Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army											Date: May 2021	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604808A *I Landmine Warfare/Barrier - Eng Dev*							
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
Total Program Element	-	33.881	9.239	14.137	-	14.137	-	-	-	-	-	-
016: *Close Combat Capabilities ENG DEV*	-	18.408	7.314	11.174	-	11.174	-	-	-	-	-	-
415: *Mine Neutral/Detection*	-	15.473	1.925	-	-	-	-	-	-	-	-	-
CS2: *Render Safe Sets Kits and Outfits (RS-SKO)*	-	-	-	0.916	-	0.916	-	-	-	-	-	-
CS3: *Next Generation Advanced Bomb Suit (NGABS)*	-	-	-	2.047	-	2.047	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This Program Element (PE) provides for the Engineering and Manufacturing Development (EMD) and demonstration of networked munitions, countermine systems, Explosive Ordnance Disposal (EOD) render safe, and counter improvised explosive device capabilities. This PE also implements the National Landmine Policy to develop alternatives to the non-self-destructing counter mobility anti-personnel landmine systems. The PE contributes to area access and area denial (A2/AD) to support unified land operations and improve soldier survivability.

Project 016: Funding in this program supports the Army's Cross Functional Teams (CFT) initiatives. Project 016, Close Combat Capabilities, covers two programs: Next Generation Advanced Bomb Suit (NGABS) and Explosive Ordnance Disposal Render Safe (EOD RS). It provides for the Engineering and Manufacturing Development (EMD) and demonstration of capabilities needed for Explosive Ordnance Disposal (EOD) teams to Render Safe (RS) US and foreign ordnance and improvised explosive devices, enabling ground force commanders to retain freedom of maneuver and secure lines of communications. NGABS directly contributes to Soldier lethality and ground force commander freedom of maneuver by providing next generation sensor and optics in the cutting-edge Heads-Up-Display (HUD) while integrating the Government's latest investments in protective material for the modular, scalable NGABS bomb suit fabrication. EOD RS equips EOD teams with low light visual augmentation system, electronic countermeasures, buried IED detection, dismounted X-ray imager, X-ray generator, trace explosive, Chemical, Biological, Radiological, and Nuclear (CBRN), and drug detection, unmanned aerial system, power management, gamma and neutron search and detection, and render safe initiation. This project will continue to support cross-service initiatives to improve commonality.

NGABS will increase the Warfighter lethality and mobility by optimizing Soldier protection for EOD personnel, while effectively managing all life cycle aspects of Personal Protective Equipment (PPE). Warfighter lethality is increased through bomb suit weight reduction utilizing extensive investments in protective material research and development. The result is material solutions that are lighter and are pieced together in a manner which increases Soldier mobility and longevity. EOD Soldier situational awareness and exposure to ballistic threats is enhanced through the NGABS HUD which allows the Soldier increased visibility under various obscurants and low/no-light situations.

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army	Date: May 2021
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604808A *I Landmine Warfare/Barrier - Eng Dev*

Project 415: This Project provides for Engineering Manufacturing and Development (EMD) for the next generation of capabilities to detect, identify and neutralize hybrid threats and explosive hazards such as Improvised Explosive Devices (IEDs) and landmines. These capabilities are a Family of Systems (FOS) encompassing handheld, vehicle mounted, small robotic mounted, aerial platform mounted and area access, and neutralization systems operating in manned, remotely controlled, semi-autonomous or fully autonomous modes. Continued development of this FOS is necessary to support Route Clearance Platoons located within both Engineer Companies and Brigade Engineering Battalion Brigade Combat Teams.

The Husky Mounted Detection System (HMDS) is a counter-explosive device capability that provides standoff detection and marking of metallic encased caches and metallic and low-metallic antitank landmines, unexploded ordnance, trigger mechanisms, and improvised explosive devices (IEDs) in support of route and area-clearance operations. HMDS is a mission equipment package mounted on the Husky route clearance vehicle. The program was restructured in September 2016 to align with emerging shallow buried Wire Detection (WD) capabilities integrated onto the HMDS Increment A1 configuration (includes Ground Penetrating Radar (GPR)). These changes are necessary to adapt to changing IED threats. WD Technology will be fully integrated through Engineering Change Proposals (ECPs) at the end of FY20. Prototypes developed under the concluded HMDS Increment A2 effort may be leveraged in development of future capabilities. Future capabilities may include detection of deep buried IEDs and caches, and semi-autonomous control of the Husky vehicle and HMDS from inside a follow-on vehicle.

Route Clearance & Interrogation System (RCIS) Type I consists of a semi-autonomous vehicle and includes designated control vehicles and Operator Control Units (OCUs) which provide a standoff capability to detect and neutralize the full spectrum of explosive hazards. Type I integrates a semi-autonomous kit onto a High Mobility Engineering Excavator (HMEE) for remote control from a Buffalo Mine Protected Clearance Vehicle (MPCV). RCIS Type I semi-autonomous kit will be integrated onto the HMEE and be capable of interrogating and classifying explosive hazards. An OCU will be integrated into a Buffalo MPCV for Type I. RCIS capabilities will be fielded to Route Clearance Squads and Engineer Platoons which includes Tele-operation, RADAR-based Follow-Me, LIDAR obstacle detection, onscreen predictive turning map, and customizable camera views in order to achieve the RCIS mission.

Standoff Robotic Explosive Hazard Detection System (SREHD), formerly known as the Autonomous Mine Detection System (AMDS), provides increased survivability through mine and explosive hazards stand-off detection, marking and neutralization capability for the dismounted soldier. It provides area access and freedom of movement for the Commander. SREHD consists of payload modules to be mounted on man-portable unmanned ground vehicles. The payloads are for surface laid and buried threats to include mines and explosive hazards. This capability allows a soldier to remain in a protective posture while detecting and neutralizing a wide variety of hybrid and conventional explosive threats. SREHD conducted a successful Milestone (MS) C in April 2018 and initiated Low Rate Initial Production (LRIP) in June 2018. Due to the realignment of funds FY 2020-2024 to higher Army priorities, the proponent withdrew support to the Standoff Robotic Explosive Hazard Detection System (SREHD) after Low Rate Initial Production (LRIP) award. Research, Development, Test and Evaluation (RDTE) tasks will conclude in FY 2019 under FY 2018 PE 0654808A, Project 415, Landmine Warfare/Barrier - Eng Dev, once corrective action plans and trainer re-development are completed. The program will conclude in June 2020 under FY 2018 OPA R68260 / AREA MINE DETECTION SYSTEM (AMDS) and PAA E50510 / DEMO KIT, BLASTING: Munition Array Charge, XM335 for system qualification and production and receipt of LRIP quantities for an orderly program closeout.

Robotic Explosive Hazard Detection System (REHDS) provides the warfighter with a robotic mounted capability to detect and mark buried landmines and IEDs from a safe standoff distance. REHDS is an enabler for Soldier Lethality as it enables soldier maneuverability by enhancing the probability and speed of detection of buried landmines and IEDs allowing for increased speed of dismounted operations making the unit more efficient and lethal. REHDS is a new start in FY 2021 and begins

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army	Date: May 2021
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604808A *I Landmine Warfare/Barrier - Eng Dev*

in the Engineering and Manufacturing Development (EMD) phase. REHDS will leverage developed SREHD capability and incorporate increased Rate of Advanced Downtrack (RoAD) and Integration to the Man Transportable Robotic System (MTRS) II platform.

Project CS2: This project provides for the Engineering and Manufacturing Development (EMD) and demonstration of capabilities needed for Explosive Ordnance Disposal (EOD) teams to Render Safe (RS) US and foreign ordnance and improvised explosive devices, enabling ground force commanders to retain freedom of maneuver and secure lines of communications. EOD Render Safe Sets Kits and Outfits (RS-SKO) equips EOD teams with low light visual augmentation system, electronic countermeasures, buried IED detection, dismounted X-ray imager, X-ray generator, trace explosive, Chemical, Biological, Radiological, and Nuclear (CBRN), and drug detection, unmanned aerial system, power management, gamma and neutron search and detection, and render safe initiation. This project will continue to support cross-service initiatives to improve commonality.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	37.108	9.589	9.226	-	9.226
Current President's Budget	33.881	9.239	14.137	-	14.137
Total Adjustments	-3.227	-0.350	4.911	-	4.911
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.700	-			
• SBIR/STTR Transfer	-1.527	-0.350			
• Adjustments to Budget Years	-	-	4.911	-	4.911

Change Summary Explanation

The FY 2021 to FY 2022 increase supports integrating prototype efforts to support force protection and signature management related to critical mission threads, operational constructs (Multi-Domain Operations) and key weapon systems. This includes responding to impending Army requirements. Funding includes supporting capability and capacity to meet Army strategic guidance in support of the National Defense Strategy, and other related Army efforts.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army											Date: May 2021	
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*				Project (Number/Name) 016 / *Close Combat Capabilities ENG DEV*			
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
016: *Close Combat Capabilities ENG DEV*	-	18.408	7.314	11.174	-	11.174	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project 016: Funding in this program supports the Army's Cross Functional Teams (CFT) initiatives. Project 016, Close Combat Capabilities, covers two programs: Next Generation Advanced Bomb Suit (NGABS) and Explosive Ordnance Disposal Render Safe (EOD RS).

NGABS directly contributes to Soldier lethality and ground force commander freedom of maneuver by providing next generation sensor and optics in the cutting-edge Heads-Up-Display (HUD) while integrating the Government's latest investments in protective material for the modular, scalable NGABS bomb suit development. NGABS will increase the Warfighter survivability and mobility by optimizing Soldier protection for EOD personnel, while effectively managing all life cycle aspects of Personal Protective Equipment (PPE). Warfighter lethality is increased through bomb suit weight reduction utilizing extensive investments in protective material research and development. The result is material solutions that are lighter and are pieced together in a manner which increases Soldier mobility and longevity. EOD Soldier situational awareness and exposure to ballistic threats is enhanced through the NGABS HUD which allows the Soldier increased visibility under various obscurants and low/no-light situations. Funds were transferred from APE 0604808016 to APE 0604808CS3 to clearly define the functions that are being completed with the NGABS funding line.

Explosive Ordnance Disposal Render Safe (EOD RS) provides for the Engineering and Manufacturing Development (EMD) and demonstration of capabilities needed for Explosive Ordnance Disposal (EOD) teams to Render Safe (RS) US and foreign ordnance and improvised explosive devices, enabling ground force commanders to retain freedom of maneuver and secure lines of communications. EOD RS equips EOD teams with low light visual augmentation system, electronic countermeasures, buried IED detection, dismounted X-ray imager, X-ray generator, trace explosive, Chemical, Biological, Radiological, and Nuclear (CBRN), and drug detection, unmanned aerial system, power management, gamma and neutron search and detection, and render safe initiation. This project will continue to support cross-service initiatives to increase commonality.

B. Accomplishments/Planned Programs ($ in Millions)	**FY 2020**	**FY 2021**	**FY 2022**
Title: Next Generation Advanced Bomb Suit (NGABS)	11.186	6.351	0.166
Description: The objective of this effort is to increase the Warfighter lethality, modularity, and mobility, by optimizing Soldier protection and situational awareness for EOD personnel. The mission of this program is to enhance the tactical utility and applicability of this bomb suit concept by incorporating modularity/scalability and sensor technologies that are non-existent in legacy designs. This new, tailorable, full body protective system will provide a significantly increased capability at a reduced weight.			
FY 2021 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 016 / *Close Combat Capabilities ENG DEV*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
NGABS FY 2021 plans center around finalizing the production design for the bomb suit, executing ballistic and blast test plans with subsequent fixes applied to the suit design. FY 2021 also leads NGABS into the complex phases of component integration; sensor suite, Heads Up Display (HUD), power, cooling, helmet, and suit with Soldier Protection System components. All of these components combined are the NGABS system. FY 2021 includes the planning and scheduling for system level tests (ballistic, blast, environmental, Human Factor Evaluation (HFE), etc.). ***FY 2022 Plans:*** Funds were transferred from APE 0604808016 to APE 0604808CS3 to clearly define the functions that are being completed with the NGABS funding line. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funds were transferred from APE 0604808016 to APE 0604808CS3 to clearly define the functions that are being completed with the NGABS funding line.			
Title: Explosive Ordnance Disposal (EOD) Render Safe (RS) ***Description:*** Render Safe (RS) procedures require technicians to employ a wide variety of capabilities and explosives. ***FY 2021 Plans:*** Activities include the conduct of a market survey, testing of equipment against requirements, reporting of findings and recommendations. Electronic countermeasures (ECM) continue to be tested and evaluated against emerging threats and loadset verification and validation will continue. Conduct preliminary design reviews for ECM and contract award for prototype systems. ***FY 2022 Plans:*** FY 2022 funding will support the build of the final ECM design prototypes and the testing of the final prototypes against requirements. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2021 funding required to support multiple prototype design builds ahead of a down select and final design build in FY 2022. Program is transitioning to project CS2:Render Safe Sets Kits and Outfits (RS-SKO) in FY 2022.	7.222	0.963	0.074
Title: Prototype Integration for Multi-Domain Operations ***Description:*** Integrating prototype efforts to support force protection and signature management related to critical mission threads, operational constructs (Multi-Domain Operations) and key weapon system including responding to impending Army requirements. Effort will support capability and capacity to meet Army strategic guidance in support of the National Defense Strategy and other related Army efforts. ***FY 2022 Plans:***	-	-	10.934

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 016 / *Close Combat Capabilities ENG DEV*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
FY 2022 funding in the amount of $10.934 million will support integrating prototype efforts to support force protection and signature management related to critical mission threads, operational constructs (Multi-Domain Operations) and key weapon systems. This effort supports the Secretariat and Global Security Initiatives in identified Army Research, Development, Test and Evaluation (RDTE) requirements to ensure capability, capacity and readiness of Army Military capabilities. Includes next generation devices and technologies to support Army's ability to meet current and emerging requirements, integrating RDTE prototypes with Component programs for acquisition, sustainment and maintenance. Funding includes supporting capability and capacity to meet Army strategic guidance in support of the National Defense Strategy, and other related Army efforts. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2021 to FY2022 funding increase to support force protection and signature management related to critical mission multi-domain operations and key weapon systems to meet Army strategic guidance in support of the National Defense Strategy.			
Accomplishments/Planned Programs Subtotals	18.408	7.314	11.174

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• R63610: *Render Safe Sets kits Outfits*	102.684	145.313	84.000	-	84.000	-	-	-	-	-	-
• CS2: *Render Safe Sets Kits and Outfits (RS-SKO)*	-	-	0.916	-	0.916	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The Next Generation Advanced Bomb Suit (NGABS) Program utilizes a competitive, developmental, innovative and efficient Other Transaction Authority (OTA) in EMD through the Fort Belvoir Sensor Communication and Electronic Consortium (SCEC) which will result in a production ready prototype leading to a Production and Deployment (PD) phase for full capability while ensuring best value to the Army. Milestone (MS) B / Material Development Decision (MDD) occurred in FY 2018 and MS C is scheduled for FY 2022.

The Explosive Ordnance Disposal (EOD) Render Safe (RS) program utilizes existing government contract vehicles to acquire prototype systems for testing and evaluation of the systems for down selection and inclusion in the capabilities package during Engineering and Manufacturing Development. The program will continue to use the existing government contract vehicles for the production and deployment phase as well as to continue the development of capabilities during the 5 phase technical refresh.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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The Multi-Domain Operations (MDO) program utilizes existing government contract vehicles to integrate prototype efforts to support force protection and signature management related to critical mission threads, operational constructs and key weapons systems.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) 016 / *Close Combat Capabilities ENG DEV*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NGABS	Allot	PM SPE : Fort Belvoir	1.801	0.703		0.900		-		-		-	0.000	3.404	Continuing
		Subtotal	1.801	0.703		0.900		-		-		-	0.000	3.404	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NGABS - Production Prototype Development	C/FFP	TBD : Manufacturing Techniques Inc. (MTEQ), Lorton, VA	11.791	2.153		2.899		-		-		-	0.000	16.843	Continuing
EOD RS Development Contract 1	MIPR	Northrop Grumman Corporation : Falls Church, VA	-	2.000	Sep 2020	-		-		-		-	0.000	2.000	Continuing
EOD RS Development Contract 2	MIPR	Sierra Nevada Corporation : Sparks, NV	-	2.000	Sep 2020	-		-		-		-	0.000	2.000	Continuing
EOD RS Development Contract 3	MIPR	Peraton Corporation : Herndon, VA	-	1.921	Dec 2020	-		-		-		-	0.000	1.921	Continuing
EOD RS Follow On Development Contract	MIPR	TBD : TBD	-	-		0.129	Aug 2021	-		-		-	0.000	0.129	Continuing
Prototype Integration for Multi-Domain Opertions	TBD	TBD : TBD	-	-		-		10.934	Jan 2022	-		10.934	0.000	10.934	Continuing
		Subtotal	11.791	8.074		3.028		10.934		-		10.934	0.000	33.827	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NGABS Support Costs	MIPR	TBD : Various	1.711	0.703		2.126		0.166		-		0.166	0.000	4.706	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) 016 / *Close Combat Capabilities ENG DEV*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EOD RS	MIPR	DEVCOM C5ISR Center : Aberdeen Proving Ground (APG), MD	-	0.959	Jan 2020	0.687	Mar 2021	-		-		-	0.000	1.646	Continuing
EOD RS	MIPR	DEVCOM Armaments Center : PIcatinny Arsenal, NJ	-	-		-		0.074	Oct 2021	-		0.074	0.000	0.074	Continuing
		Subtotal	1.711	1.662		2.813		0.240		-		0.240	0.000	6.426	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NGABS Test & Evaluation	MIPR	TBD : Various	-	7.627		0.426		-		-		-	0.000	8.053	Continuing
EOD RS	MIPR	NAVSEA Warfare Center Indian Head : Indian Head, MD	-	0.342	Jun 2020	-		-		-		-	0.000	0.342	Continuing
EOD RS	MIPR	MRIGlobal : Kansas City, MO	-	-		0.147	Apr 2021	-		-		-	0.000	0.147	Continuing
		Subtotal	-	7.969		0.573		-		-		-	0.000	8.542	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	15.303	18.408		7.314		11.174		-		11.174	0.000	52.199	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 016 / *Close Combat Capabilities ENG DEV*

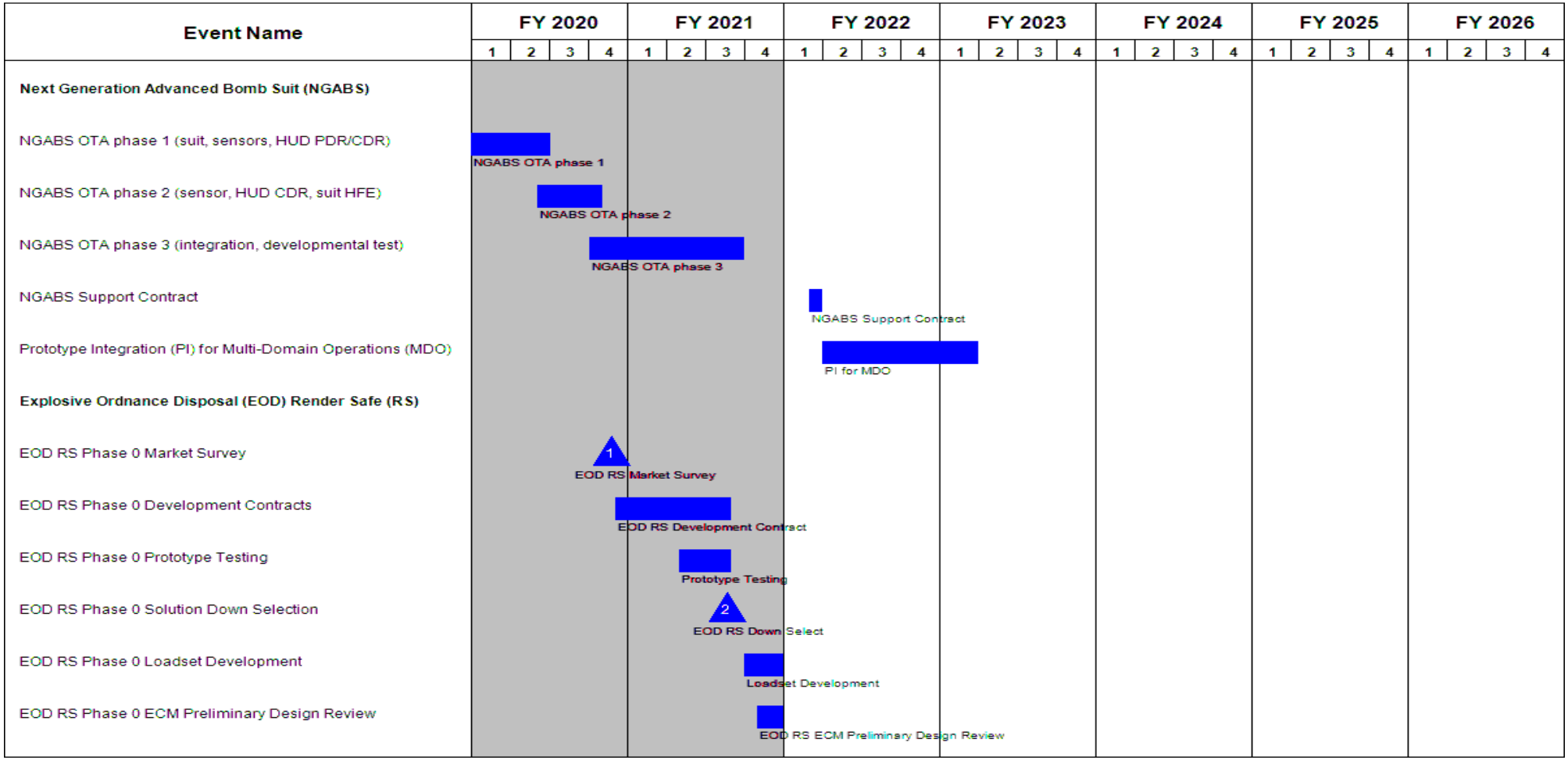

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 016 / *Close Combat Capabilities ENG DEV*

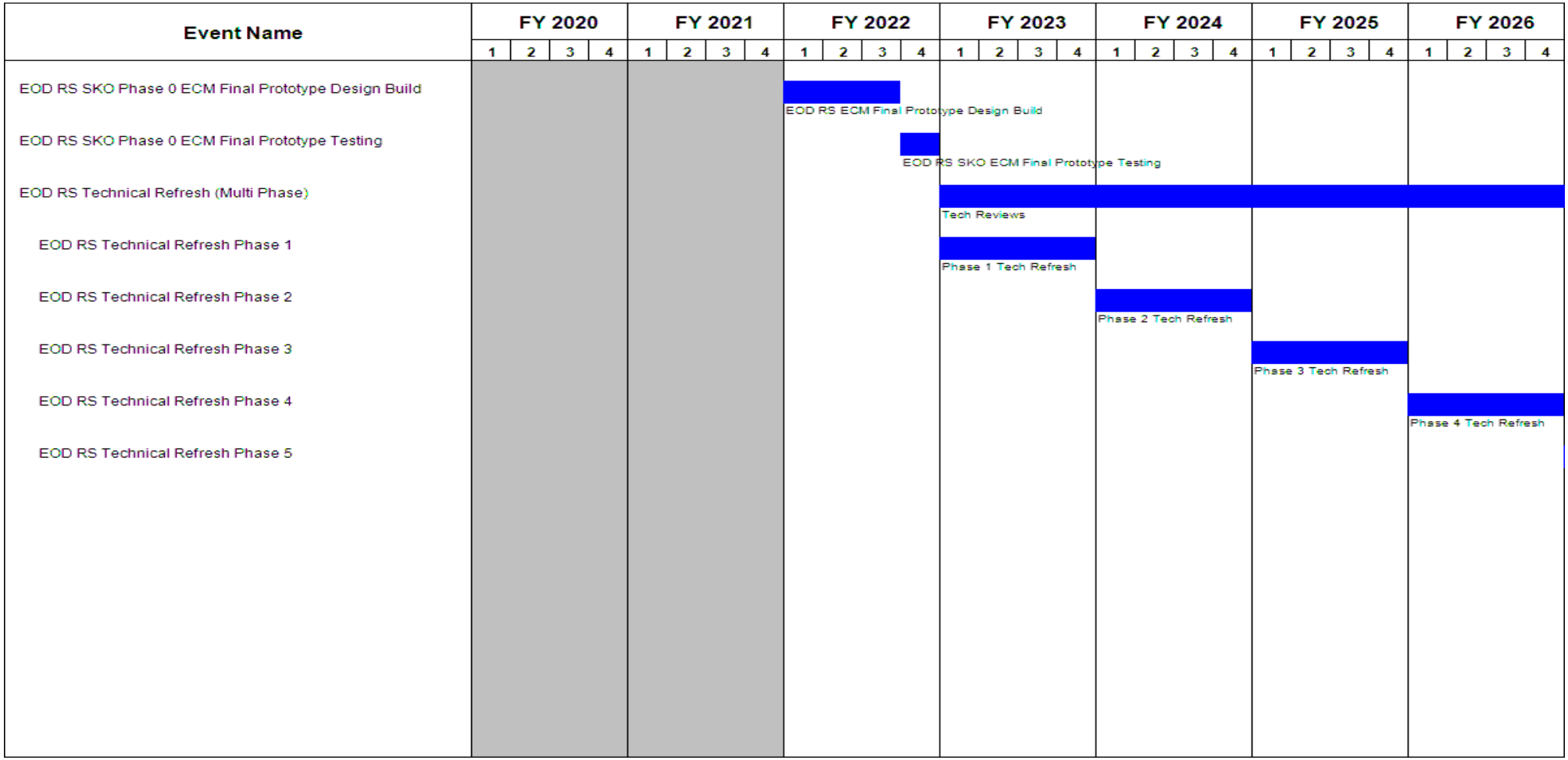

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 016 / *Close Combat Capabilities ENG DEV*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Next Generation Advanced Bomb Suit (NGABS)	1	2017	4	2022
NGABS Materiel Development Decision (MDD)	2	2018	2	2018
NGABS OTA phase 1 (suit, sensors, HUD PDR/CDR)	4	2019	2	2020
NGABS OTA phase 2 (sensor, HUD CDR, suit HFE)	2	2020	4	2020
NGABS OTA phase 3 (integration, developmental test)	4	2020	3	2021
NGABS Support Contract	1	2022	1	2022
Prototype Integration (PI) for Multi-Domain Operations (MDO)	2	2022	1	2023
Explosive Ordnance Disposal (EOD) Render Safe (RS)	1	2020	4	2027
EOD RS Phase 0 Market Survey	4	2020	4	2020
EOD RS Phase 0 Development Contracts	4	2020	3	2021
EOD RS Phase 0 Prototype Testing	2	2021	3	2021
EOD RS Phase 0 Solution Down Selection	3	2021	3	2021
EOD RS Phase 0 Loadset Development	4	2021	4	2021
EOD RS Phase 0 ECM Preliminary Design Review	4	2021	4	2021
EOD RS SKO Phase 0 ECM Final Prototype Design Build	1	2022	3	2022
EOD RS SKO Phase 0 ECM Final Prototype Testing	4	2022	4	2022
EOD RS Technical Refresh (Multi Phase)	1	2023	4	2027
EOD RS Technical Refresh Phase 1	1	2023	4	2023
EOD RS Technical Refresh Phase 2	1	2024	4	2024
EOD RS Technical Refresh Phase 3	1	2025	4	2025
EOD RS Technical Refresh Phase 4	1	2026	4	2026
EOD RS Technical Refresh Phase 5	1	2027	4	2027

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army											Date: May 2021	
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*				Project (Number/Name) 415 / *Mine Neutral/Detection*			
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
415: *Mine Neutral/Detection*	-	15.473	1.925	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project 415: This Project provides for Engineering Manufacturing and Development (EMD) for the next generation of capabilities to detect, identify and neutralize hybrid threats and explosive hazards such as Improvised Explosive Devices (IEDs) and landmines. These capabilities are a Family of Systems (FOS) encompassing handheld, vehicle mounted, small robotic mounted, aerial platform mounted and area access, and neutralization systems operating in manned, remotely controlled, semi-autonomous or fully autonomous modes. Continued development of this FOS is necessary to support Route Clearance Platoons located within both Engineer Companies and Brigade Engineering Battalion Brigade Combat Teams.

The Husky Mounted Detection System (HMDS) is a counter-explosive device capability that provides standoff detection and marking of metallic encased caches and metallic and low-metallic antitank landmines, unexploded ordnance, trigger mechanisms, and improvised explosive devices (IEDs) in support of route and area-clearance operations. HMDS is a mission equipment package mounted on the Husky route clearance vehicle. The program was restructured in September 2016 to align with emerging shallow buried Wire Detection (WD) capabilities integrated onto the HMDS Increment A1 configuration (includes Ground Penetrating Radar (GPR)). These changes are necessary to adapt to changing IED threats. WD Technology will be fully integrated through Engineering Change Proposals (ECPs) at the end of FY20. Prototypes developed under the concluded HMDS Increment A2 effort may be leveraged in development of future capabilities. Future capabilities may include detection of deep buried IEDs and caches, and semi-autonomous control of the Husky vehicle and HMDS from inside a follow-on vehicle.

Route Clearance & Interrogation System (RCIS) Type I consists of a semi-autonomous vehicle and includes designated control vehicles and Operator Control Units (OCUs) which provide a standoff capability to detect and neutralize the full spectrum of explosive hazards. Type I integrates a semi-autonomous kit onto a High Mobility Engineering Excavator (HMEE) for remote control from a Buffalo Mine Protected Clearance Vehicle (MPCV). RCIS Type I semi-autonomous kit will be integrated onto the HMEE and be capable of interrogating and classifying explosive hazards. An OCU will be integrated into a Buffalo MPCV for Type I. RCIS capabilities will be fielded to Route Clearance Squads and Engineer Platoons which includes Tele-operation, RADAR-based Follow-Me, LIDAR obstacle detection, onscreen predictive turning map, and customizable camera views in order to achieve the RCIS mission.

Standoff Robotic Explosive Hazard Detection System (SREHD), formerly known as the Autonomous Mine Detection System (AMDS), provides increased survivability through mine and explosive hazards stand-off detection, marking and neutralization capability for the dismounted soldier. It provides area access and freedom of movement for the Commander. SREHD consists of payload modules to be mounted on man-portable unmanned ground vehicles. The payloads are for surface laid and buried threats to include mines and explosive hazards. This capability allows a soldier to remain in a protective posture while detecting and neutralizing a wide variety of hybrid and conventional explosive threats. SREHD conducted a successful Milestone (MS) C in April 2018 and initiated Low Rate Initial Production (LRIP) in June 2018. Due to the realignment of funds from FY 2020 through FY 2024 to higher Army priorities, the proponent withdrew support to the Standoff Robotic Explosive Hazard Detection System (SREHD) after Low Rate Initial Production (LRIP) award. Research, Development, Test and Evaluation (RDTE) tasks will conclude in FY 2019 under FY 2018 PE 0654808A, Project 415, Landmine Warfare/Barrier - Eng Dev, once corrective action plans and trainer re-development are completed. The program will

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conclude in June 2020 under FY 2018 OPA R68260 / AREA MINE DETECTION SYSTEM (AMDS) and PAA E50510 / DEMO KIT, BLASTING: Munition Array Charge, XM335 for system qualification and production and receipt of LRIP quantities for an orderly program closeout.

Robotic Explosive Hazard Detection System (REHDS) provides the warfighter with a robotic mounted capability to detect and mark buried landmines and IEDs from a safe standoff distance. REHDS is an enabler for Soldier Lethality as it guarantees soldier maneuverability by enhancing the probability and speed of detection of buried landmines and IEDs allowing for increased speed of dismounted operations making the unit more efficient and lethal. REHDS is a new start in FY 2021 and begins in the Engineering and Manufacturing Development (EMD) phase. REHDS will leverage developed SREHD capability and incorporate increased Rate of Advanced Downtrack (RoAD) and Integration to the Man Transportable Robotic System (MTRS) II platform.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: HMDS Program Management Support ***Description:*** Husky Mounted Detection System (HMDS) Program Management Support	1.544	-	-
Title: HMDS GPR: Engineer Change Proposal (ECP) to add Wire Detection and Infrared Illumination ***Description:*** HMDS A1 Tactical GPR: Engineer Change Proposal (ECP) to add Wire Detection and Infrared Illumination	3.512	-	-
Title: HMDS Testing and Test Support activities ***Description:*** HMDS Testing and Test Support activities	1.419	-	-
Title: HMDS A1 Auto-Height Improvements ***Description:*** Auto-Height Control	0.652	-	-
Title: HMDS Systems Training Product Development ***Description:*** Training product development to support Developmental test and limited user testing	0.865	-	-
Title: HMDS Program and Logistics Support ***Description:*** Program and Logistics support	0.946	-	-
Title: RCIS Type I ***Description:*** Route Clearance & Interrogation System (RCIS) Type I provides standoff capability to detect and neutralize the full spectrum of explosive hazards.	5.722	-	-
Title: Robotic Explosive Hazard Detection System (REHDS) ***Description:*** Robotic Explosive Hazard Detection System (REHDS)	-	1.925	-

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
FY 2021 Plans: Develop REHDS contract and conduct Materiel Development Decision. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Program has been delayed until FY 2023 and will be developed as Handheld Standoff Explosive Hazard Detection System (HSTEHDS) within Project. 415 / Mine Neutral/Detection.			
Title: SBIR/STTR	0.813	-	-
Accomplishments/Planned Programs Subtotals	15.473	1.925	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• R64001: *HUSKY MOUNTED DETECTION SYSTEM (HMDS)*	75.586	95.608	26.823	-	26.823	-	-	-	-	-	-
• R68102: *GRND STANDOFF MINE DETECTN SYSM (GSTAMIDS)BLK 1*	40.680	2.497	-	-	-	-	-	-	-	-	-
• DA0924: *Modification Of In Svc Equip*	73.627	56.112	29.349	-	29.349	-	-	-	-	-	-
• M80400: *Robotic Combat Support System (RCSS)*	5.300	-	-	-	-	-	-	-	-	-	-
• R64003: *HMDS - DEEP BURIED DETECTION*	29.382	71.882	15.300	-	15.300	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The Husky Mounted Detection System (HMDS) program is pursuing an acquisition approach that delivers capability increments - Increment A, Configuration 1 (A1) to the Warfighter by leveraging the Quick Reaction Capability (QRC) Ground Penetrating Radar (GPR) currently deployed in support of Operation Enduring Freedom (OEF) and Operation Inherent Resolve (OIR). In FY 2020, the program will complete execution of an Engineering Change Proposals (ECP) to add a wire detection capability to address evolving threat, and Infrared illumination to enable nighttime operation, improve operational availability of the HMDS during inclement weather and address obsolescence and Cyber Security deficiencies.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
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The Route Clearance & Interrogation System (RCIS) program executes an Engineering Manufacturing and Development (EMD) phase for Type I systems with an OEM contract award for Delta High Mobility Engineering Excavator (HMEE) support and a contract award in 4th quarter of FY 2018 to one EMD contractor for the Semi-Autonomous Control (SAC) Kit . The SAC Kit was awarded based on a source selection from full and open competition. The SAC EMD contract awardee will execute Preliminary Design Review (PDR), design, integration, and build phase of seven Semi-Autonomous Capability (SAC) kits, integrated onto six vehicles, with one kit available for engineering and System Integration Lab (SIL) evaluations. These assets enable the Government to execute a full Pre-Production Qualification Test (PPQT) and to evaluate against Capability Production Document (CPD) and performance specification requirements. Production and Technical Data Package (TDP) procurement options on the EMD contract take advantage of competition to assist in cost reduction. The RCIS Type I program Lifecycle Cost Estimate (LCCE), and associated budget request, was updated based on costs associated with modifying the base HMEE platform to accept the SAC kit, changes in the acquisition strategy and alignment of development and test activities in support of a production decision. To support EMD, ALUGS is funding Reset/Recap of four Buffalo Mine Protected Clearance Vehicle (MPCV) test assets at Letterkenny Army Depot. These will be provided to the SAC contractor for Operator Control Unit (OCU) integration.

The Standoff Robotic Explosive Hazard Detection System (SREHD) (formerly known as AMDS) is currently in the Low Rate Initial Production (LRIP) phase to provide standoff detection, marking, and neutralization of explosive hazards (e.g., landmines, improvised explosive devices (IED), booby-traps (explosive), and unexploded ordnance (UXO)) in complex and urban terrain, including confined areas and subterranean environments (e.g., buildings, bunkers, tunnels, etc.). Transition to Low Rate Initial Production (LRIP) occurred 30 April 2018 under PAA E50510 / DEMO KIT, BLASTING: Munition Array Charge, XM335, for the neutralization capability, as well under OPA R68260 / AREA MINE DETECTION SYSTEM (AMDS) for the detection and marking capabilities. Due to the realignment of funds beginning FY 2020 through FY 2024 to higher Army priorities, the proponent withdrew support to the Standoff Robotic Explosive Hazard Detection System (SREHD) after Low Rate Initial Production (LRIP) award. Subsequently, the Milestone Decision Authority (MDA) directed that FY 2019 funding will not be executed for this program. Due to timing, funding is still reflected in FY 2019. Research, Development, Test and Evaluation (RDTE) tasks will conclude in FY 2019 under FY 2018 PE 0654808A, Project 415, Landmine Warfare/Barrier - Eng Dev, once corrective action plans and trainer re-development are completed. The program will conclude in June 2020 under FY 2018 OPA R68260 / AREA MINE DETECTION SYSTEM (AMDS) and PAA E50510 / DEMO KIT, BLASTING: Munition Array Charge, XM335 for system qualification and production and receipt of LRIP quantities for an orderly program closeout.

Robotic Explosive Hazard Detection System (REHDS) is a new start in FY 2021 and begins in the Engineering Manufacturing Development (EMD) phase. REHDS will develop the capability to detect and mark explosive hazards from a robotic platform to deliver standoff capability to the warfighter. REHDS will leverage developed SREHDS capability and incorporate the following two changes: Increased Rate of Advanced Downtrack (RoAD) and Integration to Man Transportable Robotic System (MTRS) II platform.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HMDS System Engineering & Program Management	MIPR	PM Terrestrial Sensors : Fort Belvoir. VA	3.590	1.544	Mar 2020	-		-		-		-	0.000	5.134	-
Program Management - RCIS Type I	MIPR	PM FP : Warren, MI	4.982	0.582	Oct 2019	-		-		-		-	Continuing	Continuing	-
SREHD (Formerly AMDS) Program Management	Allot	JPEO A&A, PM CCS : Picatinny Arsenal, NJ	3.868	-		-		-		-		-	0.000	3.868	-
SREHD (Formerly AMDS) Program Closeout	Allot	JPEO A&A, PM CCS : Picatinny Arsenal, NJ	0.811	-		-		-		-		-	0.000	0.811	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	0.813		-		-		-		-	0.000	0.813	-
		Subtotal	13.251	2.939		-		-		-		-	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HMDS A1 Dev of Engineering Change Proposal w/ Wire Detect and InfraRed	SS/FFP	Chemring Sensors & Electronic Systems (CSES) : Dulles, VA	23.660	3.512	Nov 2019	-		-		-		-	0.000	27.172	-
HMDS Auto-height improvements	C/CPFF	TBD : TBD	-	0.652	Nov 2019	-		-		-		-	0.000	0.652	-
HMDS Systtems Training Product Development	MIPR	CECOM : Various	0.892	0.865	Nov 2019	-		-		-		-	0.000	1.757	-
RCIS Type I	SS/FFP	J C Bamford : Pooler, GA	11.043	0.542	Oct 2019	-		-		-		-	0.000	11.585	Continuing
RCIS Type I test assets	MIPR	Letterkenny Army Depot : Letterkenny, PA	2.252	-		-		-		-		-	0.000	2.252	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army		Date: May 2021
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
RCIS Type I SAC	C/CPIF	QinetiQ : Waltham, MA	3.700	3.834	Oct 2019	-		-		-		-	Continuing	Continuing	-
Multi-Function Video Display	MIPR	NVESD : Fort Belvoir, VA	4.472	-		-		-		-		-	3.047	7.519	3.047
Buffalo MPCV Interrogation Arm Improvements	C/CPFF	KRC : Houghton, MI	0.425	-		-		-		-		-	0.000	0.425	-
SREHD (Formerly AMDS) EMD and Trainer Re-development	C/CPIF	Carnegie Robotics LLC : Pittsburgh, PA	30.889	-		-		-		-		-	0.000	30.889	-
SREHD (Formerly AMDS) RAMS Type B Integration with Trainer	MIPR	ARL : Adelphi, MD	0.300	-		-		-		-		-	0.000	0.300	-
		Subtotal	77.633	9.405		-		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HMDS - Program and Logistics Support	MIPR	Various : Various	-	0.946	Nov 2019	-		-		-		-	0.000	0.946	-
RCIS Type I	MIPR	TARDEC, TACOM : Warren, MI	8.356	0.332	Oct 2019	-		-		-		-	Continuing	Continuing	-
SREHD (Formerly AMDS)	MIPR	Various : Various	13.676	-		-		-		-		-	0.000	13.676	-
Robotic Explosive Hazard Detection System	MIPR	CCDC - Picatinny : Picatinny Arsenal, NJ	-	-		1.925	Mar 2021	-		-		-	0.000	1.925	-
		Subtotal	22.032	1.278		1.925		-		-		-	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HMDS ATEC Testing	MIPR	ATEC : Alexandria, VA	8.762	0.533	Nov 2019	-		-		-		-	0.000	9.295	-
HMDS Test Support	MIPR	CECOM : Various	0.892	0.886	Nov 2019	-		-		-		-	0.000	1.778	-
RCIS Type I	MIPR	ATEC : Aberdeen, MD	2.232	0.432	Oct 2019	-		-		-		-	0.000	2.664	-
SREHD (Formerly AMDS)	MIPR	OTC : Ft. Hood, TX	4.341	-		-		-		-		-	0.000	4.341	-
SREHD (Formerly AMDS)	MIPR	ARL : Adelphi, MD	0.100	-		-		-		-		-	0.000	0.100	-
		Subtotal	16.327	1.851		-		-		-		-	0.000	18.178	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	129.243	15.473		1.925		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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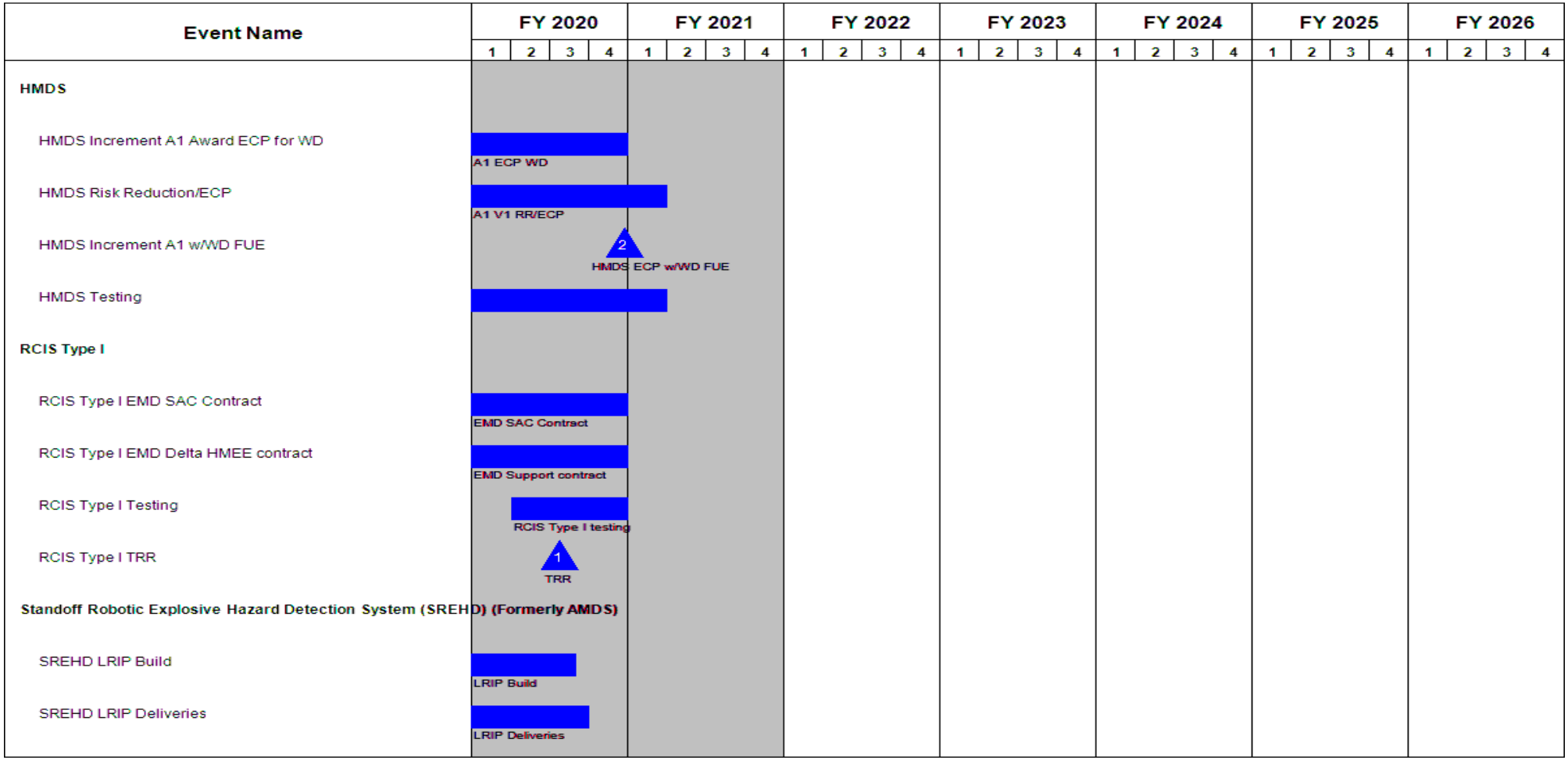

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
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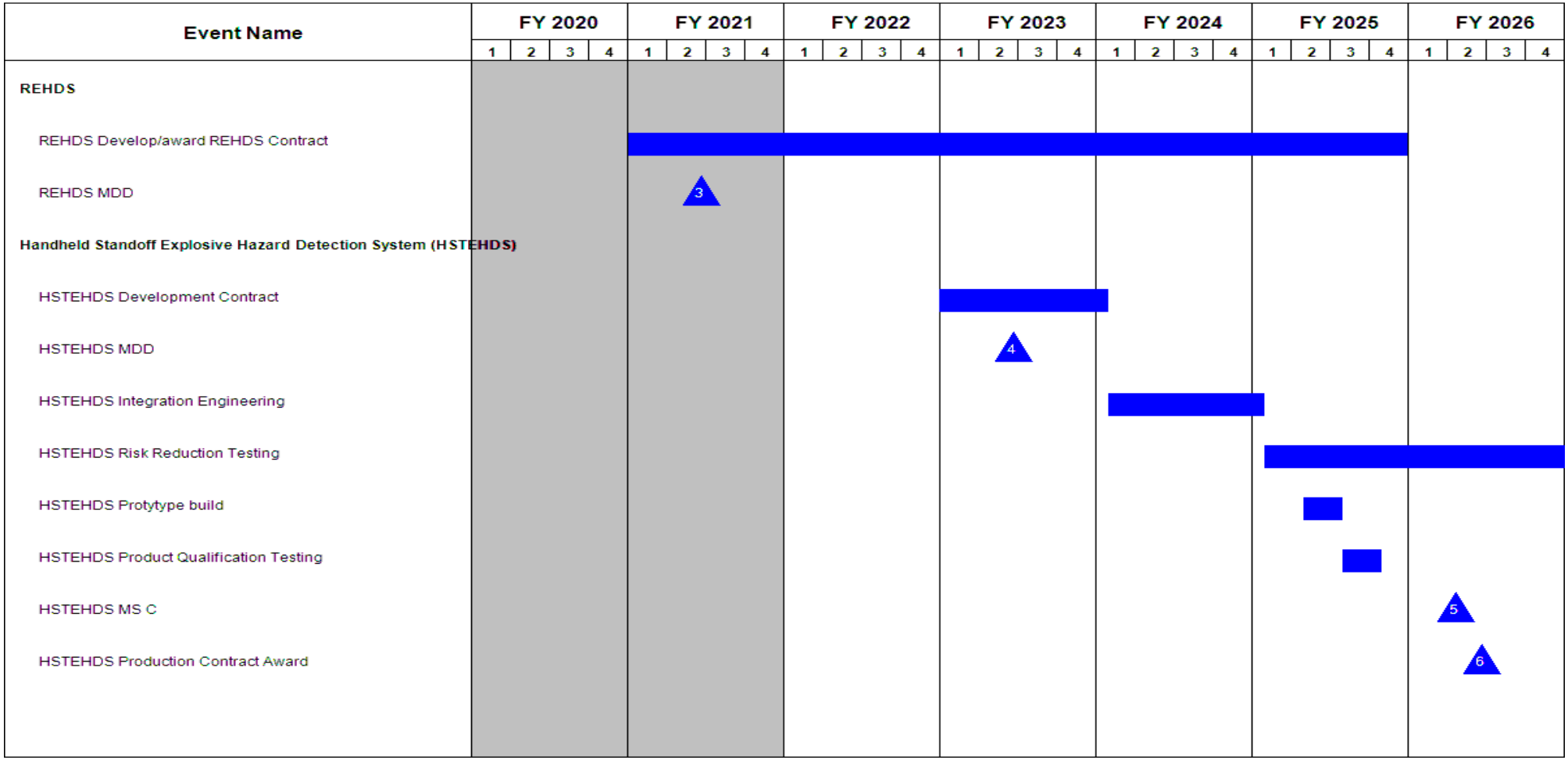

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
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Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
HMDS	1	2016	1	2023
HMDS Increment A1 - MS C Review	4	2017	4	2017
HMDS Increment A1-TC/MR	3	2018	3	2018
HMDS Increment A1-FUE	3	2018	3	2018
HMDS Increment A1-IOC	3	2019	3	2019
HMDS Increment A1 Award ECP for WD	3	2018	4	2020
HMDS Risk Reduction/ECP	2	2017	1	2021
HMDS Increment A1 w/WD FUE	4	2020	4	2020
HMDS Testing	2	2018	1	2021
RCIS Type I	1	2015	4	2022
RCIS Type I MS B	4	2018	4	2018
RCIS Type I EMD SAC Contract	4	2018	4	2020
RCIS Type I EMD Delta HMEE contract	2	2019	4	2020
RCIS Type I Testing	2	2020	4	2020
RCIS Type I CDR	3	2019	3	2019
RCIS Type I TRR	3	2020	3	2020
Standoff Robotic Explosive Hazard Detection System (SREHD) (Formerly AMDS)	1	2018	4	2022
SREHD Regression Testing	1	2018	2	2018
SREHD Milestone C	3	2018	3	2018
SREHD Trainer Re-development Contract Modification	3	2018	3	2018
SREHD Low Rate Initial Production (LRIP) Award	3	2018	3	2018
SREHD Trainer Re-development	3	2018	3	2019

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
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	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
SREHD Corrective Action Period (CAP)	4	2018	2	2019
SREHD FAT Build	2	2019	3	2019
SREHD Product Verification Test (PVT)	3	2019	4	2019
SREHD First Article Test (FAT)	4	2019	4	2019
SREHD LRIP Build	4	2019	3	2020
SREHD LRIP Deliveries	4	2019	3	2020
REHDS	1	2021	4	2025
REHDS Develop/award REHDS Contract	1	2021	4	2025
REHDS MDD	2	2021	2	2021
Handheld Standoff Explosive Hazard Detection System (HSTEHDS)	1	2023	4	2027
HSTEHDS Development Contract	1	2023	1	2024
HSTEHDS MDD	2	2023	2	2023
HSTEHDS Integration Engineering	1	2024	1	2025
HSTEHDS Risk Reduction Testing	1	2025	4	2027
HSTEHDS Protytype build	2	2025	3	2025
HSTEHDS Product Qualification Testing	3	2025	4	2025
HSTEHDS MS C	2	2026	2	2026
HSTEHDS Production Contract Award	2	2026	2	2026

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
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COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
CS2: *Render Safe Sets Kits and Outfits (RS-SKO)*	-	-	-	0.916	-	0.916	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project CS2: Funding in this program supports one of the Army's Cross Functional Teams (CFT) initiatives: Explosive Ordnance Disposal Render Safe Sets Kits and Outfits (EOD RS-SKO).

Explosive Ordnance Disposal Render Safe (EOD RS) provides for the Engineering and Manufacturing Development (EMD) and demonstration of capabilities needed for Explosive Ordnance Disposal (EOD) teams to Render Safe (RS) US and foreign ordnance and improvised explosive devices, enabling ground force commanders to retain freedom of maneuver and secure lines of communications. EOD RS-SKO equips EOD teams with low light visual augmentation system, electronic countermeasures, buried IED detection, dismounted X-ray imager, X-ray generator, trace explosive, Chemical, Biological, Radiological, and Nuclear (CBRN), and drug detection, unmanned aerial system, power management, gamma and neutron search and detection, and render safe initiation. This project will continue to support cross-service initiatives to increase commonality.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Explosive Ordnance Disposal (EOD) Render Safe (RS)	-	-	0.916
FY 2022 Plans: FY 2022 funding will support the build of the final ECM design prototypes and the testing of the final prototypes against requirements.			
FY 2021 to FY 2022 Increase/Decrease Statement: Program is transitioning from 016:Close Combat Capabilities ENG DEV in FY 2022.			
Accomplishments/Planned Programs Subtotals	-	-	0.916

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• 016: *Close Combat Capabilities ENG DEV*	18.408	7.314	11.174	-	11.174	-	-	-	-	-	-
• R63701: *Render Safe Sets Kits Outfits*	102.684	145.313	84.000	-	84.000	-	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** CS2 / *Render Safe Sets Kits and Outfits (RS-SKO)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

The Explosive Ordnance Disposal (EOD) Render Safe (RS) program utilizes existing government contract vehicles to acquire prototype systems for testing and evaluation of the systems for down selection and inclusion in the capabilities package during Engineering and Manufacturing Development. The program will continue to use the existing government contract vehicles for the production and deployment phase as well as to continue the development of capabilities during the 5 phase technical refresh.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EOD RS - Engineering Support	MIPR	DEVCOM C5ISR Center : Aberdeen Proving Ground (APG), MD	-	-		-		0.690	Oct 2021	-		0.690	Continuing	Continuing	-
EOD-RS - Engineering Support	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		-		0.076	Oct 2021	-		0.076	Continuing	Continuing	-
		Subtotal	-	-		-		0.766		-		0.766	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EOD- RS Test & Evaluation	MIPR	ATEC - Yuma Test Center : Yuma, AZ	-	-		-		0.150	Jul 2022	-		0.150	0.000	0.150	-
		Subtotal	-	-		-		0.150		-		0.150	0.000	0.150	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		0.916		-		0.916	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** CS2 / *Render Safe Sets Kits and Outfits (RS-SKO)*

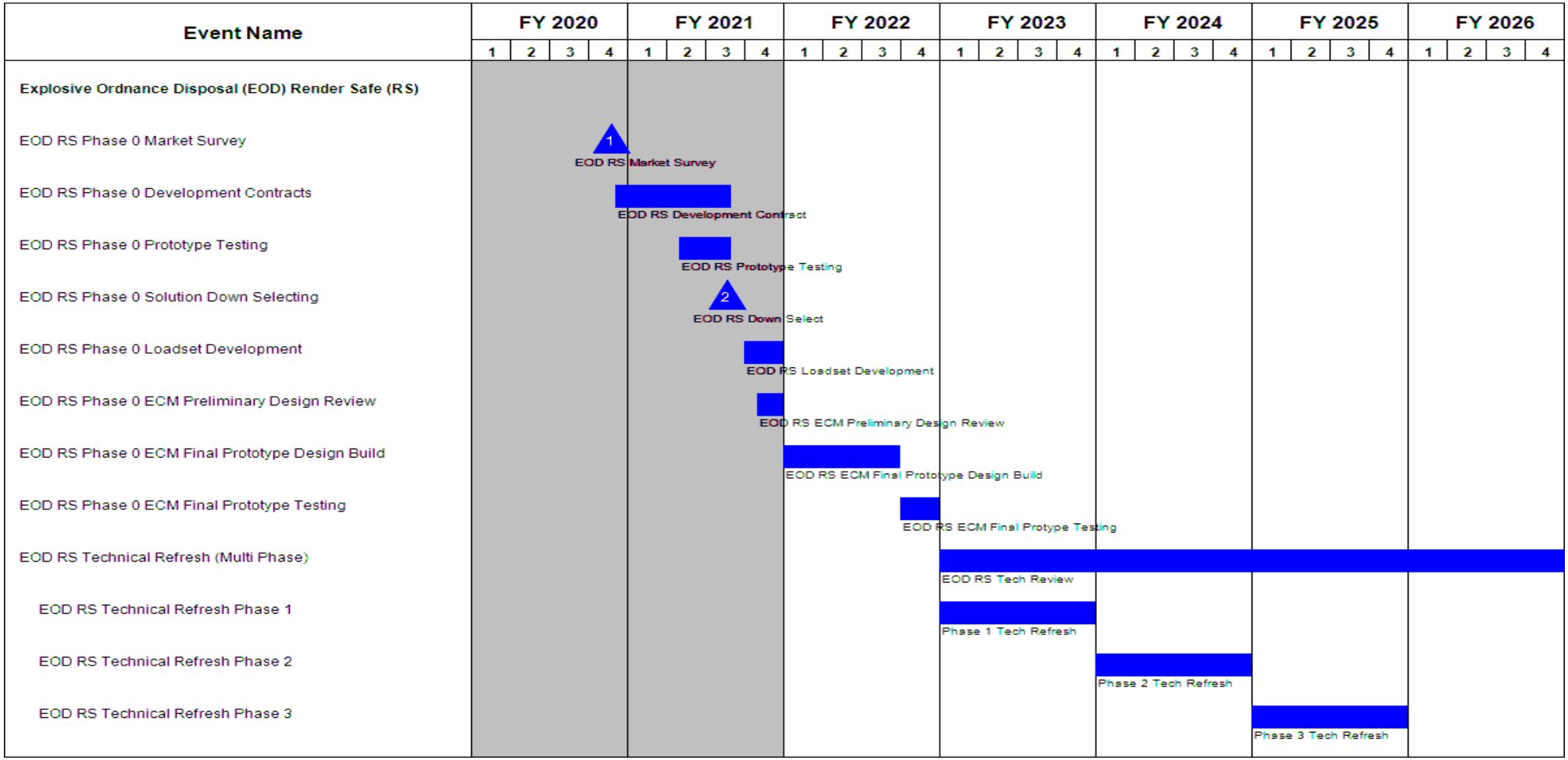

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** CS2 / *Render Safe Sets Kits and Outfits (RS-SKO)*

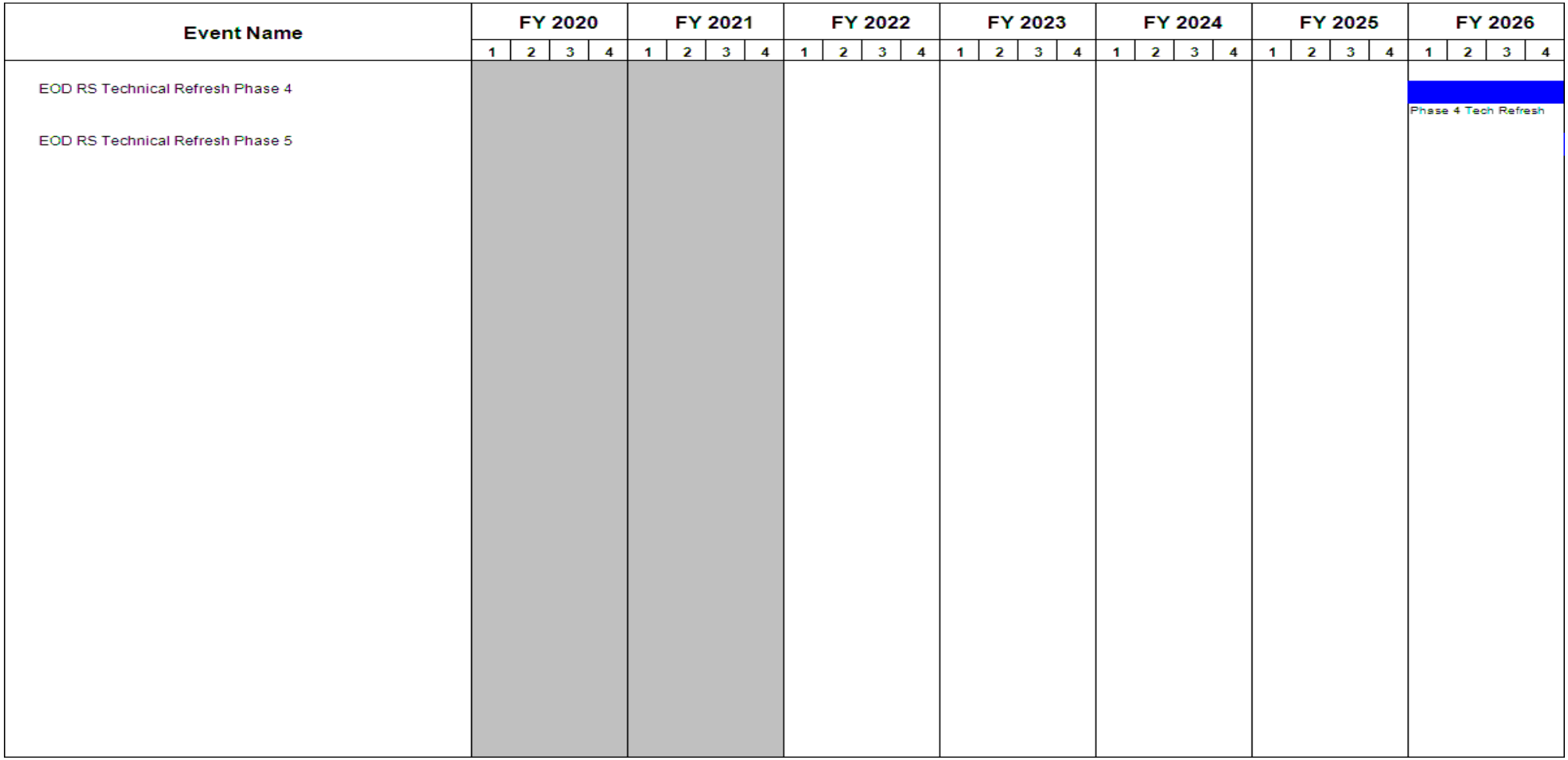

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** CS2 / *Render Safe Sets Kits and Outfits (RS-SKO)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Explosive Ordnance Disposal (EOD) Render Safe (RS)	1	2020	4	2025
EOD RS Phase 0 Market Survey	4	2020	4	2020
EOD RS Phase 0 Development Contracts	4	2020	3	2021
EOD RS Phase 0 Prototype Testing	2	2021	3	2021
EOD RS Phase 0 Solution Down Selecting	3	2021	3	2021
EOD RS Phase 0 Loadset Development	4	2021	4	2021
EOD RS Phase 0 ECM Preliminary Design Review	4	2021	4	2021
EOD RS Phase 0 ECM Final Prototype Design Build	1	2022	3	2022
EOD RS Phase 0 ECM Final Prototype Testing	4	2022	4	2022
EOD RS Technical Refresh (Multi Phase)	1	2023	4	2027
EOD RS Technical Refresh Phase 1	1	2023	4	2023
EOD RS Technical Refresh Phase 2	1	2024	4	2024
EOD RS Technical Refresh Phase 3	1	2025	4	2025
EOD RS Technical Refresh Phase 4	1	2026	4	2026
EOD RS Technical Refresh Phase 5	1	2027	4	2027

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) CS3 / *Next Generation Advanced Bomb Suit (NGABS)*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
CS3: *Next Generation Advanced Bomb Suit (NGABS)*	-	-	-	2.047	-	2.047	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funding in this project supports the Soldier Lethality Cross Functional Team (CFT).

The NGABS program directly contributes to Soldier lethality and ground force commander freedom of maneuver by providing next generation sensor and optics in the cutting-edge Heads-Up-Display (HUD) while integrating the Government's latest investments in protective material for the modular, scalable NGABS bomb suit development. NGABS will increase the Warfighter survivability and mobility by optimizing Soldier protection for EOD personnel, while effectively managing all life cycle aspects of Personal Protective Equipment (PPE). Warfighter lethality is increased through bomb suit weight reduction utilizing extensive investments in protective material research and development. The result is material solutions that are lighter and are pieced together in a manner which increases Soldier mobility and longevity. EOD Soldier situational awareness and exposure to ballistic threats is enhanced through the NGABS HUD which allows the Soldier increased visibility under various obscurants and low/no-light situations. This program is not a new start. Funds were transferred from APE 0604808016 to clearly define the functions that are being completed with the NGABS funding line.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Next Generation Advanced Bomb Suit (NGABS)	-	-	2.047
Description: The objective of this effort is to increase the Warfighter lethality, modularity, and mobility, by optimizing Soldier protection and situational awareness for EOD personnel. The mission of this program is to enhance the tactical utility and applicability of this bomb suit concept by incorporating modularity/scalability and sensor technologies that are non-existent in legacy designs. This new, tailorable, full body protective system will provide a significantly increased capability at a reduced weight.			
FY 2022 Plans: During FY22, the NGABS program will complete its final milestones. This includes the delivery of the Interface Control Documents, the Level of Repair Analysis, and the final Technical Data Package, which provides specifications for all aspects of the system. After completion of these final milestones, the program utilizes the final documentation to complete the NGABS production milestone review, its subsequent approval, and begin to transition to production with contract award.			
FY 2021 to FY 2022 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** CS3 / *Next Generation Advanced Bomb Suit (NGABS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
This program is not a new start. Funds were transferred from APE 0604808016 to clearly define the functions that are being completed with the NGABS funding line.			
Accomplishments/Planned Programs Subtotals	-	-	2.047

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Next Generation Advanced Bomb Suit (NGABS) Program utilizes a competitive, developmental, innovative and efficient Other Transaction Authority (OTA) in EMD through the Fort Belvoir Sensor Communication and Electronic Consortium (SCEC) which will result in a production ready prototype leading to a Production and Deployment (PD) phase for full capability while ensuring best value to the Army. Milestone (MS) B / Material Development Decision (MDD) occurred in FY 2018 and MS C is scheduled for FY 2022.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) CS3 / *Next Generation Advanced Bomb Suit (NGABS)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NGABS	Allot	PdM SPE : Fort Belvoir	-	-		-		0.338		-		0.338	0.000	0.338	Continuing
		Subtotal	-	-		-		0.338		-		0.338	0.000	0.338	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NGABS - Production Prototype Development	C/FFP	TBD : Manufacturing Techniques Inc. (MTEQ), Lorton, VA	-	-		-		1.009		-		1.009	0.000	1.009	Continuing
		Subtotal	-	-		-		1.009		-		1.009	0.000	1.009	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NGABS Support Costs	MIPR	TBD : Various	-	-		-		0.542		-		0.542	0.000	0.542	Continuing
		Subtotal	-	-		-		0.542		-		0.542	0.000	0.542	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NGABS Test & Evaluation	MIPR	TBD : Various	-	-		-		0.158		-		0.158	0.000	0.158	Continuing
		Subtotal	-	-		-		0.158		-		0.158	0.000	0.158	N/A

	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		2.047		-		2.047	0.000	2.047	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) CS3 / *Next Generation Advanced Bomb Suit (NGABS)*	

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** CS3 / *Next Generation Advanced Bomb Suit (NGABS)*

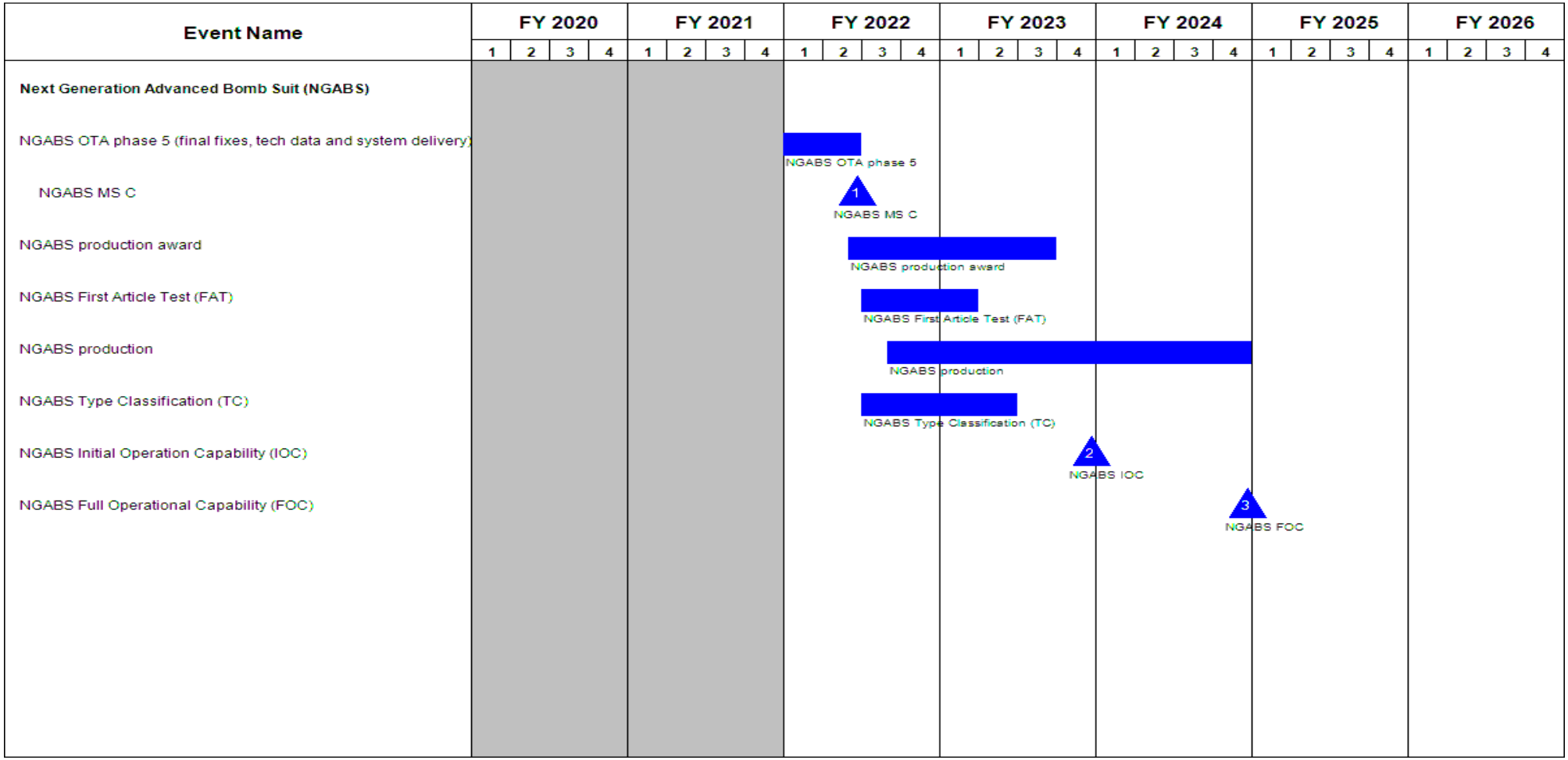

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** CS3 / *Next Generation Advanced Bomb Suit (NGABS)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Next Generation Advanced Bomb Suit (NGABS)	1	2022	4	2024
NGABS OTA phase 5 (final fixes, tech data and system delivery)	1	2022	2	2022
NGABS MS C	2	2022	2	2022
NGABS production award	2	2022	3	2023
NGABS First Article Test (FAT)	3	2022	1	2023
NGABS production	3	2022	4	2024
NGABS Type Classification (TC)	3	2022	2	2023
NGABS Initial Operation Capability (IOC)	4	2023	4	2023
NGABS Full Operational Capability (FOC)	4	2024	4	2024