS AND STRUCTURES	8.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603464A / *Long Range Precision Fires Advanced Technology*	**Project (Number/Name)** BO8 / *Long Range Precision Fires Advanced Tech (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for HYPERSONIC AND STRATEGIC MATERIALS AND STRUCTURES		
Congressional Add: Program Increase - HYPERSONIC METAL ALLOYS ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Hypersonic Metal Alloys	2.000	-
Congressional Add: Program Increase - MISSILE MULTI AGENT EXTENSIBLE ENGAGEMENT SERVICES ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for MISSILE MULTI AGENT EXTENSIBLE ENGAGEMENT SERVICES	15.000	-
Congressional Add: Program Increase - SUPER RAMJET ARTILLERY MISSION ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for SUPER RAMJET ARTILLERY MISSION	8.000	-
Congressional Add: Program Increase - XM1155 GUIDED FLIGHT PROJECTILE ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for XM1155 GUIDED FLIGHT PROJECTILE	20.000	-
Congressional Adds Subtotals	102.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603464A / *Long Range Precision Fires Advanced Technology*	Project (Number/Name) BY2 / *Advanced Hypersonic Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BY2: *Advanced Hypersonic Technology*	-	35.184	64.136	43.241	-	43.241	19.748	32.419	31.024	28.429	0.000	254.181
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project directly supports Long Range Hypersonic Precision Fires Modernization Priority capabilities by developing and maturing critical technologies for strategic missiles. Technology development includes critical technologies to improve strategic missile components such as advanced structures and materials, thermal protection systems, navigation systems, data links, and seekers/terminal sensors.

The cited research is consistent with Under Secretary of Defense for Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy.

Research in this Project is performed by the Aviation & Missile Center (AvMC) in coordination with the United States Army Rapid Capabilities and Critical Technologies Office (RCCTO).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Hypersonics Advanced Technology	35.184	64.136	43.241
Description: This effort matures and demonstrates new subsystems and components of a hypersonic weapon delivery system to defeat Anti Access/Area Denial (A2/AD) capabilities, suppress adversary Long Range Fires, and engage other payoff/ time critical targets.			
FY 2024 Plans: Will complete development and transition of 2D/3D carbon-carbon thermal protection materials and material processing techniques and standards to design agent and industry partners in support of critical material decisions for the Common Hypersonic Glide Body (CHGB). Will demonstrate guidance, navigation and control technology to reduce both size, weight, and power (SWAP) packaging and reliance on GPS for navigation accuracy in contested environments. Will mature and demonstrate seeker and terminal sensor component technologies to include seeker window, antenna, and transceiver for hypersonic weapon applications.			
FY 2025 Plans: Will develop and mature advanced modeling and simulation capability for determining system definition concepts and identification of critical technology performance requirements for future high speed vehicle applications; mature emerging technologies in the development of next generation high temperature materials and aerothermal structures for high speed vehicle applications;			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603464A / *Long Range Precision Fires Advanced Technology*	**Project (Number/Name)** BY2 / *Advanced Hypersonic Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
mature guidance, navigation and control technology to reduce both size, weight, and power (SWAP) packaging and reduce reliance on GPS for navigation accuracy in contested environments; mature terminal sensor component technologies to include, but not limited to Infrared/Radio Frequency (IR/RF) transparent windows, antennas, and transceivers for high speed vehicle applications; mature emerging propulsion and warhead technologies with greater performance to size/weight ratios. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease in Fiscal Year (FY) 2025 due to completing characterization of 2DCC/3DCC materials for process model development and demonstrating navigation technology on a sounding rocket to simulate a hypersonic flight environment in Fiscal Year (FY) 2024.			
Accomplishments/Planned Programs Subtotals	35.184	64.136	43.241

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603464A / *Long Range Precision Fires Advanced Technology*	Project (Number/Name) CE9 / *Armaments Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CE9: *Armaments Advanced Technology*	-	-	-	5.326	-	5.326	7.999	13.371	13.796	10.541	0.000	51.033
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Armaments Advanced Technology is a new start within the Long Range Precision Fires Advanced Technology program in FY 2025.

A. Mission Description and Budget Item Justification

Improve defeat of imprecisely located and relocated/moving targets by leveraging and advancing component technologies in armament technologies (multi-mode g-hardened seekers for cross spectrum targeting, advanced guidance, navigation, and control (GNC) and in-flight update technologies).

Work in this Project complements PE 0602141A / Lethality Technology / Project AH9 (Advanced Warheads Technology) and PE 0602147A (Long Range Precision Fires Technology) / Project AG4 (Extended Range Artillery Munition Suite Technology) and Project BN5 (Fuze and Power for Munitions).

The cited research is consistent with the Assistant Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Armaments Center (AC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Strategic Armaments Advanced Tech	-	-	5.326
Description: This effort provides performance enhancements for Long Range Fires by developing and integrating cannon artillery automation and rearm, enhanced lethality, munition survivability, precision, and munition collaborations technologies to maximize effects.			
FY 2025 Plans: Will optimize advanced targeting capabilities, multi-modal navigation, kinematic maneuver authority, course correction, collaborative and in-flight targeting, and terminal engagement mechanisms and technologies for artillery systems; mature energetics, warheads, fuzing, and precision component technologies into artillery munitions and submunitions to provide lethal and non-lethal enhanced tactical fires effects for multi-domain operations.			
FY 2024 to FY 2025 Increase/Decrease Statement: This effort is a new start in FY 2025.			
Accomplishments/Planned Programs Subtotals	-	-	5.326

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603464A / *Long Range Precision Fires Advanced Technology*	**Project (Number/Name)** CE9 / *Armaments Advanced Technology*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603464A / *Long Range Precision Fires Advanced Technology*	Project (Number/Name) CZ8 / *PrSM Modular Payload Advanced Development*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CZ8: *PrSM Modular Payload Advanced Development*	-	14.193	2.743	27.864	-	27.864	35.301	54.695	35.033	22.683	0.000	192.512
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project directly supports Long Range Precision Fires Modernization Priority capabilities by maturing and demonstrating critical technologies for autonomous, Cluster Munition policy compliant, enhanced lethality payloads deployed from Precision Strike Missile to autonomously and cooperatively find and engage the full spectrum of deep moved, moving, dispersed, and poorly located targets in areas with contested access at extended ranges.

Work in this Project complements Program Element (PE) 0602147A (Long Range Precision Fires Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Precision Strike Missile (PrSM) Advanced Development/PrSM Modular Payload	14.193	2.743	2.814
Description: Mature and demonstrate critical technologies for the delivery of distributed and enhanced lethality capabilities via extended range missiles. Technology examples include: sensor and associated signal processing technologies for target acquisition, identification, and engagement; datalink and communications technologies to transmit targetable data; compact propulsion technologies to enable dwell time on station; payload dispensing technologies for deploying these payloads from high speed long range missiles; and advanced extended range missile propulsion and guidance technologies.			
FY 2024 Plans: Will continue to mature critical component technologies and integrate payload enhanced lethality models and autonomy algorithms in high fidelity simulation to optimize missile terminal engagement performance.			
FY 2025 Plans: Will optimize components for modular payloads such as submunition guidance, six-degree of freedom model development, sensor packaging and algorithms, warhead performance, and airframe design; conduct wind tunnel demonstrations to optimize aerodynamic design; perform quantitative analysis on six-degree-of-freedom simulations against scenario specific vignettes.			
FY 2024 to FY 2025 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603464A / *Long Range Precision Fires Advanced Technology*	**Project (Number/Name)** CZ8 / *PrSM Modular Payload Advanced Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding increase is an economic adjustment.			
Title: Sensor Fuzed Weapon Development ***Description:*** This Project matures and demonstrates a sensor fuzed weapon (SFW) prototype to validate a capability to engage armored and mechanized forces utilizing the Extended Range Guided Multiple Launch Rocket System (ER GMLRS) as the delivery vehicle. The SFW prototype will consist of a munition dispenser containing multiple submunitions. The project will optimize the SFW submunitions to independently acquire, identify, and engage these targets. In order to support an accelerated demonstration schedule, initial efforts will be focused on demonstration of SFW on a standard range GMLRS. ***FY 2025 Plans:*** Will optimize the SFW payload munition design and conduct a Design Review; mature critical dispense mechanism and submunition component hardware and software,and perform subsystem testing to support integration of the SFW payload into a GMLRS form-factor. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding realigned from Program Element (PE) 0205778A (Guided Multiple-Launch Rocket System (GMLRS)) / Project EG3 (Guided MLRS) to develop an Extended Range Guided Multiple Launch Rocket System Sensor Fuzed Weapon (ER-GMLRS-SFW) capability.	-	-	25.050
Accomplishments/Planned Programs Subtotals	14.193	2.743	27.864

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	265.429	158.795	140.578	-	140.578	146.603	149.144	157.340	173.402	0.000	1,191.291
AI8: *Alternative Concept Engine Advanced Technology*	-	0.001	-	-	-	-	-	-	-	-	0.000	0.001
AJ9: *Integ Mission Equip for Vert Lift Systems Adv Tech*	-	24.278	17.095	2.396	-	2.396	-	-	-	-	0.000	43.769
AK3: *Aviation Survivability Advanced Technology*	-	3.953	-	-	-	-	-	-	-	-	0.000	3.953
AK5: *Multi-Role Small Guided Missile Advanced Tech*	-	10.980	11.795	6.105	-	6.105	-	-	-	-	0.000	28.880
AK7: *Adv Rotorcraft Armaments Protection Sys Adv Tech*	-	9.290	-	-	-	-	-	-	-	-	0.000	9.290
AK8: *Air Launched Effects Advanced Technology*	-	27.884	28.018	20.615	-	20.615	23.812	24.832	30.764	27.535	0.000	183.460
AL1: *Adv Teaming for Tactical Aviation Oper Adv Tech*	-	34.600	40.060	35.036	-	35.036	41.291	42.277	30.784	36.983	0.000	261.031
AL7: *Full Spectrum Targeting Advanced Technology*	-	8.419	8.955	8.651	-	8.651	8.379	6.861	6.466	6.070	0.000	53.801
AL9: *Holistic Sit Awareness and Dec Making Adv Tech*	-	28.291	21.128	15.474	-	15.474	18.228	18.606	23.226	23.458	0.000	148.411
BP8: *Future Vertical Lift Air Platform Adv Tech (CA)*	-	94.750	-	-	-	-	-	-	-	-	0.000	94.750
CA8: *Adv Rotocraft Armaments Protection Sys*	-	2.824	6.388	4.764	-	4.764	3.426	10.332	12.875	13.004	0.000	53.613
CC4: *FVL Radar Advanced Technologies*	-	3.220	4.403	-	-	-	2.389	3.895	4.422	4.947	0.000	23.276
CG1: *Holistic Team Survivability Adv Tech*	-	11.597	15.339	14.438	-	14.438	19.299	13.385	15.655	17.836	0.000	107.549
CH7: *Power & Thermal Management for FVL Adv Tech*	-	4.315	4.294	5.459	-	5.459	7.577	5.499	2.104	2.125	0.000	31.373

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army												Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603465A *I Future Vertical Lift Advanced Technology*							
CI8: *Adaptive Avionics Advanced Technologies*	-	-	-	10.046	-	10.046	17.929	16.940	19.150	19.342	0.000	83.407
CJ5: *Future Vertical Lift Medical Advanced Technology*	-	1.027	1.320	1.595	-	1.595	1.597	1.600	1.604	1.620	0.000	10.363
CK2: *High Speed Maneuverable Missile (HSMM) Adv Tech*	-	-	-	15.999	-	15.999	2.676	4.917	10.290	20.482	0.000	54.364

Note

In Fiscal Year (FY) 2025, project CI8 / Adaptive Avionics Advanced Technologies is a new effort realigned within PE 0603465A / Future Vertical Lift Advanced Technology. Funding realigned from project AJ9 /Integ Mission Equip for Vert Lift Systems Adv Tech.

In FY 2025, project CK2 / High Speed Maneuverable Missile (HSMM) Adv Tech is a new start within PE 0603465A / Future Vertical Lift Advanced Technology. This project continues and matures technologies developed in Budget Activity 2 Program Element 0602148 (Future Vertical Lift Tech) / Project CI5 (High Speed Maneuverable Missile Tech).

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and demonstrates manned and unmanned air vehicle and mission system technologies as well as advanced teaming capabilities to enable Army Future Vertical Lift. Emphasis is on platform and mission system technologies to enhance manned and unmanned air vehicle combat and combat support operations for attack, reconnaissance, air assault, survivability, logistics, and command and control missions. Within this PE, aviation technologies are advanced and integrated into realistic and robust demonstrations.

Research in this PE contributes to the Army Science and Technology (S&T) air systems portfolio and is fully coordinated with efforts in PE 0602148A (Future Vertical Lift Technology), PE 0602183A (Air Platform Applied Research) and PE 0603043A (Air Platform Advanced Technology).

A portion of this PE is directly aligned to the Future Vertical Lift (FVL) Army Modernization Priority.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering S&T focus areas and the Army Modernization Strategy.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603465A *I Future Vertical Lift Advanced Technology*

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	272.551	158.795	165.415	-	165.415
Current President's Budget	265.429	158.795	140.578	-	140.578
Total Adjustments	-7.122	0.000	-24.837	-	-24.837
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-2.035	-			
• SBIR/STTR Transfer	-5.087	-			
• Adjustments to Budget Years	-	-	-24.837	-	-24.837

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Project: BP8: *Future Vertical Lift Air Platform Adv Tech (CA)*		
Congressional Add: *Program Increase - UH-60 Main Rotor Blade Modernization*	5.000	-
Congressional Add: *Program Increase - Data Refinement and Optimization for Aviation Sustainment*	4.500	-
Congressional Add: *Program Increase - Fleetspace Maintenance Tool*	5.250	-
Congressional Add: *Program Increase - Platform Digitization and Maintenance*	7.000	-
Congressional Add: *Program Increase - Stretch Broken Carbon Fiber*	10.000	-
Congressional Add: *Program Increase - UAS Fuel Systems Enhancements*	2.000	-
Congressional Add: *Program Increase - ADDITIVE MANUFACTURING CAPABILITY*	2.000	-
Congressional Add: *Program Increase - ADDITIVE MANUFACTURING FOR FVL*	10.000	-
Congressional Add: *Program Increase - AUTONOMOUS CONFIGURATION MANAGEMENT AND AVIATION RECORDS*	10.000	-
Congressional Add: *Program Increase - DLC COATINGS FOR RED PHOSPHOROUS OBSCURANTS*	3.000	-
Congressional Add: *Program Increase - FVL SURFACE TOLERANT ADHESIVES*	9.000	-
Congressional Add: *Program Increase - INDIVIDUAL BLADE AND HIGHER HARMONIC CONTROL*	22.000	-
Congressional Add: *Program Increase - Multi-Drone, Multi-Sensor ISR*	5.000	-
Congressional Add Subtotals for Project: BP8	94.750	-
Congressional Add Totals for all Projects	94.750	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*

Change Summary Explanation

Decrease in Fiscal Year (FY) 2025 funding from the previous PB to the current PB due to realignment of funding priorities to Program Element (PE) 0602183A / Air Platform Applied Research.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) AI8 / *Alternative Concept Engine Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AI8: *Alternative Concept Engine Advanced Technology*	-	0.001	-	-	-	-	-	-	-	-	0.000	0.001
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project provides demonstration of adaptable, fuel efficient, and high power to weight engine technologies for potential application to Future Vertical Lift platforms. Research includes development of alternative, adaptive and smart engine technologies to provide improved performance, readiness and affordability across the engine operating envelope for increased operational capability.

Research in this Project is fully coordinated with Program Element (PE) 0602148A (Future Vertical Lift Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Improved Propulsion Technology Demonstration (IPTD)	0.001	-	-
Description: Effort will develop and execute an advanced engine integration, maintenance, and capability improvement strategy to produce key technology advancements on Future Long Range Assault Aircraft (FLRAA) engine systems, including the ACE engine technologies as appropriate. Full engine validation testing will be completed to TRL 6 providing improved propulsion system performance, maintainability, and durability while reducing integration risk for FVL FLRAA Platform.			
Accomplishments/Planned Programs Subtotals	0.001	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) AJ9 / *Integ Mission Equip for Vert Lift Systems Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AJ9: *Integ Mission Equip for Vert Lift Systems Adv Tech*	-	24.278	17.095	2.396	-	2.396	-	-	-	-	0.000	43.769
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates a mission systems architecture to support Future Vertical Lift (FVL) through utilization of a reconfigurable and flexible tiered architectural approach.

Work in this Project is fully coordinated with Program Element (PE) 0602148A (Future Vertical Lift Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Integrated Mission Equipment for Vertical Lift Systems	24.278	17.095	2.396
Description: Develops and demonstrates a mission systems architecture to support FVL through utilization of a reconfigurable and flexible tiered architectural approach. The approach will consist of the following: Maturing and implementing Model Based Engineering methods and Modular Open Systems Architecture strategies; instantiating an architecture verification environment and developing an agile and resilient digital backbone to support the rapidly changing threat environment including the digital battleground.			
FY 2024 Plans: Will complete automation of AVE, demonstrate representative capability to verify MOSA requirements, transition specification and architecture repository. Will install and flight test digital backbone technologies on experimental UH-60M aircraft. Will integrate, install, and demonstrate multiple sets of mission system components using multiple third party integrators in the Mission Systems Flying Test Bed (MSFTB) lab and conduct flight test on experimental UH-60M aircraft.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** AJ9 / *Integ Mission Equip for Vert Lift Systems Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will complete integration and demonstration of mission system components in the Mission Systems Flying Test Bed (MSFTB) lab and flight test on experimental UH-60M aircraft; document lessons learned, complete transition products, and provide support for adoption. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease in FY25 reflects completion of flight tests and shift to documentation and transition support. Funding realigned to PE 0603465A (Future Vertical Lift Advanced Technology) / Project CI8 (Adaptive Avionics Advanced Technologies) and PE 0602148A CI4 (Future Vertical Lift Technology) / Project CI4 (Adaptive Avionics Technologies).			
Accomplishments/Planned Programs Subtotals	24.278	17.095	2.396

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) AK3 / *Aviation Survivability Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AK3: *Aviation Survivability Advanced Technology*	-	3.953	-	-	-	-	-	-	-	-	0.000	3.953
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates increased Future Vertical Lift (FVL) survivability through the integration and demonstration of technologies that reduce platform signatures, improve threat warning and countermeasures against integrated networked air and ground threat systems. Also matures and demonstrates unmanned aircraft systems (UAS) survivability technologies to enable manned/unmanned team-based approaches to enable operation in contested peer/near peer environments.

Research in this Project is fully coordinated with Program Element (PE) 0602148A (Future Vertical Lift Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Survivability Against Integrated Networked Threats ***Description:*** This effort increases rotorcraft survivability by reducing platform signatures, providing the means to more efficiently counter enemy detection and tracking systems	3.953	-	-
Accomplishments/Planned Programs Subtotals	3.953	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) AK5 / *Multi-Role Small Guided Missile Advanced Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AK5: *Multi-Role Small Guided Missile Advanced Tech*	-	10.980	11.795	6.105	-	6.105	-	-	-	-	0.000	28.880
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates a holistic lethality solution for current Army Aviation and Future Vertical Lift (FVL) Modernization Priority. This Project matures and demonstrates critical technology and designs components for future affordable rockets and missiles to provide overwhelming defeat of conventional and asymmetrical threats in all environments. Matures and demonstrates component technologies to enable an expeditionary short-to-medium range loitering maneuvering missile with man-in-the-loop capability for situational awareness, targeting, and lethal effects against hard and soft targets; and matures and demonstrates critical component technology and designs for future missiles that provide simultaneous multiple launch, control, and supervised autonomous terminal engagement of multiple missiles.

Work in this Project is fully coordinated with Program Element (PE) 0602148A (Future Vertical Lift Technology) / Project AK4 (Multi-Role Small Guided Missile Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Multiple Simultaneous Engagement Technologies (MSET)	10.980	11.795	6.105
Description: Matures and demonstrates critical component technology and designs for future missiles that provide simultaneous multiple launch, control, and supervised autonomous terminal engagement of multiple missiles against stationary and moving hard/soft targets, image-based target discrimination/shared situation awareness/lock-on, and multi-missile control digital datalink with inter-missile cooperative networked communications. The end-state is a multi-missile Organic command and control (C2) solution that handles all aspects of sensor integration, fire control, and airspace management. This capability will support overwhelming lethal effects against anti-access/aerial denial (A2AD) / Integrated Air Defense Systems (IADS).			
FY 2024 Plans: Will optimize and validate MSET HWIL and high-fidelity simulation using MSET hardware and software data from integrated flight demonstrations. Will mature and demonstrate MSET fire control, command and control (C2) communication for missile simultaneous engagements. Will mature and demonstrate MSET digital command link for missile to missile and C2			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** AK5 / *Multi-Role Small Guided Missile Advanced Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
communications. Will mature and advance supervised autonomous target acquisition and terminal target engagement that enable a single user to launch and supervise simultaneous multi-missile engagements. ***FY 2025 Plans:*** Will perform system level demonstration of MSET integrated system to include fire control, command & control, collaborative autonomy, real time multi-agent re-tasking and target acquisition and de-confliction; the demonstration will include simultaneous engagements of stationary and moving target while reducing operator workload; validate MSET HWIL and high-fidelity simulation with system level demonstration data. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease due to planned purchase of hardware ending in FY24 to support demonstrations in FY25.			
Accomplishments/Planned Programs Subtotals	10.980	11.795	6.105

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) AK7 / *Adv Rotorcraft Armaments Protection Sys Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AK7: *Adv Rotorcraft Armaments Protection Sys Adv Tech*	-	9.290	-	-	-	-	-	-	-	-	0.000	9.290
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project investigates and demonstrates a holistic lethality solution for Future Vertical Lift (FVL) offensive and defensive applications, focused on but not limited to Future Attack Reconnaissance Aircraft. Develop components for use in multi-role armament solutions for fire control, armament systems, munitions and integration of threat agnostic countermeasures.

Research in this Project is fully coordinated with Program Element (PE) 0602148A (Future Vertical Lift Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Armaments Center (AC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Rotorcraft Armament and Protection System (ARAPS) - Future Attack Reconnaissance Aircraft (FARA) ***Description:*** This effort matures and demonstrates a holistic medium caliber lethality solution for Future Vertical Lift offensive applications. Develops components for use in multi-role armament solutions for fire control, software, armament systems, and munitions.	6.557	-	-
Title: ARAPS-Dispenser ***Description:*** This effort matures and demonstrates a dispenser countermeasure, a component of the holistic survivability solution for Future Vertical Lift defensive applications. Develop components for use in multi-role countermeasure solutions for fire control, software and countermeasure systems.	2.733	-	-
Accomplishments/Planned Programs Subtotals	9.290	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** AK7 / *Adv Rotorcraft Armaments Protection Sys Adv Tech*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) AK8 / *Air Launched Effects Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AK8: *Air Launched Effects Advanced Technology*	-	27.884	28.018	20.615	-	20.615	23.812	24.832	30.764	27.535	0.000	183.460
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project develops and demonstrates the ability to launch an Unmanned Aircraft System (UAS) from a manned or unmanned Future Vertical Lift (FVL) aircraft at tactical altitudes and to control the UAS from the cockpit or a crew station; and assesses the enabled capabilities and determine their relevance to current Army Aviation engagement and survivability portfolios.

Research in this Project is fully coordinated with Program Element (PE) PE 0602148A (Future Vertical Lift Technology), Project CH2 (Air Launched Effects Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Air Launched Effects	27.884	28.018	20.615
Description: Develop and demonstrate the ability to launch a future unmanned aircraft system (FUAS) from FVL platform at tactical altitudes, and to control the UAS from the cockpit or a crew station. Assess the enabled capabilities and determine their relevance to current Army Aviation engagement and survivability portfolios. These air-launched FUAS will employ a variety of non-lethal effects including: electronic attack, decoy, and communications relay.			
FY 2024 Plans: Will further mature and demonstrate decoy and disrupt electronic warfare (EW) air launched effects capabilities through multi-UAS behaviors and novel payloads. Will evaluate range and throughput capabilities of secure, anti-jam communications payloads during teamed flight operations. Will enhance mission systems and system hardening to align with A-CDD. Will demonstrate teams of Detect, Identify, Locate, and Report (DILR), Decoy, Disrupt, and Lethal air launched effects UAS, equipped with advanced teaming software, executing synchronized operations facilitating integrated air defense system (IADS) breach capability in contested conditions through participation in Joint All-Domain Operations.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** AK8 / *Air Launched Effects Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will demonstrate in flight launch capability of air launched effects prototype UAS and interfaces compatibility with future aircraft. Will demonstrate decoy and disrupt electronic warfare (EW) air launched effects capabilities through multi- UAS behaviors and payloads. Will evaluate range and throughput capabilities of secure, anti-jam communications payloads during teamed flight operations. Will demonstrate teams of Detect, Identify, Locate, and Report (DILR), Decoy, Disrupt, and Lethal air launched effects UAS, equipped with advanced teaming software, executing synchronized operations facilitating integrated air defense system (IADS) breach capability through participation in Joint All-Domain Operations. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects significant reduction of testing and demonstration efforts in FY25.			
Accomplishments/Planned Programs Subtotals	27.884	28.018	20.615

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) AL1 / *Adv Teaming for Tactical Aviation Oper Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AL1: *Adv Teaming for Tactical Aviation Oper Adv Tech*	-	34.600	40.060	35.036	-	35.036	41.291	42.277	30.784	36.983	0.000	261.031
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates and drafts frameworks for autonomous teaming behaviors and autonomous decision making for Future Vertical Lift (FVL) and Future Unmanned Aircraft System (FUAS) platform formations in combined arms operations.

Work in this Project is fully coordinated with Program Element (PE) 0602148A (Future Vertical Lift Technology) / Project AK9 (Adv Teaming for Tactical Aviation Operations Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC) and Command, Control, Communication, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Teaming Demonstration ***Description:*** Develop and demonstrate teaming behaviors and autonomous decision making for mixed FVL and FUAS platform formations in combined arms operations that are beyond current Manned-Unmanned Teaming (MUM-T) technologies. Focus areas include: resilient autonomous algorithms; self-organizing unmanned formations; distributed command and control; and navigation. This effort will also demonstrate multi-platform distributed apertures of multispectral sensors for threat detection and awareness and improved reliability through adaptation in autonomous systems.	26.475	-	-
Title: Sensors / Multi-Function Imagers for Future Aviation ***Description:*** Mature and demonstrate multi-function sensing system concepts to increase FVL manned platform survivability and situational awareness. This will enable the manned FVL platforms to engage in multi-domain advanced teaming operations and leverage autonomous behaviors of both manned and unmanned aviation platforms. This effort will enable tactical operations in complex environments (e.g. high threat, degraded visuals, and urban) through the use of sensing modules suitable for multiple tactical applications. The multifunction sensor approach will mitigate the need for separate dedicated threat warning and situational awareness imaging sensor modules, thus reducing the total cost and logistics burden for future aviation systems.	8.125	8.486	8.043

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** AL1 / *Adv Teaming for Tactical Aviation Oper Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
FY 2024 Plans: Will mature and optimize an aircraft-hardened multispectral multifunction camera using a proven digital readout integrated circuit for aerial threat warning and situational awareness data collection. Will mature multispectral sensing and threat warning capabilities and establish a threat warning performance baseline. Will conduct flight demonstration of flyable multispectral sensor in relevant environments. ***FY 2025 Plans:*** Will improve threat warning performance through continued multi spectral sensing data collections; demonstrate multispectral sensor in urban environments; optimize and ruggedize flight sensor; demonstrate interim capabilities of a multi-function sensor compared to current fleet baseline. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease is an economic adjustment.			
Title: Complex Advanced Teaming Operations ***Description:*** Mature and demonstrate teaming behaviors and autonomous decision making for mixed FVL and FUAS platform formations in complex and contested operational environments. Focus includes maturing solutions that overcome unique challenges associated with autonomy, teaming, range, communication, navigation and mission operations in littoral and urban / fringe environments, while adhering to Modular Open Systems Approach (MOSA) strategy for rapid insertion and affordability. ***FY 2024 Plans:*** Will adapt and enhance autonomy and teaming technologies for use in complex environment operations, specifically addressing range, navigation, and communication challenges; evaluate initial team dynamic retasking, reconfigurability, and mission execution capabilities within complex and contested operational environments; demonstrate autonomous team of teams synchronized operations facilitating integrated air defense system (IADS) breach capability in contested conditions through participation in Joint all-domain experiments. ***FY 2025 Plans:*** Will demonstrate autonomous team-of-teams synchronized operations across domains to facilitate an integrated air defense system (IADS) breach capability in contested conditions; initiate extension of Modular Open Systems Approach (MOSA) architecture to address unique challenges associated with operations in complex urban / fringe and littoral environments, and begin evaluating open systems attributes through integration of mixed AI and non-AI technologies, including highly-autonomous coordinated team mission behaviors, navigation and mission execution at low altitude in featureless and cluttered terrain, and sophisticated behaviors for employment of targeted electronic attack using teams of UAS. ***FY 2024 to FY 2025 Increase/Decrease Statement:***	-	31.574	26.993

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** AL1 / *Adv Teaming for Tactical Aviation Oper Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Funding decrease reflects this effort's shift towards architecture enhancement with reduced flight testing and demonstration activities in FY25. In Fiscal Year (FY) 2025 a portion of this Program Element (PE) was realigned to PE 0602183A (Air Platform Applied Research) / Project DK1 (Air Vehicle Integrated & Alternative Tech (AVIATe)).			
Accomplishments/Planned Programs Subtotals	34.600	40.060	35.036

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) AL7 / *Full Spectrum Targeting Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AL7: *Full Spectrum Targeting Advanced Technology*	-	8.419	8.955	8.651	-	8.651	8.379	6.861	6.466	6.070	0.000	53.801
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project demonstrates next generation targeting concepts for Future Vertical Lift (FVL) and Future Unmanned Aircraft System (FUAS) platforms.

Work in this Project is fully coordinated with Program Element (PE) 0602148A (Future Vertical Lift Technology) / Project AK9 (Advanced Teaming for Tactical Aviation Operations Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Communication, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Full Spectrum Targeting	8.419	8.955	8.651
Description: This effort will mature and demonstrate key targeting sensor system concepts to enable the FVL and FUAS modernization priorities. Effort will leverage advancements in laser, infrared imaging focal plane arrays, compact long-range optics, and multispectral system technologies to develop a stabilized, payload that can actively and/or passively image in multiple spectral bands simultaneously to provide robust targeting and situational awareness capabilities for the prevailing battlefield conditions. Effort will demonstrate the ability of multispectral sensing to autonomously scan areas of interest and identify tactical threats with reduced cognitive workloads through sensor fusion and automated spectral selection.			
FY 2024 Plans: Will provide assessment of long range optics performance against military targets in relevant environments. Will provide baseline sensor architecture specifications for steerable turret with dual-band infrared sensor paired with novel compact long-range optical components. Will validate performance of improved multi-band fused Aided Target Recognition (AiTR) algorithms. Will conduct payload demonstration of range performance, Degraded Visual Environment (DVE) capability, and automation of target recognition and acquisition times.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** AL7 / *Full Spectrum Targeting Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will provide updated baseline sensor architecture specifications for steerable turret with dual-band infrared sensor paired with novel compact long-range optical components; optimize performance of improved multi-band fused Aided Target Detection and Recognition (AiTD/R) approaches; demonstrate Aided Target Detection/Recognition (AiTD/R) with long range optics and improved performance against military and Camouflage, Concealment, and Deception (CC&D) targets in relevant environments, to include DVE; optimize AiTD/R hardware processing solution design in support of FUAS aircraft. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease is an economic adjustment.			
Accomplishments/Planned Programs Subtotals	8.419	8.955	8.651

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) AL9 / *Holistic Sit Awareness and Dec Making Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AL9: *Holistic Sit Awareness and Dec Making Adv Tech*	-	28.291	21.128	15.474	-	15.474	18.228	18.606	23.226	23.458	0.000	148.411
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates a pilotage and decision aiding system that allows for carefree operations in complex and hostile environments through demonstration of a comprehensive human machine interface for all situational awareness (SA) domains (terrain & obstacles, threat, weather, & environment); and demonstration of decision aiding technologies to reduce cognitive loading of air crews during operations in complex and hostile environments.

Work in this Project is fully coordinated with Program Element (PE) PE 0602148A (Future Vertical Lift Technology) / AL8 (Holistic Situational Awareness and Dec Making Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the U.S. Army Combat Capabilities Development Command (DEVCOM) Analysis Center (DAC) and Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Holistic Situational Awareness and Decision Making	12.393	12.826	13.574
Description: This program directly contributes to Future Vertical Lift (FVL) to ensure Future Aircraft pilots have the necessary situational awareness, accurate understanding of the tactical mission, and ability to decide faster than our adversaries. ***FY 2024 Plans:*** Will demonstrate an increase in FVL crew station effectiveness through pilot workload management scenarios that investigate scalable automation methods for select mission tasks while performing simulated combat missions. The automation will leverage an experimental situational awareness data model, and workload and effectiveness will be measured using both subjective and objective means, including biometrics. Will participate in Fiscal Year 2024 (FY24) Project Convergence through flight simulation demonstration to assess this capability's impact in relevant mission scenarios. ***FY 2025 Plans:*** Will further mature and demonstrate operator performance modeling and data management capabilities; conduct lab demonstrations at vendor locations in preparation for upcoming Army major demonstration events; demonstrate multi-modal			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** AL9 / *Holistic Sit Awareness and Dec Making Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
cueing including 3D audio, automation of select mission tasks, and novel human-machine interface optimizing information presentation to FVL pilots. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** In Fiscal Year (FY) 2025 funding increase will support the execution of increased lab demonstrations at vendor locations. Partial funding realignment to PE 0602183A (Air Platform Applied Research) / Project DK1 (Air Vehicle Integrated & Alternative Tech (AVIATe)).			
Title: Multi-function RF for FVL Platforms ***Description:*** This effort matures and demonstrates multi-function radio-frequency (RF) sensor technologies to support the FVL family of systems. It provides integrated software and hardware technologies that enable the use of common electronics and system components to support varied functions, such as enhanced situational awareness, threat-detection and localization, targeting, communications, and aircraft pilotage. This will result in improved performance for these critical functions and reduced requirements for size, weight, and power for mission equipment across FVL platforms. ***FY 2024 Plans:*** Will utilize technical designs and analysis to mature multi-function RF sensor system hardware. Will demonstrate resource management of multiple RF functional modes and mode software on multi-function system hardware. Will validate performance of multi-function technology against relevant targets and current and emerging threats to support the FVL family of systems. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** In Fiscal Year (FY) 2024, this effort is completed.	13.887	6.188	-
Title: Early Human Systems Integration Demonstrations ***Description:*** Human Systems Integration (HSI) analysis assesses and matures technologies to optimize pilot situational awareness and workload management, crew task automation and decision-aiding, information management, and advanced crew station interfaces. The objective of this effort is to reduce crew decision and task execution timelines in a tactically challenging mission environment. ***FY 2024 Plans:*** Will mature and demonstrate effects of dynamic information processing to enhance aircrew situational awareness, decision-making, and information management. Will assess and mature technologies for performance-based crew workload measurement and task automation, will assess impact of advanced technologies to enhance Soldier performance via large data analytics, and will assess and optimize advanced Soldier displays. Will demonstrate interface design extensions to support enhanced	2.011	2.114	1.900

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** AL9 / *Holistic Sit Awareness and Dec Making Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
sense making and decision making in AMD C2 operations centers conducting multi-domain operations (MDO). Will develop and demonstrate a concept for supervised automation (supervisory control) in AMD C2 operations centers. ***FY 2025 Plans:*** Will mature and demonstrate effects of intelligent agents and virtual crewmember to enhance aircrew decision-making, situational awareness, and dynamic information management; mature technologies for performance-based crew workload measurement and task automation, demonstrate impact of advanced technologies to enhance Soldier performance with embedded large data analytics, and mature advanced Soldier displays to include augmented reality interfaces; continue to demonstrate interface design extensions to support enhanced sense making and decision making in AMD C2 operations centers conducting multidomain operations; demonstrate and analyze concepts for supervised automation (control) in AMD C2 operations centers; mature the multi-level C2 performance assessment that considers the Soldier and system capabilities and limitations. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease is an economic adjustment.			
Accomplishments/Planned Programs Subtotals	28.291	21.128	15.474

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) BP8 / *Future Vertical Lift Air Platform Adv Tech (CA)*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
BP8: *Future Vertical Lift Air Platform Adv Tech (CA)*	-	94.750	-	-	-	-	-	-	-	-	0.000	94.750
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Congressional Interest Item funding provided for Future Vertical Lift Air Platform Advanced Technology.

A. Mission Description and Budget Item Justification

Congressional Interest Item funding provided for Future Vertical Lift Air Platform Advanced Technology.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
Congressional Add: Program Increase - UH-60 Main Rotor Blade Modernization	5.000	-
FY 2023 Accomplishments: Congressional Interest Item funding provided for UH-60 Main Rotor Blade Modernization		
Congressional Add: Program Increase - Data Refinement and Optimization for Aviation Sustainment	4.500	-
FY 2023 Accomplishments: Congressional Interest Item funding provided for Data Refinement and Optimization for Aviation Sustainment		
Congressional Add: Program Increase - Fleetspace Maintenance Tool	5.250	-
FY 2023 Accomplishments: Congressional Interest Item funding provided for Fleetspace Maintenance Tool		
Congressional Add: Program Increase - Platform Digitization and Maintenance	7.000	-
FY 2023 Accomplishments: Congressional Interest Item funding provided for Platform Digitization and Maintenance		
Congressional Add: Program Increase - Stretch Broken Carbon Fiber	10.000	-
FY 2023 Accomplishments: Congressional Interest Item funding provided for Stretch Broken Carbon Fiber		
Congressional Add: Program Increase - UAS Fuel Systems Enhancements	2.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** BP8 / *Future Vertical Lift Air Platform Adv Tech (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: Congressional Interest Item funding provided for UAS Fuel Systems Enhancements		
Congressional Add: Program Increase - ADDITIVE MANUFACTURING CAPABILITY ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Additive Manufacturing Capability	2.000	-
Congressional Add: Program Increase - ADDITIVE MANUFACTURING FOR FVL ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Additive Manufacturing for FVL	10.000	-
Congressional Add: Program Increase - AUTONOMOUS CONFIGURATION MANAGEMENT AND AVIATION RECORDS ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for AUTONOMOUS CONFIGURATION MANAGEMENT AND AVIATION RECORDS	10.000	-
Congressional Add: Program Increase - DLC COATINGS FOR RED PHOSPHOROUS OBSCURANTS ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for DLC COATINGS FOR RED PHOSPHOROUS OBSCURANTS	3.000	-
Congressional Add: Program Increase - FVL SURFACE TOLERANT ADHESIVES ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for FVL SURFACE TOLERANT ADHESIVES	9.000	-
Congressional Add: Program Increase - INDIVIDUAL BLADE AND HIGHER HARMONIC CONTROL ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Individual Blade and Higher Harmonic Control	22.000	-
Congressional Add: Program Increase - Multi-Drone, Multi-Sensor ISR ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Multi-Drone, Multi-Sensor ISR	5.000	-
Congressional Adds Subtotals	94.750	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** BP8 / *Future Vertical Lift Air Platform Adv Tech (CA)*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) CA8 / *Adv Rotocraft Armaments Protection Sys*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CA8: *Adv Rotocraft Armaments Protection Sys*	-	2.824	6.388	4.764	-	4.764	3.426	10.332	12.875	13.004	0.000	53.613
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project investigates and demonstrates a holistic lethality solution for Future Vertical Lift (FVL) offensive and defensive applications, focused on but not limited to Future Long Range Assault Aircraft (FLRAA). Develop components for use in multi-role armament solutions for fire control, armament systems, munitions and integration of threat agnostic countermeasures.

Work in this Project complements Program Element (PE) 0602183A (Air Platform Applied Research), Project DE2 (Airborne Threat Defeat).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Research in this Project is performed by the Armaments Center (AC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Rotorcraft Armanents Protection System-Future Long Range Assault Aircraft	2.824	6.388	1.257
Description: This effort matures and demonstrates a holistic small caliber lethality solution for FVL offensive applications. Integrates and demonstrates components for use in multi-role armament solutions for fire control, software, and armament systems.			
FY 2024 Plans: Will optimize stabilized mount for weight, performance, size and power integration needs of future aviation platforms. Will demonstrate improved aviation armament system performance from an optimized weapon mount integrated on an air platform. Will validate improved weapon system accuracy and performance for future aviation platforms in a relevant environment.			
FY 2025 Plans: Will validate improved aviation armament system performance from an optimized weapon mount integrated on an air platform.			
FY 2024 to FY 2025 Increase/Decrease Statement: In FY25 Funding decrease reflects planned completion of mount stabilization integration needs of future aviation platforms and completion of demonstration of system performance from an optimized weapon mount integrated on an air platform. In Fiscal			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** CA8 / *Adv Rotocraft Armaments Protection Sys*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Year (FY) 2025 a portion of this Program Element (PE) was realigned to PE 0602183A (Air Platform Applied Research) / Project DK1 (Air Vehicle Integrated & Alternative Tech (AVIATe)).			
Title: Aviation CM Advanced Tech ***Description:*** This effort will mature and demonstrate countermeasure and lethality solutions necessary to protect current and future aviation platforms. The effort will focus on offensive and or defensive applications of armament systems for use in multi-role applications. ***FY 2025 Plans:*** Will improve area weapon armament system performance through modeling and sub-system level demonstration. Will mature use of holistic armament system and countermeasures for offensive and defensive fires. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** This is a new start effort in FY25. Funding for this task was realigned from Program Element (PE) 0602148A (Future Vertical Lift), Project AK2 (Aviation Survivability Technology) and Program Element (PE) 0603462A (Next Generation Combat Vehicle Advanced Technology), Project BK6 (Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech).	-	-	3.507
Accomplishments/Planned Programs Subtotals	2.824	6.388	4.764

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) CC4 / *FVL Radar Advanced Technologies*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CC4: *FVL Radar Advanced Technologies*	-	3.220	4.403	-	-	-	2.389	3.895	4.422	4.947	0.000	23.276
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Fiscal Year (FY) 2025 is a skip year. This project has no FY 2025 budget request.

A. Mission Description and Budget Item Justification

This Project develops Next Generation Reconfigurable Radar Aperture for detection, tracking and precision targeting, navigation and fire control for both reconnaissance, surveillance, and target acquisition (RSTA) and intelligence, surveillance and reconnaissance (ISR).

Work in this Project is fully coordinated with Program Element (PE) 0602148A (Future Vertical Lift Technology) / Project CC3 (FVL Radar Technologies).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Command, Control, Communication, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Multi-mission Airborne Radar	3.220	4.403	-
Description: Advanced Digital radio frequency (RF) processing integration with final demonstration subsystem and system level radar hardware and software designs. ***FY 2024 Plans:*** Will validate component integration into radar system level capability in a surrogate airframe body. Will conduct flight demonstration of all-weather, day/night, Detect, Identify, Locate, and Report (DILR) capability via a small form factor radar system and Automatic Target Recognition (ATR) capability on surrogate Air Launched Effects (ALE) platform. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** In Fiscal Year (FY) 2024, this effort is completed.			
Accomplishments/Planned Programs Subtotals	3.220	4.403	-

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** CC4 / *FVL Radar Advanced Technologies*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) CG1 / *Holistic Team Survivability Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CG1: *Holistic Team Survivability Adv Tech*	-	11.597	15.339	14.438	-	14.438	19.299	13.385	15.655	17.836	0.000	107.549
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates increased Future Vertical Lift (FVL) Family of Systems Survivability (FoS) in an advanced integrated air defense systems environment through a multi-layered approach. The approach focuses on maturing and demonstrating technologies for reducing aircraft susceptibility and vulnerability during pre-mission planning, mission execution (combat survivability and safety), and post-mission repair and return to service.

Work in this Project is fully coordinated with Program Element (PE) 0602148A (Future Vertical Lift Technology) / Project CH3 (Holistic Team Survivability Technology).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC) and Command, Control, Communication, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Radio Frequency Countermeasures	6.617	6.918	6.964
Description: This effort matures and demonstrates adaptive sensor and countermeasure technologies that provide platform protection against guided threats. It develops software and hardware to increase probability of detection and defeat of threats to aviation platforms using modeling and simulation (M&S), hardware in the loop (HIL) assessment, and field events. It provides integrated software and sensor technologies to counter the characteristics of advanced and agile threats.			
FY 2024 Plans: Will exploit advances in chip-scale technology, enabling the replacement of high Size, Weight and Power-Cost, (SWAP-C) analog RF components with low SWAP-C semi-conductor components. Will mature and integrate these next-generation RF components into a payload with enhanced capability. Will improve payload performance against current and emerging threats and provide technical models of the optimized payload. Will demonstrate improved algorithms and payload behaviors of the next-generation payload.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** CG1 / *Holistic Team Survivability Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will mature RF threat defeat techniques and technique description framework to enable portability of techniques; improve low SWAP-C payload and implement threat defeat techniques in payload hardware; validate projected performance of integrated payload with advanced algorithms and techniques; demonstrate team-based behaviors of multiple RF payloads with increased range, capability, and probability of threat defeat in laboratory. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change is an economic adjustment.			
Title: Holistic End to End Survivability ***FY 2024 Plans:*** Will continue to develop and mature team based survivability architectures, behaviors, and component technologies. Will conduct feasibility analysis of integration for Crashworthiness/Crash predictive capabilities into the Survivability Correlator software architecture. Will continue to maturate EO/IR coatings and RF materials for future manned and unmanned platform demonstration. Will continue maturation / demonstration of air vehicle vulnerability reduction technologies. Will demonstrate air-to-air recovery of UAS to host platform. Will continue to mature team based survivability architectures, behaviors, and component technologies. ***FY 2025 Plans:*** Will begin integration if microclimatology algorithms into the Survivability Correlator software in the loop (SIL) environment; perform SIL integration team-based survivability behaviors and begin component technologies demonstrations; begin integration of improved durability RF materials and Electro-Optical/ Infrared coatings onto demonstration platform(s); perform integration and flight test demonstration of unmanned arial systems survivability component technologies. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned lifecycle glide path of this effort with ramp down of team-based survivability architectures development.	4.980	8.421	7.474
Accomplishments/Planned Programs Subtotals	11.597	15.339	14.438

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) CH7 / *Power & Thermal Management for FVL Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CH7: *Power & Thermal Management for FVL Adv Tech*	-	4.315	4.294	5.459	-	5.459	7.577	5.499	2.104	2.125	0.000	31.373
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates at the system level, integrated electrical power technologies (including power generation, distribution, and control along with advanced energy storage) and thermal management technologies to provide significantly higher electrical power capability to Future Vertical Lift (FVL) aircraft while addressing consequential size, weight, pulsed power, and thermal issues. Provides power capability for advanced electric aeromechanical effectors, advanced mission systems that for example, execute algorithms for route planning and teaming, and for advanced survivability and electronic warfare capability. Will demonstrate software-in-the-loop performance of power & thermal management technologies to provide significantly higher electrical power capability to FVL aircraft while addressing consequential SWAP-C & thermal issues.

Work in this Project is fully coordinated with Program Element (PE) 0602148A (Future Vertical Lift Technology) / Project CH4 (Power & Thermal Management for FVL Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC) and Command, Control, Communication, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Optimized Energy for C5ISR Platforms Advanced Technology	2.005	2.042	2.070
Description: Enable advanced Control, Communications, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) and survivability systems on FVL platforms through component development of improved high power and energy storage technologies, higher capacity lower Size, Weight, and Power (SWaP) cooling systems, and more efficient electrical architectures			
FY 2024 Plans: Will mature and demonstrate electrical power controls that will optimize the availability and efficiency of electrical power sources, including batteries and power generation for power on FVL aircraft; optimize for both performance and safety of energy storage systems through improved packaging for aviation applications.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** CH7 / *Power & Thermal Management for FVL Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Will exploit power controls findings to improve electrical performance while increasing electrical power source efficiency; improve safety while maintaining performance of energy storage systems through improved packaging for aviation FVL aircraft applications. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase is an economic adjustment.			
Title: Power & Thermal Management Tech Demo ***Description:*** Exploits fabrication, and systems integration lab validation testing to Technical Readiness Level (TRL) 6 of power and thermal management technologies to provide significantly higher electrical power capability to FVL aircraft while addressing thermal issues and reducing system weight/volume ***FY 2024 Plans:*** Will continue fabrication of advanced power and thermal management system components and begin fabrication/modification of the systems integration laboratory to be used in component level and system level validation efforts; conduct component level and system level validation efforts, ***FY 2025 Plans:*** Will complete fabrication of advanced power and thermal management system components and the systems integration laboratory to be used in component level and system level validation efforts; continue component level and system level validation efforts. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase in FY25 supports fabrication and increased component and system level testing and validation of power and thermal management system technologies. Partial funding support from PE 0602148A (Future Vertical Lift Technology) / Project CH4 (Power & Thermal Management for FVL Tech).	2.310	2.252	3.389
Accomplishments/Planned Programs Subtotals	4.315	4.294	5.459

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) CI8 / *Adaptive Avionics Advanced Technologies*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CI8: *Adaptive Avionics Advanced Technologies*	-	-	-	10.046	-	10.046	17.929	16.940	19.150	19.342	0.000	83.407
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This effort begins in FY25 with funding realigned from PE 0603456A (Future Vertical Lift Advanced Technology) / Project AJ9 (Integ Mission Equip for Vert Lift Systems Adv Tech).

A. Mission Description and Budget Item Justification

This project will develop the ability for rapidly adaptable mission systems hardware and software that utilizes tactical situational awareness to optimize performance and will develop robust, secure and ruggedized computing elements, advanced architectures for efficient data storage and processing, algorithms for optimized computing resources and hardware qualification approaches. These resource technologies will be used in the development of solider tailorable software applications, adaptable security controls and dynamic use of system of systems capabilities across the Combat Aviation Brigade (CAB).

Work in this Project is fully coordinated with Program Element (PE) 0602148A (Future Vertical Lift Technology) / Project CI4 (Adaptive Avionics Technologies).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Reconfigurable Mission Systems (RMS)	-	-	7.469
Description: This effort will develop rapidly adaptable mission systems capabilities using affordable and sustainable approaches that will enable tactically reconfigurable and responsive software technologies. The objective for RMS is to leverage previous MOSA successes to develop and demonstrate soldier reconfigurable, tailorable mission systems software capabilities to ensure Future Vertical Lift (FVL) dominance and develop proactive mission systems capabilities development and deployment to accelerate speed of action.			
FY 2025 Plans: Will begin development of reconfigurable software capabilities by leveraging results from Future Avionics Implementation Research (FAIR) and specifying reconfigurable approaches, implementing recurring technology identified by stakeholders and exploring how they can be used in more efficient ways to promote reuse through reconfiguration; continue to explore RMS			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** CI8 / *Adaptive Avionics Advanced Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
concepts including but not limited to Dynamic Software Architecture, or dynamic software updating; investigate approaches for scalability in time, space, and resources; investigate agility in computing processes; develop adaptive security methods and further investigate cybersecurity techniques with S3I Lab integration and testing. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** This effort begins in FY25 with funding realigned from PE 0603456A (Future Vertical Lift Advanced Technology) / Project AJ9 (Integ Mission Equip for Vert Lift Systems Adv Tech).			
Title: Tactical Real-time Avionics Computing Enabler (TRACE) ***Description:*** This effort will develop advanced data architectures and the ability to utilize ever evolving commercial computing products to increase the ability to efficiently process massive amounts of available data. The objective for TRACE is to develop a computing hardware resource management system for the Future Vertical Lift (FVL) family of systems that uses contextual situational awareness to dynamically reallocate computing resources to effectively and efficiently process the massive amounts of data available across distributed assets. ***FY 2025 Plans:*** Will begin development of advanced data management capability by utilizing lessons learned from Future Avionics Implementation Research (FAIR) to identify and procure a data management capability that enables rapid decomposition of data, enabling the efficient conversion of raw data into useful information; investigate advanced pattern recognition techniques to further enable efficient digestion of data and develop smart data processing capabilities; further utilize lessons learned from FAIR to identify and procure processing unit(s) that are capable of real-time allocation and distribution of resources to focus processing power on prioritized tasks and able to change priorities real-time Implement; begin development of software algorithms to enable distributed computing resource loading based on operational need and availability Incorporate advanced data management capabilities learned from FAIR to improve data storage, management, access and processing efficiencies and investigate qualification approaches and technologies that isolate qualification concerns between chassis and processor cards. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** This effort begins in FY25 with funding realigned from PE 0603456A (Future Vertical Lift Advanced Technology) / Project AJ9 (Integ Mission Equip for Vert Lift Systems Adv Tech).	-	-	2.577
Accomplishments/Planned Programs Subtotals	-	-	10.046

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** CI8 / *Adaptive Avionics Advanced Technologies*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040 / 3					R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*				Project (Number/Name) CJ5 / *Future Vertical Lift Medical Advanced Technology*			
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
CJ5: *Future Vertical Lift Medical Advanced Technology*	-	1.027	1.320	1.595	-	1.595	1.597	1.600	1.604	1.620	0.000	10.363
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project evaluates, validates, matures and delivers medical guidelines and strategies to assure optimal Soldier performance and protection on the future technologically-intensive battlefield. Key elements of the program include: 1) tailored medical selection and retention standards for Future Vertical Lift (FVL); 2) medical strategies to maintain and enhance human performance in Multi-domain operations (MDO); 3) human-centered technology design guidance to accommodate the range of aircrew; 4) improved protection standards to reduce FVL occupant injury; and 5) operator state monitoring tools to enable scalable autonomy in FVL aircraft.

Efforts in this Project further develop work done in Program Element 0602148A (Future Vertical Lift Technology) / Project BZ7 (Future Vertical Lift Medical Technologies).

Work in this Project is performed by the United States Army Aeromedical Research Laboratory (USAARL).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Biomedical Strategies to Support Design and Operation of Future Vertical Lift (FVL) Aircraft	1.027	1.320	1.595
Description: This effort evaluates, validates, matures and delivers medical guidelines and strategies to assure optimal Soldier performance and protection on the future technologically-intensive battlefield. Key elements of the program include: 1) tailored medical selection and retention standards for FVL; 2) medical strategies to maintain and enhance human performance in MDO.); 3) human-centered technology design guidance to accommodate the range of aircrew; 4) improved protection standards to reduce FVL occupant injury; and 5) operator state monitoring tools to enable scalable autonomy in FVL aircraft.			
FY 2024 Plans: Will validate recommended holistic HSM limits for injury and performance. Will validate human variables for operator state assessment and mature a holistic aircrew workload/ performance stress model. Will validate proposed responses of autonomous system to FVL aircrew. Will validate package for enhanced FVL crashworthiness. Efforts in this task further develop work done in Program Element 0602148A, Project BZ7.			
FY 2025 Plans: Develop injury criteria for whole-body response to vertical and frontal acceleration. Validate human factor, efficacy and flight compatibility of US Army aviation life support equipment. Validate impacts of trust on aircrew workload and performance under stress. Validate spatial audio display design guidelines to enhance pilot radio communication capabilities for Future Vertical Lift.			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** CJ5 / *Future Vertical Lift Medical Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Assess/validate torso harness restraint system performance. Efforts in this task further develop work done in Program Element 0602148A, Project BZ7. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Accomplishments/Planned Programs Subtotals	1.027	1.320	1.595

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603465A / *Future Vertical Lift Advanced Technology*	Project (Number/Name) CK2 / *High Speed Maneuverable Missile (HSMM) Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CK2: *High Speed Maneuverable Missile (HSMM) Adv Tech*	-	-	-	15.999	-	15.999	2.676	4.917	10.290	20.482	0.000	54.364
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

High Speed Maneuverable Missile (HSMM) Adv Tech is a new start within the Future Vertical Lift Advanced Technology program in FY 2025.

This Project continues and matures technologies developed in Budget Activity 2 Program Element 0602148 (Future Vertical Lift Tech) / Project CI5 (High Speed Maneuverable Missile Tech).

A. Mission Description and Budget Item Justification

The Project matures and demonstrates missile component technologies compatible with Future Vertical Lift (FVL) aviation platforms in a Multi-Domain Battle/Cross-domain Maneuver operational environment. Efforts mature technologies to support a smaller, faster, maneuverable missile capable of long-range non-line-of-sight attack in contested/degraded environments. Technology development increases aviation lethality and platform survivability by increasing missile standoff range, speed, and maneuverability, a faster rate of fire, shorter times of flight, and multi-threat lethal effects. Enables cross domain applications for aviation and ground vehicle platforms, including handoff capability, to engage threats in dead zones, and to operate in contested environments.

Work in this Project is fully coordinated with PE 0602148 (Future Vertical Lift Technology) / Project CI5 (High Speed Maneuverable Missile Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: HSMM Tech Maturation and Demo	-	-	15.999
Description: Efforts provide technology maturation to support a maneuverable missile capable of both short-range direct attack and long-range non-line-of-sight attack with reduced time to target; reduced size and weight for increased load-out; capable of air and ground launched missions in degraded/contested environments.			
FY 2025 Plans: Will mature critical missile sensor components, demonstrate, and optimize sensor component data during system level demonstration to verify system performance in relevant environment to include degraded and contested environments; mature,			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603465A / *Future Vertical Lift Advanced Technology*	**Project (Number/Name)** CK2 / *High Speed Maneuverable Missile (HSMM) Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
demonstrate, and validate missile test bed capability with data collected from relevant environment; demonstrate the advanced propulsion system to verify increased range and speed with desired trajectory for effectiveness and survivability. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** BA3 funding for Project CK2 (HSMM Adv Tech) was approved to accelerate lethality capability at extended ranges for Aviation platforms; Technology transitions in Fiscal Year (FY) 2024 from PE 0602148A (Future Vertical Lift Tech) / Project CI5 (HSMM Tech) for further maturation and demonstration starting in FY 2025.			
Accomplishments/Planned Programs Subtotals	-	-	15.999

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army											Date: March 2024	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603466A *I Air and Missile Defense Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	108.758	21.015	28.333	-	28.333	38.190	39.513	41.404	39.821	0.000	317.034
AE3: *Unconventional Countermeasures-Survivability ATech*	-	0.512	11.208	11.863	-	11.863	11.928	0.788	1.246	1.585	0.000	39.130
BN7: *Weapons Components Adv Technology (CA)*	-	98.000	-	-	-	-	-	-	-	-	0.000	98.000
CV6: *Optimized High Energy Laser Source Adv Tech*	-	6.852	6.743	4.188	-	4.188	5.547	5.653	5.051	3.499	0.000	37.533
DB3: *Radar Survivability through Dis Sensing Adv Tech*	-	3.394	3.064	6.724	-	6.724	8.054	4.239	4.344	-	0.000	29.819
IB1: *Integrated Beam Control Systems Demo for C-CM*	-	-	-	5.558	-	5.558	4.522	3.028	2.021	3.644	0.000	18.773
SU2: *Counter Small Unmanned Aircraft Sys (C-sUAS) Adv**	-	-	-	-	-	-	8.139	25.805	28.742	31.093	0.000	93.779

*This project's R-2a exhibit has been suppressed due to funding not beginning until after FY 2025

Note

In Fiscal Year (FY) 2025, project IB1 / Integrated Beam Control Systems Demonstration for Counter-Cruise Missiles is a new start within PE 0603466A / Air and Missile Defense Advanced Technology.

A. Mission Description and Budget Item Justification

This Program Element (PE) matures demonstrates technology in support of Army Modernization Priority Air and Missile Defense by maturating, demonstrating and conducting system level experimentation for the development of advanced air defense technologies that reduce the cost curve of missile defense, restore overmatch, survive volley-fire attacks, and operate within sophisticated Anti-Access/Area Denial (A2/AD) and contested domains.

Research in this PE complements PE 0602150A (Air and Missile Defense Technology).

This PE is directly aligned to the Air & Missile Defense (AMD) Army Modernization Priority.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603466A *I Air and Missile Defense Advanced Technology*

Research is performed by the United States (U.S.) Army Futures Command (AFC), the United States Army Space and Missile Defense Command/Army Forces Strategic Command (SMDC/ARSTRAT), and the Engineer Research and Development Center (ERDC), and the United States Army Rapid Capabilities and Critical Technologies Office (RCCTO).

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	99.147	21.015	28.277	-	28.277
Current President's Budget	108.758	21.015	28.333	-	28.333
Total Adjustments	9.611	0.000	0.056	-	0.056
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	10.000	-			
• SBIR/STTR Transfer	-0.389	-			
• Adjustments to Budget Years	-	-	0.056	-	0.056

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Project: BN7: *Weapons Components Adv Technology (CA)*		
Congressional Add: *Program Increase - HEL for All-Terrain Vehicles*	12.000	-
Congressional Add: *Program Increase - Silicon Carbide Electronics*	8.000	-
Congressional Add: *Program Increase: Palletized Counter sUAS HEL Weapon System*	20.000	-
Congressional Add: *Program Increase: Weapons Components Advance Technology*	20.000	-
Congressional Add: *Program Increase - MISSILE AI FORCE APPLICATION SYNCHRONIZATION TESTBED*	8.000	-
Congressional Add: *Program Increase - MOBILE FORCE PROTECTION*	20.000	-
Congressional Add: *HEL Power and Thermal Subsystem*	10.000	-
Congressional Add Subtotals for Project: BN7	98.000	-
Congressional Add Totals for all Projects	98.000	-

Change Summary Explanation

Increased funding due to revised economic assumptions.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603466A / *Air and Missile Defense Advanced Technology*	Project (Number/Name) AE3 / *Unconventional Countermeasures-Survivability ATech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
AE3: *Unconventional Countermeasures-Survivability ATech*	-	0.512	11.208	11.863	-	11.863	11.928	0.788	1.246	1.585	0.000	39.130
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates technologies to increase survivability of personnel and critical assets using integrated unconventional countermeasures. These countermeasures include tone down concepts for signature management using novel materials, rapidly deployable, low-cost, multisprectral survivability enhancement technologies as well as intuitive decision support technologies to select and assess non-kinetic protective measures.

Work in this Project complements Program Element (PE) 0602150A (Air and Missile Defense Technology) / Project AE2 (Unconventional Countermeasures-Survivability Tech).

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is conducted by the United States Army Engineer Research and Development Center Geotechnical and Structures Laboratory.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Advanced Integrated Unconventional Countermeasures Applications Demonstrations	0.512	1.164	1.839
Description: This effort demonstrates methods and materials to defeat peer advanced reconnaissance, surveillance, targeting methods through advancements in material science and computational prototyping to reduce targetable signatures and confuse targeting systems. ***FY 2024 Plans:*** Will demonstrate a prototype system and corresponding auxiliary countermeasures with design influences produced by computational tools developed for signature management applications. ***FY 2025 Plans:*** Will mature and demonstrate physical prototype survivability enhancement kits for fire assets. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned additional workflows as technologies are transitioned for maturation and demonstration.			
Title: Assured Protection of Layered Logistics Operations (APoLLO)	-	10.044	10.024

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603466A / *Air and Missile Defense Advanced Technology*	**Project (Number/Name)** AE3 / *Unconventional Countermeasures-Survivability ATech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Description: This effort matures and demonstrates unconventional countermeasures to protect joint logistical assets against emerging and dynamic threats to include expansion of core capabilities to other families of critical assets. ***FY 2024 Plans:*** Will mature and demonstrate passive unconventional countermeasures systems tailored for fixed logistics assets. Will mature active countermeasures with specific focus on low-cost logistics protection of hard-to-move unique system and subsystems. ***FY 2025 Plans:*** Will refine and demonstrate passive unconventional countermeasures systems tailored for additional fixed logistics assets. Will optimize active countermeasures with specific focus on low-cost logistics protection of hard-to-move unique system and subsystems. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Decrease funding reflect planned lifecycle for this effort.			
Accomplishments/Planned Programs Subtotals	0.512	11.208	11.863

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army												Date: March 2024
Appropriation/Budget Activity 2040 / 3					R-1 Program Element (Number/Name) PE 0603466A / *Air and Missile Defense Advanced Technology*				Project (Number/Name) BN7 / *Weapons Components Adv Technology (CA)*			
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
BN7: *Weapons Components Adv Technology (CA)*	-	98.000	-	-	-	-	-	-	-	-	0.000	98.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Congressional Interest Item funding provided for Weapons Components Advanced Technology.

A. Mission Description and Budget Item Justification

Congressional Interest Item funding provided for Weapons Components Advanced Technology.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
Congressional Add: Program Increase - HEL for All-Terrain Vehicles ***FY 2023 Accomplishments:*** Program increase supporting advanced technology development of high energy lasers for all-terrain vehicles. Furthers efforts executed under FY 2022 congressional add Program Increase. This effort provided research and development on advanced weapons technology leading to a high energy laser system for vehicles that support Army Brigade and below operations. It further enabled soldiers to have a Counter- small Unmanned Air System (C-UAS) weapon system at the small unit level and requirements put forth by the Joint Counter-UAS Office. The effort built upon the advanced laser technologies being developed for counter rockets, artillery, and mortars (C-RAM) and to be integrated on larger vehicles (10-ton FMTV). These integrated systems find their best use in all theaters for C-UAS defense applications, a critical deficiency. Work performed by the Rapid Capabilities and Critical Technologies Office (RCCTO), in Huntsville, Alabama.	12.000	-
Congressional Add: Program Increase - Silicon Carbide Electronics ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for Silicon Carbide Electronics	8.000	-
Congressional Add: Program Increase: Palletized Counter sUAS HEL Weapon System	20.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603466A / *Air and Missile Defense Advanced Technology*	**Project (Number/Name)** BN7 / *Weapons Components Adv Technology (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024
FY 2023 Accomplishments: This effort integrated Palletized High Energy Laser (P-HEL) in a tactically relevant, rugged, transportable and fieldable fixed and semi-fixed command and control configuration. This integrated P-HEL provided the DoD with mature production prototype 20-kilowatt (kW) Counter- small Unmanned Air Systems (C-sUAS) to provide a solution for the detection, identification, management and mitigation of sUAS threats. This transition positions Army Rapid Capabilities and Critical Technologies Office (RCCTO) to deliver the P-HEL system with residual combat capabilities in support of Joint Warfighting and Interagency Organizations in collaboration with the Joint Counter sUAS Organization (JCO). Work performed by the Rapid Capabilities and Critical Technologies Office (RCCTO), in Huntsville, Alabama.		
Congressional Add: Program Increase: Weapons Components Advance Technology ***FY 2023 Accomplishments:*** This effort provided for the integration of a 300- kW class High Energy Laser Weapon System and all subsystems to be transported and prepped for system level testing at White Sands Missile Range (WSMR) in support of Army Integrated Air and Missile Defense. This effort will conclude with the integration of the laser and all subsystems into a container on an Army tactical truck complete with beam director assembly and battery packs - critical for WSMR testing. Work performed by the Rapid Capabilities and Critical Technologies Office (RCCTO), in Huntsville, Alabama.	20.000	-
Congressional Add: Program Increase - MISSILE AI FORCE APPLICATION SYNCHRONIZATION TESTBED ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for MISSILE AI FORCE APPLICATION SYNCHRONIZATION TESTBED	8.000	-
Congressional Add: Program Increase - MOBILE FORCE PROTECTION ***FY 2023 Accomplishments:*** Congressional Interest Item funding provided for MOBILE FORCE PROTECTION	20.000	-
Congressional Add: HEL Power and Thermal Subsystem ***FY 2023 Accomplishments:*** This funding furthered research and develop in Power and Thermal Subsystem for High Energy Laser (HEL) systems in the area of direct current power generation modules, stackable power modules, optimization of heat exchanger materials and working fluids; "mixed material brazing" heat exchangers to increase overall efficiency and reduce costs and improvements to vapor compression systems. Additionally, this funding allowed for investigation of regeneration of excessive heat generated back into energy to augment the HEL power supply.	10.000	-
Congressional Adds Subtotals	98.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603466A / *Air and Missile Defense Advanced Technology*	**Project (Number/Name)** BN7 / *Weapons Components Adv Technology (CA)*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603466A / *Air and Missile Defense Advanced Technology*	Project (Number/Name) CV6 / *Optimized High Energy Laser Source Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CV6: *Optimized High Energy Laser Source Adv Tech*	-	6.852	6.743	4.188	-	4.188	5.547	5.653	5.051	3.499	0.000	37.533
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates Optimized High Energy Laser Source advanced technology establishing a more affordable laser source for application in High Energy Laser weapon systems. This Project will deliver a lower cost laser weapon source to next generation HEL systems.

Research in this Project complements other Army Directed Energy efforts conducted under (PE) 0602150A (Air and Missile Defense Technology)/Projects DC1 (Next Generation Directed Energy Concept Development and Analysis) and CV7 (High Energy Laser Direct Diode Applied Technology).

The cited research is consistent with the Army's modernization programs, the Under Secretary of Defense for Research and Engineering priority focus areas, the Army Modernization Strategy, and supports the Army's future capability opportunities for leap-ahead technology for Directed Energy.

Research is performed by the United States Army Space and Missile Defense Command - Technical Center (USASMDC-TC) in coordination with RCCTO and PEO Missiles and Space/PM Shield.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Optimized High Energy Laser Source Advanced Technology	6.852	6.743	4.188
Description: This effort matures and demonstrates Optimized High Energy Laser Source Advanced Technology to demonstrate a more affordable laser source for application in High Energy Laser weapon systems. This effort will provide a low-cost, rugged and compact laser source. Delivering an affordable 50 kW-class laser subsystem with 50% efficiency and 80% fractional Power in the Bucket enabling improvements in efficiency and Size, Weight, and Power laser source resulting in a smaller footprint while reducing logistics requirements.			
FY 2024 Plans: This effort will continue improvement and complete the integration of the 50 kW-class semiconductor high energy laser subsystem module with a focus on validating performance of components and subsystems as they are integrated. Initiate plans to integrate the 50 kW-class laser module into a testbed for field demonstration the following year.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603466A / *Air and Missile Defense Advanced Technology*	**Project (Number/Name)** CV6 / *Optimized High Energy Laser Source Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
This effort will continue improvement and integration of the 50 kW-class semiconductor high energy laser subsystem module with a focus on validating performance of components and subsystems as they are integrated. As a risk reduction this effort will integrate a 30 kW-class ruggedized laser module into a prototype High Energy Laser System for testing and experimentation. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding decrease reflects a planned shift in the focus of work to integration and field demonstration.			
Accomplishments/Planned Programs Subtotals	6.852	6.743	4.188

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603466A / *Air and Missile Defense Advanced Technology*	Project (Number/Name) DB3 / *Radar Survivability through Dis Sensing Adv Tech*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
DB3: *Radar Survivability through Dis Sensing Adv Tech*	-	3.394	3.064	6.724	-	6.724	8.054	4.239	4.344	-	0.000	29.819
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project matures and demonstrates critical radar capability enhancements to defeat advanced Air and Missile threats and protect Army maneuver forces and critical assets. Radar enhancements are required for advanced Electronic Protection (EP) techniques against advanced jammers, electronic Combat Identification (CID), and resource optimization across the threat spectrum while retaining 360-degree coverage capability. Technology maturation in the project includes providing capabilities for: dispersed multi-static operation, classifying/tracking emerging threats and high-volume threats; adaptive digital beam forming to enable resource efficiency, performance in a dynamic clutter environment and enhanced survivability in a contested battlespace; and multi-modal tracking and additional discrimination models to support diverse and emerging threats, such as swarms and guided munitions. Multiple soldier touchpoints and demonstrations of developed technology to autonomously synchronize multiple radars across a distributed battlefield in the presence of countermeasures and the denial of Global Positioning System (GPS) will be performed in lab and field environments. Legacy concepts for centralized deployment planning and battle management overly constrain distributed Integrated Air and Missile Defense (IAMD) mission effectiveness. Multi-Domain Operations (MDO) requires distributed and collaborative engagement decision making. The Augmented Intelligence for Mission Planning and Control effort will develop and mature Artificial Intelligence (AI) Decision Aids enabling operators to continuously manage IAMD component deployments and to select best engagement options in support of Multi-Domain Operations (MDO).

This work is coordinated with Army Program Element (PE) 0602141A (Lethality Technology) / Project CG4 (Advanced Radar Concepts and Technologies); PE 0602148A (Future Vertical Lift Technology) / Project CC3 (FVL Radar Technologies); and PE 0601102A (Defense Research Sciences) / Project AA8 (Sensing and Electromagnetics).

Work in this Project complements Program Element (PE) 0602141A (Lethality Technology) / Project CJ7 (Future Air Defense Missile Enabling Tech) and PE 0602150A (Air and Missile Defense Technology) / Project DA9 (Radar Survivability through Dis Sensing Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation & Missile Center (AvMC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Radar Survivability through Dis Sensing (RSDS) Adv Tech	3.394	3.064	3.701
Description: Matures, and demonstrates critical radar capability enhancements to defeat advanced Air and Missile threats and protect Army maneuver forces and critical assets.			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603466A / *Air and Missile Defense Advanced Technology*	**Project (Number/Name)** DB3 / *Radar Survivability through Dis Sensing Adv Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
FY 2024 Plans: Will select and execute RSDS technology demonstrations of critical capabilities to generate performance metrics. Initial tactical M&S and live demonstrations in the field will incorporate soldier touch points to compare multi and mono-static operations. User feedback early in the technology development process will ensure developed technology is interoperable with Air Defense radars through software built to avoid costly hardware modifications. Utilize the low-cost distributed sensing multi-static Radar testbed S&T development to assess performance and inform future requirements. ***FY 2025 Plans:*** Will conduct an initial modeling and simulation demonstration that will assess technologies developed under the communication among sensors (CAS) task to pass detection information between sensors; mature software technology for future multi-static demonstrations. Incorporate user feedback to ensure developed technology is interoperable with Air Defense radars through software built to avoid costly hardware modifications. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase is an economic adjustment.			
Title: Augmented Intelligence for Mission Planning and Control ***Description:*** Provides mission effectiveness capabilities for MDO distributed & collaborative engagement decision making through maturation of Artificial Intelligence (AI) decision aids that enable operators to continuously manage IAMD component deployments and select best engagement options and pairings. Performs test bed demonstrations of collaborative AI processes enabling a mix of fixed and mobile AMD weapons to defeat full MDO threat spectrum. ***FY 2025 Plans:*** Will develop and evaluate various decision aids for introduction into future Air Defense Command and Control (C2) systems to reduce cognitive overload; decision aids will be evaluated in a virtual battlespace to determine their viability for the users; refine decision aids and create a process that can be incorporated into future Air Defense C2 Systems, thus building a foundation for how the Army implements Artificial Intelligence/Machine Learning (AI/ML) for AMD mission planning and optimization of weapon system pairing. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects planned initiation of this effort to develop and mature Artificial Intelligence (AI) Decision Aids enabling operators to continuously manage IAMD component deployments and to select best engagement options in support of Multi-Domain Operations (MDO).	-	-	3.023
Accomplishments/Planned Programs Subtotals	3.394	3.064	6.724

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603466A / *Air and Missile Defense Advanced Technology*	**Project (Number/Name)** DB3 / *Radar Survivability through Dis Sensing Adv Tech*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603466A / *Air and Missile Defense Advanced Technology*	Project (Number/Name) IB1 / *Integrated Beam Control Systems Demo for C-CM*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
IB1: *Integrated Beam Control Systems Demo for C-CM*	-	-	-	5.558	-	5.558	4.522	3.028	2.021	3.644	0.000	18.773
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Integrated Beam Control Systems Demo for C-CM is a new start within the Air and Missile Defense Advanced Technology program in FY 2025.

A. Mission Description and Budget Item Justification

This program element will mature and demonstrate advanced beam control technology to extend the effective range of a High Energy Laser weapon system. Integrate a 50-cm class off-axis telescope into a government Testbed with advanced adaptive optics and tracking. Validate and optimize advanced adaptive optics and laser quality tracking algorithms in order to demonstrate capabilities that will increase effective range of the Indirect Fire Protection Capability High Energy Laser weapon system.

Research in this Project complements other Army Directed Energy efforts conducted under (PE) 0602150A (Air and Missile Defense Technology)/Projects DC1 (Next Generation Directed Energy Concept Development and Analysis) and DE3 (Advanced Beam Control Component Development for Counter-Cruise Missile).

The cited research is consistent with the Army's modernization programs, the Under Secretary of Defense for Research and Engineering priority focus areas, the Army Modernization Strategy, and supports the Army's future capability opportunities for leap-ahead technology for Directed Energy.

Research is performed by the United States Army Space and Missile Defense Command - Technical Center (USASMDC-TC) in coordination with RCCTO.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Integrated Beam Control Systems Demo for C-CM	-	-	5.558
Description: Supports Advanced Beam Control Phase I (extend effective range of the Indirect Fire Protection Capability High Energy Laser weapon system). Supports Advanced Beam Control Phase II (extend effective range of the Indirect Fire Protection Capability High Energy Laser weapon system). Demonstrates New Technologies for Beam Director Assemblies. Support the Space and Missile Defense Commands efforts in developing Counter Cruise Missile Components/Subsystems.			
FY 2025 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603466A / *Air and Missile Defense Advanced Technology*	**Project (Number/Name)** IB1 / *Integrated Beam Control Systems Demo for C-CM*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Initiate integration of a 50 cm-class beam expander, advanced adaptive optics, and advanced laser quality track subsystems with a high energy laser testbed. Initiate field validation strategy to iteratively optimize advanced algorithms. Begin progress towards demonstrating extended effective range of a high energy laser weapon system and transitioning Technology Readiness Level (TRL) 6 technologies to a program of record for a block upgrade to current system architectures. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase reflects a planned New Start required to demonstrate advanced beam control capabilities to a Technical Readiness Level 6 and support transition to a program of record as a block upgrade.			
Accomplishments/Planned Programs Subtotals	-	-	5.558

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603920A *I Humanitarian Demining*

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	-	20.674	9.068	9.272	-	9.272	9.375	9.381	9.483	9.579	0.000	76.832
CD5: *Humanitarian Demining*	-	20.674	9.068	9.272	-	9.272	9.375	9.381	9.483	9.579	0.000	76.832

A. Mission Description and Budget Item Justification

This Program Element (PE) develops, demonstrates and validates cost-effective technologies for use in humanitarian demining via Outside Continental United States (OCONUS) operational field evaluations. This PE's low-cost and highly effective technology reduces the landmine and unexploded ordnance (UXO) / improvised explosive devise (IED) threat to deployed United States (US) forces and the local population. This PE coordinates with the Department of State's Weapons Removal and Abatement Program, the Department of Defense (DoD) Humanitarian Mine Action (HMA) programs of the Combatant Commands (CCMDs), and international mine action organizations and foreign militaries. New technology requirements and areas of emphasis are identified and validated at annual Requirements Workshop and UXO/IED Working Group Meetings. Technology investments are prioritized using the results of these meetings and CCMD security cooperation and theater campaign plan HMA objectives. This PE advances the state-of-the-art of demining technologies and evaluates these technologies utilizing host nation humanitarian demining partners.

This PE supports and bolsters the CCMD stability operations mission as directed under Department of Defense Instruction (DODI) 3000.05 to foster mil-to-mil engagement, and bolster economic security and development with partner nations worldwide. Additionally, this PE fosters nations' mine action capacity while improving DoD's visibility and access, generating long-term positive perceptions of DoD and the US, and fostering collaborative relationships with host nation governments. It also directly supports the National Defense Strategy through ensuring common domains remain open and free.

This PE utilizes a research and development plan based on operational test data gained through Operational Field Evaluations (OFEs). These OFEs provide this PE a unique capability to collect this data against live mines/UXO in actual minefields around the world. This data is unavailable to any other DoD organization. This OFE data drives future humanitarian demining investment decisions and is shared and leveraged by the U.S. Army's Army Futures Command programs to further improve U.S. forces' technologies. In addition, this PE provides mine and UXO detector training to the CCMDs at the Humanitarian Demining Training Center (HDTC) in support of Military to Military training and partnerships.

This PE supports the DoD's strategic guidance to address instability and reduce the demand for significant US force commitments to stability operations; with DODI 3000.05 (Stability Operations) and Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3207.01C (Department of Defense Support to Humanitarian Mine Action) to reduce the social, economic and environmental impact of landmines and unexploded ordnance.

This PE will be executed by the Army Futures Command (AFC).

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Army	Date: March 2024
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603920A *I Humanitarian Demining*

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	21.000	9.068	9.253	-	9.253
Current President's Budget	20.674	9.068	9.272	-	9.272
Total Adjustments	-0.326	0.000	0.019	-	0.019
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.326	-			
• Adjustments to Budget Years	-	-	0.019	-	0.019

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2023	FY 2024
Project: CD5: *Humanitarian Demining*		
Congressional Add: *Program Increase*	12.067	-
Congressional Add Subtotals for Project: CD5	12.067	-
Congressional Add Totals for all Projects	12.067	-

Change Summary Explanation

Increased funding due to revised economic assumptions.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army			Date: March 2024
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603920A / *Humanitarian Demining*	Project (Number/Name) CD5 / *Humanitarian Demining*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
CD5: *Humanitarian Demining*	-	20.674	9.068	9.272	-	9.272	9.375	9.381	9.483	9.579	0.000	76.832
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project develops, demonstrates and validates cost-effective technologies for use in humanitarian demining via Outside Continental United States (OCONUS) operational field evaluations. This project's low-cost and highly effective technology reduces the landmine and unexploded ordnance (UXO) / improvised explosive device (IED) threat to deployed United States (US) forces and the local population. This project coordinates with the Department of State's Weapons Removal and Abatement Program, the Department of Defense (DoD) Humanitarian Mine Action (HMA) programs of the Geographic Combatant Commands (GCCs), international mine action organizations, and foreign militaries. New technology requirements and areas of emphasis are identified and validated at annual Requirements Workshops and UXO/IED Working Group Meetings. Technology investments are prioritized using the results of these meetings and GCC security cooperation and theater campaign plan HMA objectives. This Project advances the state-of-the-art of demining technologies and evaluates these technologies utilizing host nation humanitarian demining partners.

This project supports and bolsters the GCC stability operations mission as directed under Department of Defense Instruction (DODI) 3000.05 to foster mil-to-mil engagement and bolster economic security and development with partner nations worldwide. Additionally, this project fosters nations' mine action capacity while improving DoD's visibility and access, generating long-term positive perceptions of DoD and the US, and fostering collaborative relationships with host nation governments.

This project utilizes a development plan based on operational data gained through Operational Field Evaluations (OFEs). These OFEs provide this project a unique capability to collect data against live mines/UXO in actual minefields around the world. This data is not available to any other DoD organization. This OFE data drives future humanitarian demining investment decisions and is shared and leveraged by the Army Futures Command to further improve U.S. forces' technologies. In addition, this project provides mine and UXO detector training to the GCCs at the Humanitarian Demining Training Center (HDTC) in support of Military-to-Military training and partnerships.

This Project supports the DoD's strategic guidance to address instability and reduce the demand for significant US force commitments to stability operations. This is in accordance with US Title 10 Section 407 (Humanitarian Demining Assistance), DOD Instruction 3000.05 (Stability Operations), and Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3207.01C (Department of Defense Support to Humanitarian Mine Action) to reduce the social, economic, and environmental impact of landmines and unexploded ordnance.

This Project will be executed by the Army Futures Command (AFC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Humanitarian Demining Technologies	8.607	9.068	9.272

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603920A / *Humanitarian Demining*	**Project (Number/Name)** CD5 / *Humanitarian Demining*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Description: This effort adapts commercial-off-the-shelf equipment, integrates mature technologies, and leverages research and development activity within the Army, particularly the AFC CCDC Command, Control, Communications, Computers, Combat Systems, Intelligence, Surveillance, and Reconnaissance (C5ISR) Tactical Countermine mission area. This effort supports the DoD HMA programs of the CCMDs and aims to improve existing technologies for mine/UXO detection, technical survey/area reduction, mechanical mine/UXO clearance, vegetation clearance, and mechanical mine neutralization. ***FY 2024 Plans:*** Will develop and mature technologies to improve mine/UXO detection, vegetation clearance, and mechanical mine neutralization capabilities in support of Geographic Combatant Command humanitarian mine action priorities. Will demonstrate and validate emerging mine/UXO defeat technologies and capabilities in live threat environments. Will continue operational field evaluations from FY2023 of emerging mine / UXO defeat technologies. Will transition new detection and mechanical clearance technologies to six additional countries for use in clearance operations. Will continue execution of threat surveys and site assessments. Will conduct biannual Humanitarian Demining R&D UXO Working Group Meeting to prioritize global needs for UXO detection and clearance technologies. ***FY 2025 Plans:*** Will develop mine/UXO detection sensors with positioning technologies, and automated field data capture, analysis, discrimination, and classification to find mines and UXO at greater depths. Will mature robotic and global positioning system control technologies and validate mechanical technologies for remote operations. Will provide technology to address GCC HMA requirements in critical areas (i.e., Eastern Europe and the Indo-Pacific region). Will continue ongoing operational field evaluations from FY2024 and deploy several new technologies during FY2025. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding increase is an economic adjustment.			
Accomplishments/Planned Programs Subtotals	8.607	9.068	9.272

	FY 2023	FY 2024
Congressional Add: Program Increase	12.067	-
FY 2023 Accomplishments: Congressional Interest Item funding provided		
Congressional Adds Subtotals	12.067	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2025 Army		Date: March 2024
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603920A / *Humanitarian Demining*	**Project (Number/Name)** CD5 / *Humanitarian Demining*

D. Acquisition Strategy

N/A