Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army											Date: February 2020	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*							
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
Total Program Element	-	70.096	107.826	49.694	-	49.694	52.808	34.690	16.285	15.607	0.000	347.006
194: *Engine Driven Gen Ed*	-	1.743	8.395	10.655	-	10.655	12.852	13.150	6.804	7.115	0.000	60.714
EC9: *Contingency Basing Infrastructure*	-	1.509	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.509
EJ9: *Maneuver Support Vessel (MSV)*	-	32.950	27.046	11.484	-	11.484	2.728	2.416	0.000	0.000	0.000	76.624
FG4: *Ultra-Lightweight Camouflage Net System (ULCANS)*	-	3.729	11.400	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	15.129
H01: *Combat Engineer Eq Ed*	-	3.270	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.270
H02: *Tactical Bridging - Engineering Development*	-	7.050	44.452	12.398	-	12.398	24.154	8.333	0.000	0.000	0.000	96.387
L39: *Field Sustainment Support Ed*	-	2.674	1.675	1.718	-	1.718	1.771	1.805	1.798	1.798	0.000	13.239
L41: *Water And Petroleum Distribution - Ed*	-	8.366	7.540	10.988	-	10.988	8.492	7.492	6.494	5.495	0.000	54.867
L43: *ENGINEER SUPPORT EQUIPMENT - ED*	-	0.341	1.242	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.583
L46: *Maintenance Support Equipment*	-	1.365	5.000	1.349	-	1.349	0.839	0.000	0.000	0.000	0.000	8.553
L47: *Improved Environmental Control Units Ed*	-	2.262	1.076	1.102	-	1.102	1.972	1.494	1.189	1.199	0.000	10.294
VR7: *Combat Service Support Systems*	-	4.837	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.837

A. Mission Description and Budget Item Justification

This Program Element (PE) provides system development and demonstration for various projects. This PE includes the development of water craft, military tactical bridging, material handling equipment, construction equipment, engineer support equipment, soldier support equipment (to include shelter systems, environmental

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army	Date: February 2020
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604804A *I Logistics and Engineer Equipment - Eng Dev*

control, field service equipment, camouflage systems and aerial delivery equipment), water purification equipment, petroleum distribution equipment, and mobile electric power.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	76.388	103.226	51.605	-	51.605
Current President's Budget	70.096	107.826	49.694	-	49.694
Total Adjustments	-6.292	4.600	-1.911	-	-1.911
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-7.400			
• Congressional Rescissions	-	-			
• Congressional Adds	-	12.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-6.292	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	-1.911	-	-1.911

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2019	FY 2020
Project: FG4: *Ultra-Lightweight Camouflage Net System (ULCANS)*		
Congressional Add: *Mobile Camouflage System (MCS)*	-	6.901
Congressional Add Subtotals for Project: FG4	-	6.901
Project: L46: *Maintenance Support Equipment*		
Congressional Add: *Next Generation High Mobility Multipurpose Wheeled Vehicle (HMMWV) Shop Equipment Contact Maintenance (SECM)*	0.195	5.000
Congressional Add Subtotals for Project: L46	0.195	5.000
Congressional Add Totals for all Projects	0.195	11.901

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) 194 / *Engine Driven Gen Ed*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
194: *Engine Driven Gen Ed*	-	1.743	8.395	10.655	-	10.655	12.852	13.150	6.804	7.115	0.000	60.714
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This line supports the Army Network Modernization Strategy Line of Effort #4, Command Post. This line develops the capabilities to improve power generation and distribution within the Army Command Posts which in turn reduces Command Post sustainment requirements.

This project supports the Tactical Electric Power (TEP) programs (2kW-800kW Generators and Associated Equip) which is established to develop a modernized, standard family of Mobile Electric Power (MEP) systems to include MEP Generating Sources (MEPGS), and MEP Distribution Systems (MEPDS), MEP Storage Systems (MEPSS) and MEP Management Systems (MEPMS) for all Services throughout the Department of Defense IAW DoDI 4120.11. Building on the device/ component evaluations conducted in PE 0603804A project G11, this project supports the system development and demonstration of a series of innovative mobile electric power systems that are essential to the development and eventual fielding of modernized MEPGS, MEPMS, MEPSS and MEPDS. This project also supports Army modernization priorities, specifically Combat Support/Combat Service Support (CS/CSS) demands in Network / Command, Control, Communications & Intelligence (C3I), Soldier Lethality, Air/ Missile Defense and Precision Fires and reduces sustainment requirements.

PDISE provides reliable, modular design power distribution equipment that is critical to deploying power networks. PDISE will add power distribution > 60kW. The equipment developed will provide an interface for future Onboard Vehicle Power system and Hybrid power systems.

FY 2021 funds will support the Prime Power Distribution System (PPDS) testing and development and STEP Engineering, Manufacturing and Development (EMD).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Power Distribution Illumination Systems Electrical (PDISE) expansion	1.743	3.754	1.866	-	1.866
Description: Prepare PDISE - Prime effort by awarding the Prime Power Distribution System (PPDS) contract, developing Prime Power Connection Kit first article units and start developmental testing. Provides safe power distribution from the point of generation to the point of need - Network/C3I, Air & Missile Defense, Long Range Precision Fires, Command Post and Combat Support/Combat Service Support systems. PDISE components are man-portable, safe for all weather operation and allows the warfighter to get electricity where its needed, when its needed. It provides flexibility to field operations and can be quickly assembled/ dissembled for rapid relocation.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** 194 / *Engine Driven Gen Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
FY 2020 Plans: Continue PDISE expansion EMD Phase. ***FY 2021 Base Plans:*** Development of Prime Power Distribution System (PPDS) and Large Power Distribution Systems (LPDS) to continue and begin testing FY 2022. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** 194 RDT&E line will be shared across the Tactical Electric Power portfolio.					
Title: STEP ***Description:*** The Small Tactical Electrical Power (STEP) program will provide the Warfighter with expeditionary power solutions designed for combat operations in the most austere environments. STEP will replace existing legacy 2kW (MTG) sets and 3kW (TQG) sets. STEP models will be more mobile, lightweight, reliable, and logistically supportable than their predecessors. ***FY 2021 Base Plans:*** Small Tactical Electric Power (STEP) enters into MS B in 3Q FY 2021. STEP Contract expected to be awarded 3Q FY 2021. The development contract for lightweight TPS and Hybrid Augmentation System (HAS) LOEs will be awarded in 4Q FY 2021. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase is due to the initiation of EMD for STEP program.	-	-	8.789	-	8.789
Title: Small Power Sources ***Description:*** Supports Tactical Electric Power in the 2kW-3kW range. Focuses on modernizing small power with hybrid and battery storage capabilities. ***FY 2020 Plans:*** Testing will occur on the lightweight TPS systems received under FY 2020 industry incentivizing effort to determine the entry point into the acquisition lifecycle for this line of effort (LOE). Development of 3kW auto start kit and testing of 3kW hybrid system. ***FY 2020 to FY 2021 Increase/Decrease Statement:***	-	4.259	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** 194 / *Engine Driven Gen Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
No funds requested for FY 2021.					
Title: FY 2020 SBIR/STTR Transfer	-	0.382	-	-	-
Description: Funding transferred in accordance with Title 15 USC ?638 ***FY 2020 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638					
Accomplishments/Planned Programs Subtotals	1.743	8.395	10.655	-	10.655

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• G11: *Adv Elec Energy Con Ad*	6.224	3.338	0.000	-	0.000	-	-	-	-	0.000	9.562
• MA9800: *Generators And Associated Equip*	136.906	115.912	53.433	0.106	53.539	61.474	61.630	65.220	54.980	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Small Tactical Electric Power (STEP) program is a modernization program that will provide a family of systems of improved mobile Tactical Electric Power (TEP) sources and will replace the legacy 2 kilowatt (kW) Military Tactical Generator (MTG) and the 3kW Tactical Quiet Generator (TQG). STEP models will be lightweight, modular, reliable, and more logistically supportable power sources than their predecessors for the Department of Defense's (DoD) 21st Century digitized forces. The acquisition for STEP will incorporate Joint service requirements to reduce cost, maximize interoperability and increase performance over existing generator systems. STEP will implement 3 separate lines of effort. Lightweight Tactical Power Source (TPS) will conduct an effort to incentivize the industry and foster competition for small power generator. The intent is to streamline the development phase and to determine the entry point into the acquisition lifecycle. Pending the result of the effort, two of the three systems (Lightweight Tactical Power Source (TPS) and Hybrid Augmentation System (HAS)) will start the development phase in FY 2021. This will include systems integration, prototyping, Soldier evaluations, limited testing and systems demonstration to deliver a design to meet all performance requirements and to provide the technical, logistics documentation to support STEP under the Army's two level maintenance concept. As these two Lines of Effort (LOE) end development phase in FY23, the 3kW hardened TPS effort will start development following a similar acquisition approach to the first two LOEs.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
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The Power Distribution Illumination Systems Electrical (PDISE) program will use a multi-phase acquisition strategy, continue to consolidate requirements and provide solutions to known power distribution capability gaps. The effort will include PDISE Medium, the current Army power distribution equipment (PDISE) and the microgrid feeder box; PDISE - Large, the multi-input Power Distribution Unit (PDU) being developed for use with large tactical electric power generators and PDISE Prime, the Prime Power Connection Kit (PPCK) and other products to provide the full range of power distribution equipment to support present and future power system requirements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) 194 / *Engine Driven Gen Ed*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PDISE Prime	Various	PM E2S2 : Ft. Belvoir	1.275	-		0.702		-		-		-	Continuing	Continuing	Continuing
Small Power Sources	Various	PM E2S2 Ft. Belvior : Ft. Belvior	1.132	-		0.452		1.250		-		1.250	0.000	2.834	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.382		-		-		-	0.000	0.382	-
		Subtotal	2.407	-		1.536		1.250		-		1.250	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PDISE Prime	C/CPFF	TBD : TBD	2.506	-		1.698		-		-		-	Continuing	Continuing	Continuing
AMMPS HYBRID	TBD	AMMPS HYBRID : FT. BELVOIR	-	1.743	May 2019	-		-		-		-	0.000	1.743	-
Small Power Sources	TBD	STEP : TBD	-	-		2.753		4.739		-		4.739	0.000	7.492	-
		Subtotal	2.506	1.743		4.451		4.739		-		4.739	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PDISE	Various	Various : Various	-	-		0.452		-		-		-	0.000	0.452	-
Small Power Sources	TBD	STEP : TBD	-	-		0.452		1.100		-		1.100	0.000	1.552	-
		Subtotal	-	-		0.904		1.100		-		1.100	0.000	2.004	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) 194 / *Engine Driven Gen Ed*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PDISE Prime	MIPR	Army Test & Evaluation Ctr (ATEC) : APG, MD	1.310	-		0.702		1.866	Jan 2021	-		1.866	0.000	3.878	-
Small Power Sources	TBD	STEP : TBD	-	-		0.802		1.700		-		1.700	0.000	2.502	-
		Subtotal	1.310	-		1.504		3.566		-		3.566	0.000	6.380	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	6.223	1.743		8.395		10.655		-		10.655	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** 194 / *Engine Driven Gen Ed*

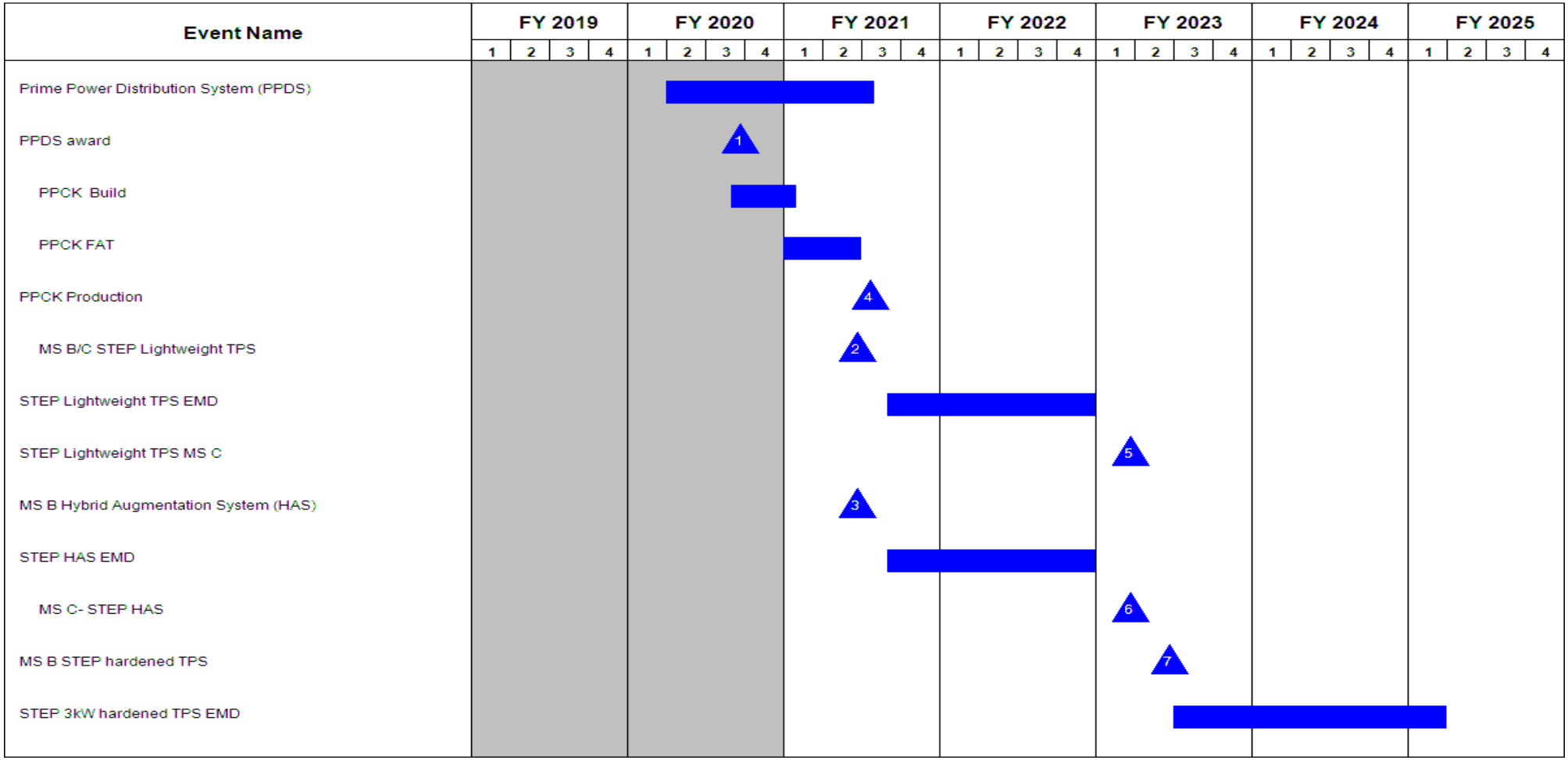

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** 194 / *Engine Driven Gen Ed*

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
STEP 3kW hardened TPS MS C																									8			

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** 194 / *Engine Driven Gen Ed*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Prime Power Distribution System (PPDS)	2	2020	3	2021
PPDS award	3	2020	3	2020
PPCK Build	3	2020	1	2021
PPCK FAT	1	2021	2	2021
PPCK Production	3	2021	3	2021
MS B/C STEP Lightweight TPS	2	2021	2	2021
STEP Lightweight TPS EMD	3	2021	4	2022
STEP Lightweight TPS MS C	1	2023	1	2023
MS B Hybrid Augmentation System (HAS)	2	2021	2	2021
STEP HAS EMD	3	2021	4	2022
MS C- STEP HAS	1	2023	1	2023
MS B STEP hardened TPS	2	2023	2	2023
STEP 3kW hardened TPS EMD	3	2023	1	2025
STEP 3kW hardened TPS MS C	1	2025	1	2025

Note

Medium Power Distribution System (MPDS) is composed of the M200,M100, M40, M60 and M46.

Army Senior Leadership made the decision to no longer invest in Large Tactical Power rather prioritizing Small Tactical Power to support Soldier Lethality critical programs.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) EC9 / *Contingency Basing Infrastructure*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
EC9: *Contingency Basing Infrastructure*	-	1.509	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.509
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Note: Project EC9 efforts are scheduled to be completed in FY 2019.

This project develops the tools and processes that will optimize recommendations for the materiel used to establish, operate, and maintain contingency bases. The project will increase the available knowledge at the base level and provide an analytical foundation for sound investment decision making. The continuous improvement modeling and simulation analysis tools will match the evolution of threats and technologies. Using a system of systems engineering approach, the Contingency Base Infrastructure (CBI) Product Directorate's focus ensures optimum integration of materiel across the base camp to facilitate the maximizing of Warfighter effectiveness. CBI's analytical results will allow leadership to make data driven, informed decisions on the acquisition and employment/deployment of equipment. This enables contingency bases to be established, operated and managed as a system (system of systems) and the equipment acquired for the base to be compatible and efficient while providing the maximum overall support to the Warfighter. This approach supports Program(s) of Record (PORs) to maximize improvements in Operational Energy and ensures efficiencies across all Areas of Responsibility (AOR).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Toolset Development ***Description:*** CBI employs Systems Engineers and System Architects to continue the maturation of tools by applying analytical rigor and a systems of systems methodology in toolset development. The toolset provides the backbone for the analysis support to the field allowing operational users to make informed decisions for the design of base camps. The Systems Database is a repository for Contingency Base (CB) information and is available as a single source of information to the CB community. Funding is provided for the following efforts in FY 2018 and FY 2019.	1.059	-	-	-	-
Title: Integrated Analysis and Design ***Description:*** CBI employs Systems Engineers, Operational Research System Analysts and collaborates with Sandia National Laboratories to provide the methodologies, modeling and analysis engines, and the analysis required to recommend and mature the optimized equipment sets that comprise a base camp. Optimized sets range from Platoon to Brigade sized camps in Armor, Infantry, Stryker, Medical, and Logistic camps that	0.100	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EC9 / *Contingency Basing Infrastructure*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
optimize the usage of fuel, water, waste and manpower. Funding is provided for the following efforts in FY 2018 and FY 2019.					
Title: Capabilities Implementation and Materiel Requirements ***Description:*** CBI employs System Integrators and Engineering Technicians to develop, update and refine system data set strategies of equipment using the developed optimized base camp designs. Funding is provided for the following efforts in FY 2018 and FY 2019.	0.300	-	-	-	-
Title: Program Management ***Description:*** Programmatic support and oversight of cost schedule, performance, risk and operational activities in managing the product office. Funding is provided for the following efforts in FY 2018 and FY 2019.	0.050	-	-	-	-
Accomplishments/Planned Programs Subtotals	1.509	-	-	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EC9 / *Contingency Basing Infrastructure*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	PM E2S2 / PEO CS&CSS : Fort Belvoir, VA / Warren, MI	2.931	0.050		-		-		-		-	0.000	2.981	-
		Subtotal	2.931	0.050		-		-		-		-	0.000	2.981	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Toolset Development	Various	Various : Various	3.031	1.059		-		-		-		-	0.000	4.090	-
Integrated Analysis and Design	Various	Various : Various	5.306	0.100		-		-		-		-	0.000	5.406	-
Capabilities Implementation and Materiel Requirements	Various	Various : Various	2.233	0.300		-		-		-		-	0.000	2.533	-
		Subtotal	10.570	1.459		-		-		-		-	0.000	12.029	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	13.501	1.509		0.000		-		-		-	0.000	15.010	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EC9 / *Contingency Basing Infrastructure*

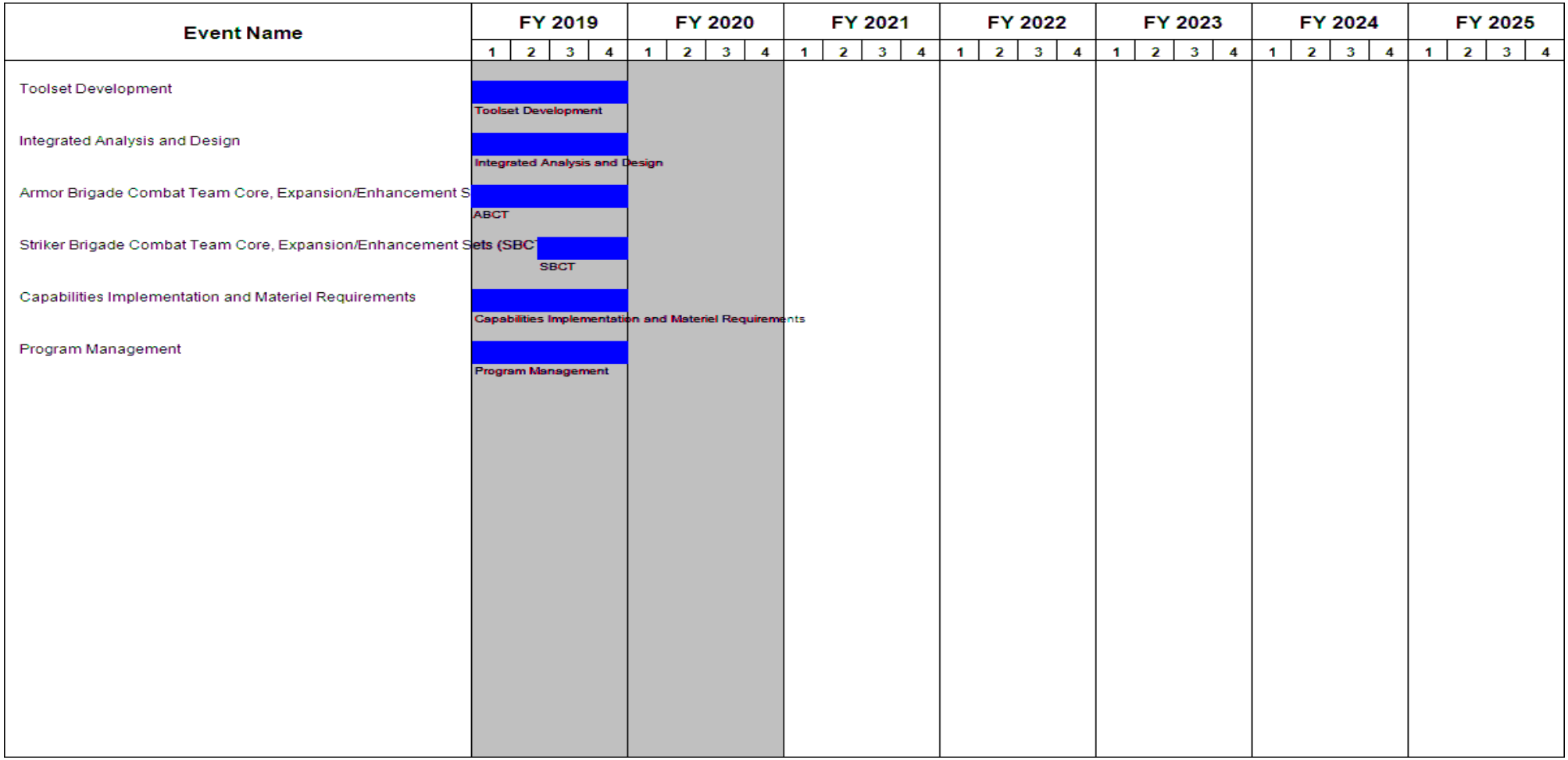

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EC9 / *Contingency Basing Infrastructure*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Toolset Development	1	2016	4	2019
Integrated Analysis and Design	1	2016	4	2019
Initial Data Transition to JCMS, Initial Operational Capability (IOC)	4	2018	4	2018
Armor Brigade Combat Team Core, Expansion/Enhancement Sets (ABCT)	2	2018	4	2019
Striker Brigade Combat Team Core, Expansion/Enhancement Sets (SBCT)	2	2019	4	2019
Capabilities Implementation and Materiel Requirements	1	2016	4	2019
Program Management	1	2016	4	2019
Infantry Brigade Combat Team, Core, Expansion/Enhancements Sets (IBCT)	2	2017	1	2018

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) EJ9 / *Maneuver Support Vessel (MSV)*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
EJ9: *Maneuver Support Vessel (MSV)*	-	32.950	27.046	11.484	-	11.484	2.728	2.416	0.000	0.000	0.000	76.624
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Army's new Maneuver Support Vessels (MSVs) support Dynamic Force Repositioning (DFR) and provides the Combatant and Multi-Domain Task Force Commander with organic waterborne lift capability that can deliver today's Army maneuver platforms and equipment, and supply bulk fuel and water across the full spectrum of operations with increased speed and lower draft; and mitigates anti-access/area denial (A2/AD) threat by providing access to shallow coastal waters, rivers, in narrow inland waterways in support of dispersed force elements in austere environments and where mature ports or road networks are unavailable. The MSVs are critical modernization efforts in support of the Army's Watercraft Transformation Strategy (AWTS) and Army Force Package 2.0.

The Maneuver Support Vessel (Light) - MSV(L) is the first modernization program which will displace the Army's aging Landing Craft Mechanized-8 (LCM-8) class of vessels. The LCM-8 does not have the speed, functional draft (shallow water capability), and maneuver capability to move today's Army Maneuver Platforms.

The MSV-L provides upgraded capabilities such as higher operational speed, reduced draft and increased payload to conduct maneuver support missions including delivery of the Army's maneuver platforms such as a combat configured Abrams, Stryker and Bradley Fighting Vehicles along with critical sustainment missions including delivery of food, water, fuel, and ammunition. The MSV(L) program is currently in the Engineering and Manufacturing Development (EMD). Specifically, FY 2021 funds the production of the single full scale MSV(L) prototype, contractor and government testing of the prototype and support for milestone documentation for Milestone C approval.

The Maneuver Support Vessel (Next) - MSV(N) is the second modernization program in the AWTS. In FY 2021, the Army is initiating feasibility studies to determine if the Army can replace both the aging Logistics Support Vessel (LSV) and the Landing Craft Utility (LCU) class of vessels with one common vessel class. Although the LSV and LCU vessels are the Army's Watercraft highest operational vessel classes, the Army must also evolve to meet the needs of the future Multi-Domain Task Force and Combatant Command missions. Specifically, FY 2021 funds the start of the MSV(N) market research, affordability and feasibility studies to inform future watercraft modernization requirements and an Analysis of Alternatives (AoA).

In general, all Army Watercraft funding supports initiatives to enhance the seaworthiness, safety, and survivability while increasing the lethality, tactical mobility, and operational capability of the Army Mariner to preserve the Combatant Commanders requirement of "freedom of seas" access in all areas of the world particularly the littorals, to support maneuver operations in all Areas of Responsibility.

In FY 2021, $0.178 million in Reimbursable Manpower for this line has been realigned from Reimbursable Civilian Funding to Direct Operations and Maintenance. Program support costs have been accurately updated to reflect the realignments.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Engineering and Manufacturing Development (EMD) Contract ***Description:*** The EMD phase of the contract includes system engineering and analysis to support execution of the Preliminary Design Review (PDR), Critical Design Review (CDR), Contract Systems Integration Laboratory (CSIL) fabrication, model basin testing, production of full-scale prototype vessel and required testing. In addition, deliverables include development of Integrated Product Support (IPS) analysis and products, as well as, development of Technical Data Package (TDP). ***FY 2020 Plans:*** Activities include completion of the full scale prototype vessel, testing and evaluation activities, and development of logistics products. ***FY 2021 Base Plans:*** Completion of the MSV(L) prototype vessel production and testing. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2021 finalizes the prototype costs for the EMD contract.	28.149	23.896	3.040	-	3.040
Title: Government Test and Evaluation Support ***Description:*** Government test support. ***FY 2020 Plans:*** Testing evaluation activities to include various subsystems and initial contractor prototype extended acceptance trials. ***FY 2021 Base Plans:*** Testing evaluation activities to include contractor prototype extended acceptance trials and follow on government testing. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Required testing activities for FY 2021 will be for various subsystems extended acceptance trials and follow on government testing.	0.535	0.643	0.950	-	0.950
Title: Government Furnished Equipment (GFE)	0.002	0.125	0.125	-	0.125

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Description: GFE for prototype vessel consists of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR). ***FY 2020 Plans:*** GFE is required to support the full size prototype vessel and base station for testing. ***FY 2021 Base Plans:*** GFE is required to support the full size prototype vessel and base station for testing.					
Title: Program Management / Systems Engineering ***Description:*** PM/Matrix Support includes PM and systems engineering oversight required to manage the program and provide contractor oversight. Salaries for support through the EMD phase of MSV(L) and start of MSV (Next) in FY 2021. ***FY 2020 Plans:*** Funds will cover matrix salaries for program management, logistics, and engineering support to include contract execution and contractor oversight. ***FY 2021 Base Plans:*** Funds will cover matrix salaries for program management, logistics, and engineering support to include contract execution and contractor oversight for the MSV(L) and MSV (Next) programs. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Salaries will be used for MSV(L) and future watercraft initiatives.	3.100	0.676	2.785	-	2.785
Title: Program Management Support Contract ***Description:*** Program Management and Contract Support for MSV(L). ***FY 2020 Plans:*** Program Management Support to support MSV(L) for Cyber Security, Contract Data Requirement List (CDRL) management, IMS support, C4ISR expertise, and Milestone C program documentation. ***FY 2021 Base Plans:***	1.164	0.478	1.036	-	1.036

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Program Management Support to end the EMD phase of MSV(L) and start of concept design for MSV (Next) in Cyber Security, Contract Data Requirement List (CDRL) management, IMS support, C4ISR expertise, and Milestone C program documentation. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase is due to the start of the MSV (Next) program.					
Title: MSV(N) Affordability and Feasibility Studies ***Description:*** Conduct Affordability and Feasibility Studies for future watercraft modernization. ***FY 2021 Base Plans:*** Support initiation of Feasibility Study for future watercraft modernization. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase is due to future watercraft modernization in FY 2021.	-	-	3.548	-	3.548
Title: FY 2020 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2020 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	1.228	-	-	-
Accomplishments/Planned Programs Subtotals	32.950	27.046	11.484	-	11.484

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• R03050: *Maneuver Support Vessel (Light) (MSV-L)*	-	14.185	76.576	-	76.576	72.938	102.524	148.006	128.106	0.000	542.335

Remarks

Significant Accomplishments:
- Critical Design Review (CDR) 1, 25 Feb - 1 Mar 2019 for Structure, Propulsion, Auxiliary piping.
- Critical Design Review (CDR) 2, 24 -26 April 2019 for Electrical C4ISR, outfitting.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost

- Knowledge Point 4 Scale Model Demo, 22 Jan 2019.
- Knowledge Point 5 CDR, 10 Sept 2019
- Virtual User Evaluation at FT. Eustis 11-14 Feb 2019.
-User Evaluation of Contractor System Integration Laboratory (CSIL) and ESOH working group 5-6 Nov 2019.

D. Acquisition Strategy

MSV(L): The program will achieve Milestone C in FY21, followed by Low Rate Initial Production (LRIP) and Full Rate Production (FRP). The single full scale prototype will undergo contractor and government testing, which will inform the updated Joint Capabilities Integration Development System (JCIDS) requirements documentation at MS C. Following successful prototype testing, JCIDS requirements documentation approval and MS C approval, the Milestone Decision Authority (MDA) will authorize the start of the Production and Deployment (P&D) phase.

MSV(N): The FY 2021 market research, affordability and feasibility studies will be utilized to inform future Analysis of Alternatives and Acquisition Strategy development.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) EJ9 / *Maneuver Support Vessel (MSV)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		1.228		-		-		-	0.000	1.228	-
		Subtotal	-	-		1.228		-		-		-	0.000	1.228	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering and Manufacturing Development (EMD)	C/FFP	Vigor Works, LLC : Clackamas, OR	22.588	28.149	Nov 2018	23.896	Nov 2019	3.040	Nov 2020	-		3.040	0.000	77.673	78.000
Government Furnished Equipment (GFE)	Reqn	Various : Various	2.293	0.002	Jan 2019	0.125	Jan 2020	0.125	Jan 2021	-		0.125	0.000	2.545	-
Trade Studies and Business Analysis MSV(N)	TBD	Various : Various	-	-		-		2.960	Nov 2020	-		2.960	Continuing	Continuing	-
		Subtotal	24.881	28.151		24.021		6.125		-		6.125	Continuing	Continuing	N/A

Remarks

MSV(L) Contract was awarded on 28 Sep 2017 to Vigor Works, LLC.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Salaries for Matrix Personnel Army Watercraft, TARDEC, ILSC PSID and ACC-Wrn.	MIPR	Detroit Arsenal : Warren, MI 48397-5000	12.995	3.100	Nov 2018	0.676	Nov 2019	3.373	Dec 2020	-		3.373	0.000	20.144	-
Salaries / Travel for Program Management Support Contracts	C/CPFF	Picatinny Arsenal, New Jersey 07806-5000 : Warren, MI 48397-5000	2.583	1.164	Apr 2019	0.478	Feb 2020	1.036	Dec 2020	-		1.036	0.000	5.261	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	15.578	4.264		1.154		4.409		-		4.409	0.000	25.405	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation - Government	MIPR	ATEC: APG : APG, MD	0.490	0.535	Nov 2018	0.643	Nov 2019	0.950	Nov 2020	-		0.950	0.000	2.618	-
		Subtotal	0.490	0.535		0.643		0.950		-		0.950	0.000	2.618	N/A

Remarks

As the MSV(L) EMD phase progresses, increased testing activities will occur for subsystems and the contractor prototype extended acceptance trials.

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	40.949	32.950		27.046		11.484		-		11.484	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

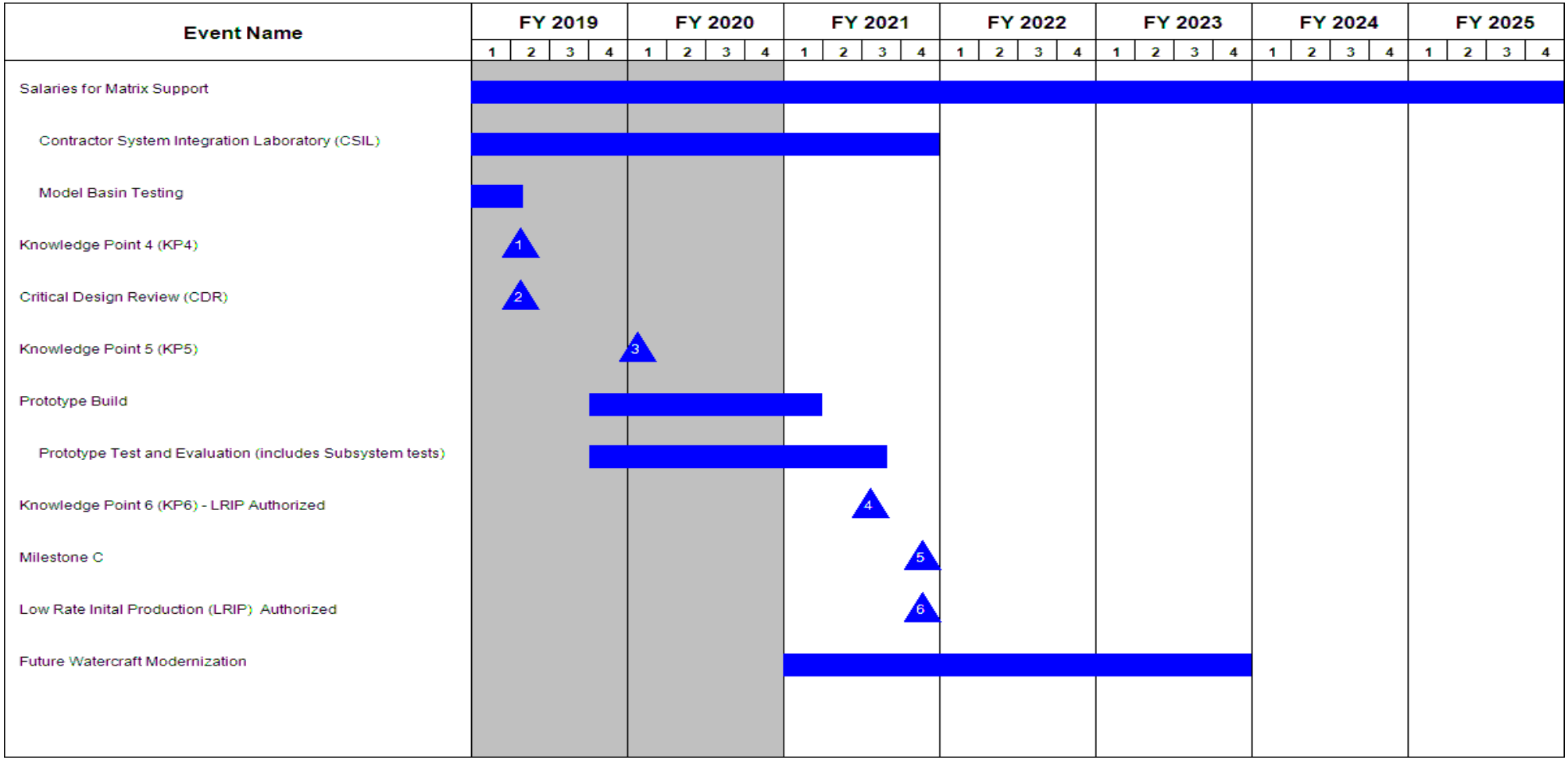

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Salaries for Matrix Support	4	2016	4	2025
Analysis of Alternatives (AoA) Final Report Complete	2	2015	2	2015
Capabilities Development Document (CDD) Approved	4	2015	4	2015
Configuration Steering Board (CSB) Held and Approved	1	2016	1	2016
Industry Day Held	1	2016	1	2016
Army Requirements Oversight Board (AROC) / CDD Update	4	2016	4	2016
CDD Update / Army Requirements Oversight Council (AROC)	4	2016	4	2016
RFP Posting	4	2016	4	2016
RFP Released	1	2017	1	2017
Milestone B	4	2017	4	2017
Contract Award - Knowledge Point 2	4	2017	4	2017
Knowledge Point 2 (KP2)	2	2018	2	2018
Preliminary Design Review (PDR)	3	2018	3	2018
Knowledge Point 3 (KP3)	4	2018	4	2018
Modeling and Simulation	4	2018	4	2018
Contractor System Integration Laboratory (CSIL)	4	2018	4	2021
Model Basin Testing	4	2018	1	2019
Knowledge Point 4 (KP4)	2	2019	2	2019
Critical Design Review (CDR)	2	2019	2	2019
Knowledge Point 5 (KP5)	1	2020	1	2020
Prototype Build	4	2019	1	2021
Prototype Test and Evaluation (includes Subsystem tests)	4	2019	3	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Knowledge Point 6 (KP6) - LRIP Authorized	3	2021	3	2021
Milestone C	4	2021	4	2021
Low Rate Inital Production (LRIP) Authorized	4	2021	4	2021
Future Watercraft Modernization	1	2021	4	2023

Note

After MS C approval in FY 2021, the MSV(L) program will transition into the P&D phase in FY 2022.
MSV(N) program begins with market research, affordability and feasibility studies.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) FG4 / *Ultra-Lightweight Camouflage Net System (ULCANS)*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
FG4: *Ultra-Lightweight Camouflage Net System (ULCANS)*	-	3.729	11.400	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	15.129
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

ULCANS provides increased survivability against multi-spectral visual, infrared and radar threats, thermal signature suppression and significant thermal/solar reduction capability. ULCANS is capable of use in all types of weather and climatic conditions except in heavy snow and winds. ULCANS variants are integrated systems that are very lightweight, easily deployable, versatile, user friendly and tailored to the equipment meeting the requirements of operations for combat systems, command and control equipment, logistic support sites, tactical facilities, and fixed facilities. RDT&E funding for ULCANS Increment I program supports formal development for necessary technology/signature enhancements of three ULCANS Increment I variants (Woodland, Arctic, Desert/Urban) to replace current legacy ULCANS variants (Woodland and Desert).

Mobile Camouflage System (MCS) provides Full Spectrum Signature Management for Vehicles from ground, aerial, and satellite. MCS enables combat vehicle protection and survivability against current peer and near-peer threats; defeats enemy targeting and surveillance systems through multi-spectral concealment (UV, VIS, NIR, SWIR, Thermal, Radar); enables multi-domain operations in A2/AD environment and provides operational units layered protection and concealment against long-range precision fires, drones, ground, aerial, and satellite threats.

Funding supports modernization of current camouflage net systems by investigating technology insertions that decrease Soldier and platform detection from threat sensors. Funding also supports developing initial prototypes to enable refinement of operational requirements and early user feedback to maintain overmatch signature reduction against future threat sensors.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Ultra-lightweight Camouflage Net System (ULCANS)	3.729	4.300	-	-	-
Description: ULCANS is durable, robust, snag resistant state of the art camouflage system that provides increased survivability against multi-spectral visual, infrared and radar threats, thermal signature suppression and significant thermal/solar reduction capability. ULCANS utilizes a snag-free design and is capable of use in all types of weather and climatic conditions except in heavy snow and winds. ULCANS variants are integrated systems that are very lightweight, easily deployable, versatile, user friendly and tailored to the equipment meeting the requirements of operations for combat systems, command and control equipment, logistic support sites, tactical facilities, and fixed facilities. RDT&E funding for ULCANS Increment I program supports formal					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** FG4 / *Ultra-Lightweight Camouflage Net System (ULCANS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
development for necessary technology/signature enhancements of three ULCANS Increment I variants (Woodland, Snow/Alpine, Desert/Urban) to replace current legacy ULCANS variants (Woodland and Desert). ***FY 2020 Plans:*** Complete logistics requirements for Snow/ Alpine ULCANS Increment I variants. Initiate development and DT/ OT, logistics requirements for Desert/Urban ULCANS Increment I variants. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding decremented to support Army modernization priorities					
Title: FY 2020 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2020 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.199	-	-	-
Accomplishments/Planned Programs Subtotals	3.729	4.499	-	-	-

	FY 2019	FY 2020
Congressional Add: Mobile Camouflage System (MCS) ***FY 2020 Plans:*** Mobile Camouflage System (MCS)	-	6.901
Congressional Adds Subtotals	-	6.901

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• VR7: *Combat Service Support Systems*	4.837	-	0.000	-	0.000	-	-	-	-	0.000	4.837
• VR8: *Combat Service Support Systems - Ad*	3.115	-	0.000	-	0.000	-	-	-	-	0.000	3.115

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** FG4 / *Ultra-Lightweight Camouflage Net System (ULCANS)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

The acquisition strategy is to accelerate product development and testing to transition into production.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) FG4 / *Ultra-Lightweight Camouflage Net System (ULCANS)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ULCANS	Various	PMFSS : Natick, MA	1.872	0.877		1.011		-		-		-	0.000	3.760	-
Mobile Camouflage System	TBD	PMFSS : Natick, MA	-	-		0.972		-		-		-	0.000	0.972	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.199		-		-		-	0.000	0.199	-
		Subtotal	1.872	0.877		2.182		-		-		-	0.000	4.931	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ULCANS Increment I Woodland Variant	C/FFP	PMFSS : Natick, MA	5.750	0.857		-		-		-		-	0.000	6.607	-
ULCANS Increment I Snow/Alpine Variant	C/FFP	PMFSS : Natick, MA	5.632	1.307		0.872		-		-		-	0.000	7.811	-
ULCANS Increment I Desert/Urban Variant	C/FFP	PMFSS : Natick, MA	-	-		1.812		-		-		-	0.000	1.812	-
Mobile Camouflage System (MCS)	TBD	PM FSS : Natick, MA	-	-		3.972		-		-		-	0.000	3.972	-
		Subtotal	11.382	2.164		6.656		-		-		-	0.000	20.202	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ULCANS Increment I Woodland Variant	Various	Various : Various	2.600	0.325		-		-		-		-	0.000	2.925	-
ULCANS Increment I Snow/Alpine Variant	Various	Various : Various	2.600	0.363		-		-		-		-	0.000	2.963	-
ULCANS Increment I Desert/Urban Variant	Various	Various : Various	-	-		0.591		-		-		-	0.000	0.591	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mobile Camouflage System (MCS)	TBD	PM FSS : Natick, MA	-	-		1.971		-		-		-	0.000	1.971	-
		Subtotal	5.200	0.688		2.562		-		-		-	0.000	8.450	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	18.454	3.729		11.400		-		-		-	0.000	33.583	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** FG4 / *Ultra-Lightweight Camouflage Net System (ULCANS)*

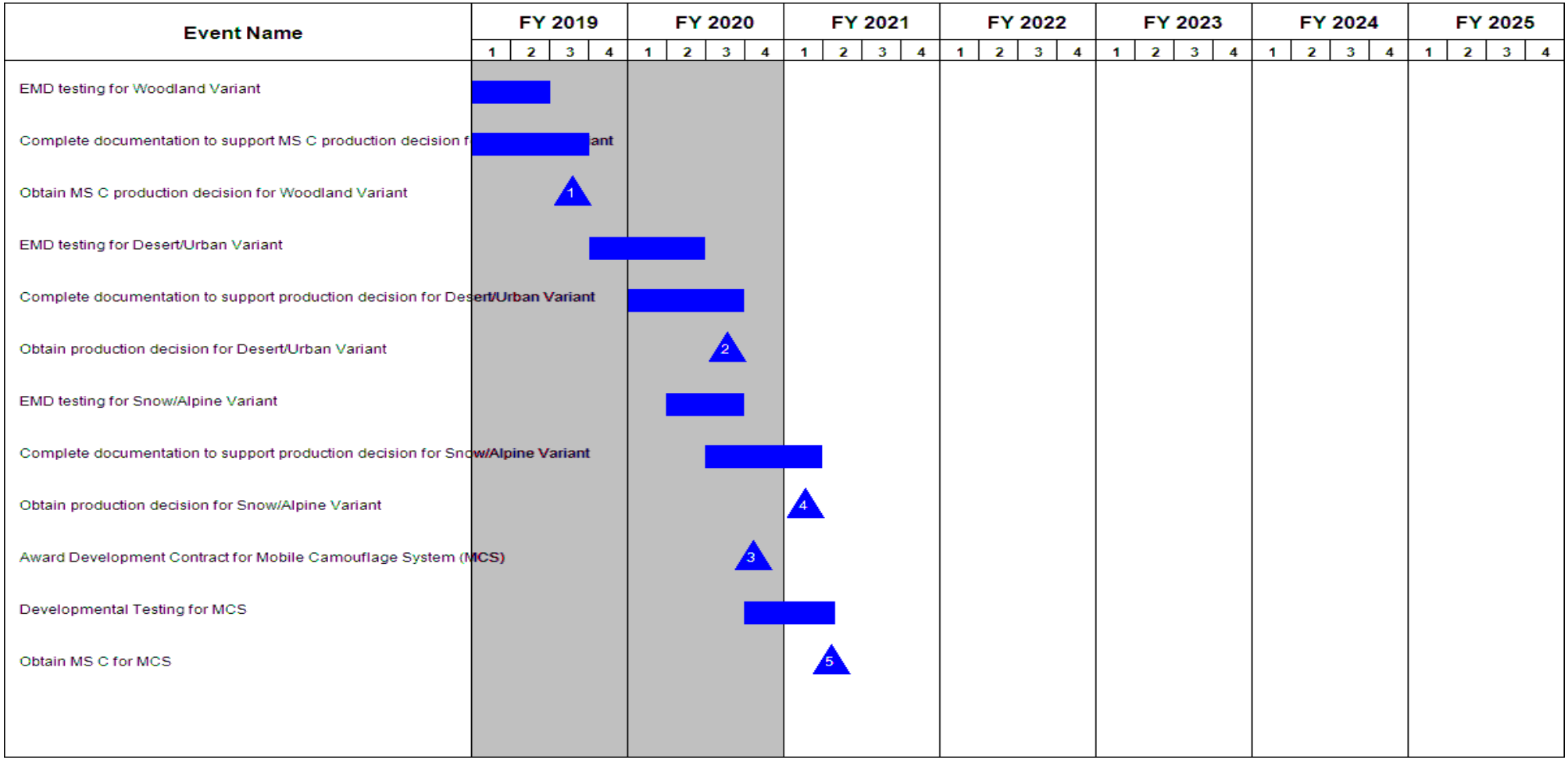

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** FG4 / *Ultra-Lightweight Camouflage Net System (ULCANS)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
EMD testing for Woodland Variant	1	2019	2	2019
Complete documentation to support MS C production decision for Woodland variant	1	2019	3	2019
Obtain MS C production decision for Woodland Variant	3	2019	3	2019
EMD testing for Desert/Urban Variant	4	2019	2	2020
Complete documentation to support production decision for Desert/Urban Variant	1	2020	3	2020
Obtain production decision for Desert/Urban Variant	3	2020	3	2020
EMD testing for Snow/Alpine Variant	2	2020	3	2020
Complete documentation to support production decision for Snow/Alpine Variant	3	2020	1	2021
Obtain production decision for Snow/Alpine Variant	1	2021	1	2021
Award Development Contract for Mobile Camouflage System (MCS)	4	2020	4	2020
Developmental Testing for MCS	4	2020	2	2021
Obtain MS C for MCS	2	2021	2	2021

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) H01 / *Combat Engineer Eq Ed*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
H01: *Combat Engineer Eq Ed*	-	3.270	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.270
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports the engineering, manufacturing, and development of combat engineer equipment used in support of horizontal and vertical engineer construction missions, and to develop a variety of enabling systems that will support and improve mobility for Engineers in the Brigade Combat Teams (BCT), Combat Support Brigade (CSB), and Multi-Roll Bridge Company (MRBC) forces. This project also supports the development of enabling systems to meet critical capabilities of joint interdependence through Air and Ground Line of Communication and Rapid Tactical Earthmoving repair and construction which increase the operational reach of modular forces. Systems that support BCT and CSB forces include: High Mobility Engineer Excavators, Scrapers, Scoop Loaders, Skid Steer Loaders, Dozers, Cranes (ATEC and Family of All Terrain Cranes), Graders and Engineer Rapid Airfield Construction Capability (ERACC). Systems that support the MRBC included the Hydraulic Excavators (HYEX), Dozer, High Mobility Engineering Excavator (HMEE), and The All Terrain Crane.

This project also supports the effort for Construction Equipment Virtual Trainers (CEVTs) first article of each variant. The CEVTs are commercial off the shelf virtual training devices with software modifications for military unique tasks. These simulators enable the United States Army Engineer School with the capability to more effectively train Engineer Military Occupational Skill (MOS), while reducing maintenance of actual equipment and fuel costs during traditional training. These simulators provide the Engineer Warfighter with a multitude of training scenarios and continuous hands on training on a variety of construction equipment and in various simulated conditions. Use of CEVT increases skills and competency in the operation of equipment.The funding will be to perform integration, software development, contractor testing, contractor data gathering, and development of prototypes.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Construction Equipment Virtual Trainers (CEVT)	3.270	-	-	-	-
Description: These funds are for the development of Construction Equipment Virtual Trainers, which are Commercial-Off-the-Shelf virtual training simulators with software modifications for military unique tasks. CEVT will be used by the United States Army Engineer School (USAES) to train Engineer Military Occupational Skill (MOS). The funds will also be used to purchase NRE's for the following variants: Dozer, Grader, Scraper, Loader, and Hyex.					
Accomplishments/Planned Programs Subtotals	3.270	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H01 / *Combat Engineer Eq Ed*	

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• R05901: *High Mobility Engineer Excavator (HMEE)*	71.748	30.188	0.000	3.703	3.703	-	-	-	-	Continuing	Continuing
• R03801: *GRADER, MTZD, HVY*	-	-	5.406	-	5.406	-	-	-	-	0.000	5.406
• X01500: *Hydraulic Excavator*	5.226	0.500	5.186	7.600	12.786	-	-	-	-	Continuing	Continuing
• M06100: *TRACTOR FULL TRACKED, MED T-9*	-	13.060	4.715	7.450	12.165	-	-	-	-	0.000	25.225
• R06701: *All Terrain Cranes*	13.031	23.003	70.560	-	70.560	75.633	74.274	7.272	7.272	0.000	271.045
• R02800: *SCRAPER, EARTHMOVING, 14-18 CU YD*	8.061	3.910	4.188	-	4.188	-	-	-	-	0.000	16.159
• R07001: *Enhanced Rapid Airfield Construction Capap*	8.480	-	0.000	-	0.000	-	-	-	-	0.000	8.480
• R07003: *ERACC Type II, Enhanced Earthmoving*	8.480	-	0.000	-	0.000	-	-	-	-	0.000	8.480
• M05500: *Const Equip ESP*	33.289	38.660	8.925	0.657	9.582	9.469	8.926	8.926	8.926	Continuing	Continuing
• ML5350: *Items Less Than $5.0M (Const Equip)*	6.103	4.731	0.000	-	0.000	-	-	-	-	0.000	10.834

Remarks

D. Acquisition Strategy

Conduct research, development, and investigations on future Construction Equipment (CE) and identify the path forward for programs of record (POR) to be transitioned for Program Executive Officer Program Management. Identify technical advancements that can improve safety, reliability, survivability, transportability, availability, maintainability and reduce the logistical footprints for current and future CE equipment.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) H01 / *Combat Engineer Eq Ed*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SBIR+STIR	TBD	TACOM : Warren, Michigan	0.167	-		-		-		-		-	0.000	0.167	-
		Subtotal	0.167	-		-		-		-		-	0.000	0.167	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Pre-Award requirements, KPP, selection criteria development, Testing of systems	Various	TACOM & TARDEC : Warren, MI	1.675	-		-		-		-		-	0.000	1.675	-
Driver Assist	TBD	TBD : TBD	3.448	-		-		-		-		-	0.000	3.448	-
Design Armor Kits for Combat Engineer	Various	TARDEC : Warren, MI	5.995	-		-		-		-		-	0.000	5.995	-
CEVT	Various	PEO STRI : PEO, STRI, Olrando, FL	12.424	3.270	Jan 2020	-		-		-		-	0.000	15.694	-
Hazard Clearance at Speed	TBD	TARDEC : Warren, Michigan	0.001	-		-		-		-		-	0.000	0.001	-
Forced Entry: (Airborne/ Air Assault) Study/ Development	C/FFP	TBD : TBD	9.288	-		-		-		-		-	0.000	9.288	-
Market Research	TBD	TARDEC : Warren, Michigan	0.189	-		-		-		-		-	0.000	0.189	-
Machine Diagnostics	MIPR	Various : Various	0.600	-		-		-		-		-	0.000	0.600	-
Technology Insertion/ System Improvement	TBD	TBD : TBD	0.462	-		-		-		-		-	0.000	0.462	-
Weight Reduction in Transparent Armor (TA)	C/TBD	TBD : TBD	0.300	-		-		-		-		-	0.000	0.300	-
Telematics	MIPR	National Center for Manufacturing	0.310	-		-		-		-		-	0.000	0.310	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) H01 / *Combat Engineer Eq Ed*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Science (NCMS) : CONUS													
		Subtotal	34.692	3.270		-		-		-		-	0.000	37.962	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering/ Program Management	MIPR	TARDEC/TACOM : Warren, Michigan	2.241	-		-		-		-		-	0.000	2.241	-
		Subtotal	2.241	-		-		-		-		-	0.000	2.241	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Operational Efficiency	MIPR	TARDEC, Warren, Michigan : TARDEC, Warren, Michigan	0.319	-		-		-		-		-	0.000	0.319	-
Operational Energy/Duty Cycle Monitoring	TBD	TBD : TBD	0.987	-		-		-		-		-	0.000	0.987	-
Non Nuclear Soil Density Set Testing	TBD	TARDEC : Warren, MI	0.050	-		-		-		-		-	0.000	0.050	-
		Subtotal	1.356	-		-		-		-		-	0.000	1.356	N/A

	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	38.456	3.270		0.000		-		-		-	0.000	41.726	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H01 / *Combat Engineer Eq Ed*

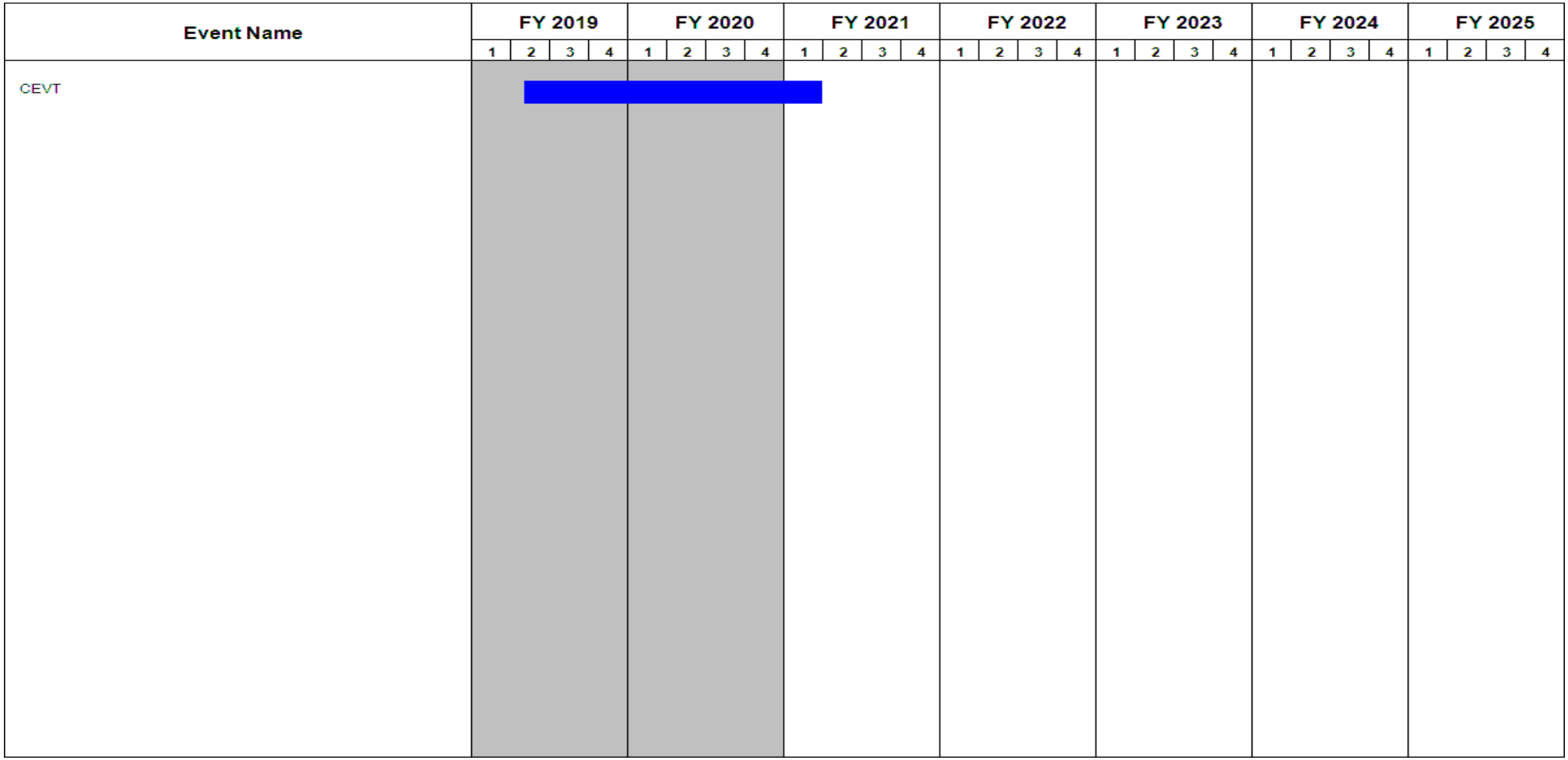

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H01 / *Combat Engineer Eq Ed*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
CEVT	2	2019	1	2021

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) H02 / *Tactical Bridging - Engineering Development*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
H02: *Tactical Bridging - Engineering Development*	-	7.050	44.452	12.398	-	12.398	24.154	8.333	0.000	0.000	0.000	96.387
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports the engineering, prototyping and manufacturing development for products transitioning to procurement for future force bridge systems and support equipment. Funding supports development and testing of the Bridge Supplemental Set (BSS) and tests associated with the Low Rate Initial Production (LRIP) phase of the Line of Communication Bridge (LOCB). This project also funds efforts to upgrade and modernize the Bridging Product Management portfolio through the development of new systems such as the Bridge Health Monitoring System, and the Family of Higher Military Load Classification Bridges (FoHMLC-B).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Line of Communication Bridge (LOCB) ***Description:*** Funding requested for development and testing of higher Military Load Classification (MLC) modular Line of Communication Bridging with the mobility to span fixed or float gaps spanning 50 to 800 meters wide. Actions include bridge structural strength analysis, performance assessments, and Production Qualification Testing (PQT) of the Line of Communication Bridge (LOCB) system. ***FY 2020 Plans:*** Funding supports commercial bridge launch testing, First Article Testing (FAT) and Initial Operational Test and Evaluation (IOT&E) of the Line of Communication Bridge (LOCB) system. ***FY 2021 Base Plans:*** Funding supports the purchase of MLC 80/110 commercial bridging test assets, structural strength and durability testing. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2020 to FY 2021 funding increase due to purchase of MLC 80/110 LOCB commercial bridging test assets for program of record testing.	1.978	2.011	7.624	-	7.624
Title: Bridge Supplemental Set (BSS) ***Description:*** Funding to develop a multi-functional, consolidated engineering set consisting of an anchorage system, access/egress traction improvement matting, power generation, tools, and a float bridge protection	3.012	2.361	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
device. The BSS is targeted for use with multiple tactical bridging systems to include the Improved Ribbon Bridge (IRB). It will also increase the capability of the Multi-Role Bridge Company (MRBC). ***FY 2020 Plans:*** Funding supports remaining prototype development costs, Initial Operational Testing (IOT) and Logistics Demonstration events. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2020 to FY 2021 decrease because no RDTE funding is required for BSS in FY 2021. Procurement funding is being requested for BSS production in FY 2021 on OPA line G06520.					
Title: Family of Higher Military Load Capacity Bridges ***Description:*** Funding provided to develop the Family of Higher Military Load Classification Bridges (FoHMLC-B). FoHMLC-B program will develop future bridging systems to replace the Heavy Assault Scissor Bridge (HASB) carried on the Joint Assault Bridge(JAB) launcher, Dry Support Bridge (DSB) and Improved Ribbon Bridge (IRB) sections/components to support the heavier weights of next generation combat vehicles. ***FY 2020 Plans:*** Funding supports the Armored Vehicle Launched Bridge (AVLB), Improved Ribbon Bridge (IRB) and Dry Support Bridge (DSB) up-weight prototype development, bridge overload testing and test facility bridge crossing simulator upgrades to support prototype testing in FY 2021. ***FY 2021 Base Plans:*** Funding supports Dry Support Bridge and Improved Ribbon Bridge test asset max weight and test to fail analysis as well as Heavy Assault Scissor Bridge (HAS-B) up-weight prototype testing. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2020 to FY 2021 funding decrease due to program transition from purchasing prototypes and test assets to max weight and up-weight durability and structural strength testing.	2.060	38.061	4.774	-	4.774
Title: FY 2020 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2020 Plans:***	-	2.019	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Funding transferred in accordance with Title 15 USC ?638					
FY 2020 to FY 2021 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC ?638					
Accomplishments/Planned Programs Subtotals	7.050	44.452	12.398	-	12.398

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• G06520: *BRIDGE SUPPLEMENTAL SET*	-	17.966	32.493	-	32.493	43.987	-	-	-	0.000	94.446
• G82404: *LINE OF COMMUNICATION BRIDGE LOCB*	81.219	64.705	10.545	50.400	60.945	10.533	13.516	-	-	0.000	230.918

Remarks

D. Acquisition Strategy

The acquisition strategy is for Research Development Test & Evaluation efforts to support prototyping, testing and follow-on production efforts for future Bridging systems.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering and Program Management	MIPR	Various : Various	-	1.543	Oct 2018	2.278	Oct 2019	1.386	Oct 2020	-		1.386	Continuing	Continuing	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		2.019		-		-		-	0.000	2.019	-
		Subtotal	-	1.543		4.297		1.386		-		1.386	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Line of Communication Bridge - Acrow MLC 80/110 150M	SS/FFP	ACC Warren : Warren, MI	-	-		-		2.100	Nov 2020	-		2.100	0.000	2.100	-
Line of Communication Bridge - Mabey MLC 80/110 150M	SS/FFP	ACC Warren : Warren, MI	-	-		-		2.300	Nov 2020	-		2.300	0.000	2.300	-
Bridge Supplemental Set - Anchorage Development and Prototype Assets	WR	Tobyhanna Army Depot : Tobyhanna, PA	-	2.287	Nov 2018	-		-		-		-	0.000	2.287	-
Family of High Military Load Capacity Bridges - ERDC Bridge Gap Analysis	MIPR	U.S. Army Engineer Research and Development Center (ERDC) : Vicksburg, MS	-	1.150	Jan 2019	-		-		-		-	0.000	1.150	-
Family of High Military Load Capacity Bridges - AVLB Test / Upgrade Study	MIPR	TARDEC : Warren, MI	-	0.100	Jan 2019	-		-		-		-	0.000	0.100	-
Family of High Military Load Capacity Bridges - DSB/IRB EMD Test Assets	TBD	TBD : TBD	-	-		3.817	Apr 2020	-		-		-	0.000	3.817	-
Family of High Military Load Capacity Bridges -	TBD	TBD : TBD	-	-		1.717	Nov 2019	-		-		-	0.000	1.717	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
IRB - Upweight Overload Modeling															
Family of High Military Load Capacity Bridges - AVLB Upweight OTA Award	TBD	TBD : TBD	-	-		27.917	Dec 2019	-		-		-	0.000	27.917	-
		Subtotal	-	3.537		33.451		4.400		-		4.400	0.000	41.388	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Bridge Lab Spt	MIPR	TARDEC - Bridge Lab : Warren, MI	-	0.783	Oct 2018	0.616	Oct 2019	0.752	Nov 2020	-		0.752	Continuing	Continuing	-
Test Facility SANG / ATEC Upgrades - HMLC	MIPR	TARDEC - Bridge Lab : Warren, MI	-	-		1.816	Oct 2019	-		-		-	0.000	1.816	-
Prototype/EMD Bridge Test Asset Transportation	TBD	TAC Code : TBD	-	-		0.256	Oct 2019	0.260	Jan 2021	-		0.260	Continuing	Continuing	-
		Subtotal	-	0.783		2.688		1.012		-		1.012	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Line of Communication Bridge - Survivability Testing	MIPR	U.S. Army Engineer Research and Development Center (ERDC) : Vicksburg, MS	-	0.040	Jan 2019	-		-		-		-	0.000	0.040	-
Line of Communication Bridge - Component Fatigue Testing	MIPR	U.S. Army Engineer Research and Development Center	-	1.007	Jan 2019	-		-		-		-	0.000	1.007	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		(ERDC) : Vicksburg, MS													
Line of Communication Bridge - Fast Water Analysis	MIPR	United States Army Materiel Systems Analysis Activity (AMSAA) : Aberdeen Proving Ground, MD	-	0.140	Jan 2019	-		-		-		-	0.000	0.140	-
Line of Communication Bridge - UMR Launch and Wet Gap Testing	MIPR	Army Test and Evaluation Command (ATEC) : Aberdeen Proving Ground, MD	-	-		0.516	Nov 2019	-		-		-	0.000	0.516	-
Line of Communication Bridge - First Article Testing	TBD	TBD : TBD	-	-		0.566	Mar 2020	-		-		-	0.000	0.566	-
Line of Communication Bridge - MLC80-110 Durability Testing	MIPR	U.S. Army Engineer Research and Development Center (ERDC) : Vicksburg, MS	-	-		-		1.500	Feb 2021	-		1.500	0.000	1.500	-
Line of Communication Bridge - MLC80/110 Structural Strength Testing	MIPR	United States Army Materiel Systems Analysis Activity (AMSAA) : Aberdeen Proving Ground, MD	-	-		-		0.500	Apr 2021	-		0.500	0.000	0.500	-
Bridge Supplemental Set - IOT / Log Demo	MIPR	TBD : TBD	-	-		1.617	Jan 2020	-		-		-	0.000	1.617	-
Family of High Military Load Capacity Bridges - AVLB Upweight Prototype Testing	TBD	TBD : TBD	-	-		1.317	Jul 2020	0.400	Jun 2021	-		0.400	Continuing	Continuing	-
Family of High Military Load Capacity Bridges - DSB - EMD Testing - Max Weight - Test to Fail	MIPR	Bridge Lab - U.S. Army Combat Capability Development Center	-	-		-		1.600	Jan 2021	-		1.600	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) H02 / *Tactical Bridging - Engineering Development*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Ground Vehicle Systems Center (USACCDCGVSC) : Selfridge Air National Guard Base (SANGB), MI													
Family of High Military Load Capacity Bridges - IRB - EMD Testing - Max Weight - Test to Fail	MIPR	U.S. Army Engineer Research and Development Center (ERDC) : Vicksburg, MS	-	-		-		1.600	Jan 2021	-		1.600	Continuing	Continuing	-
		Subtotal	-	1.187		4.016		5.600		-		5.600	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	7.050		44.452		12.398		-		12.398	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*

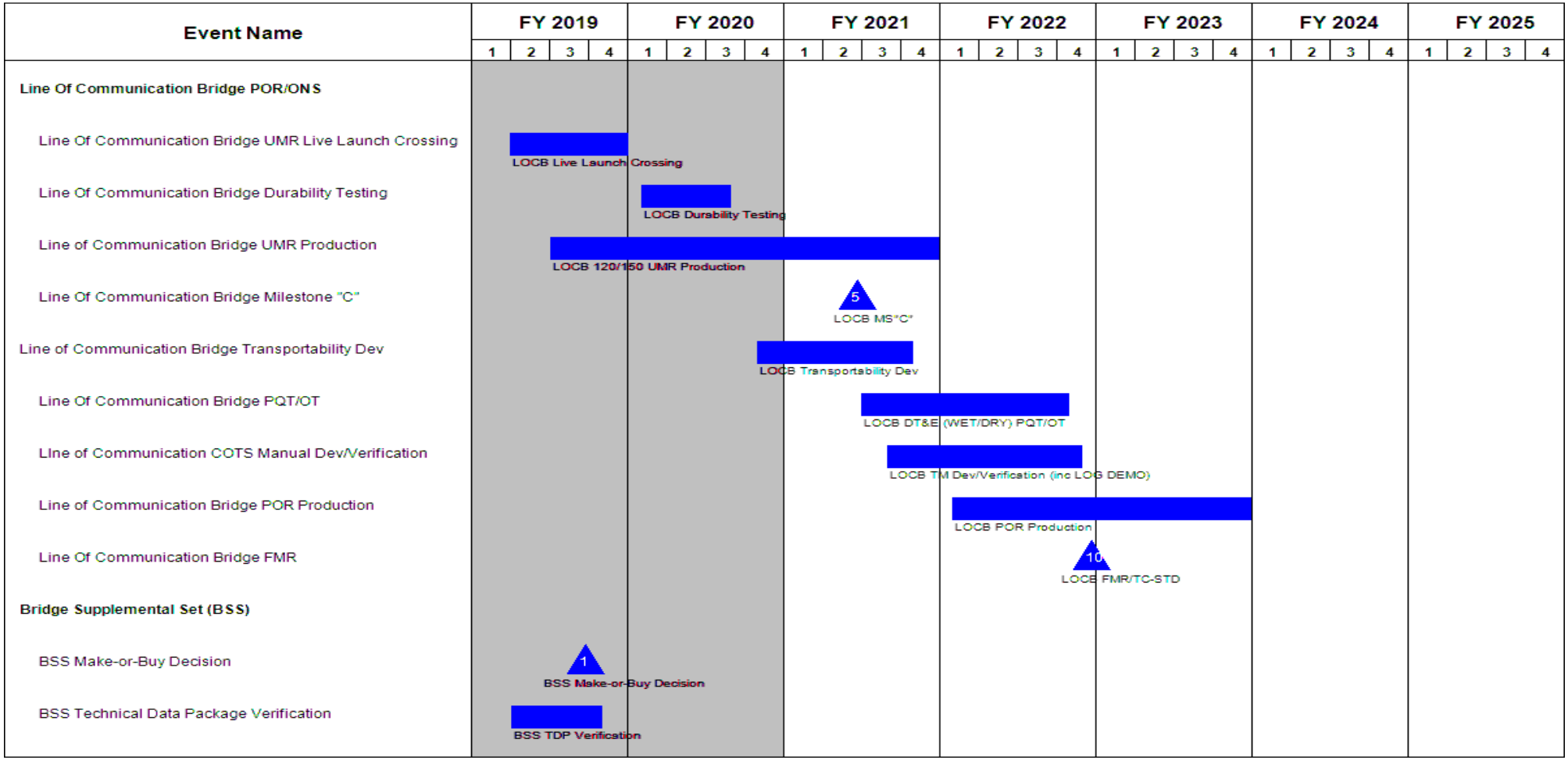

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*

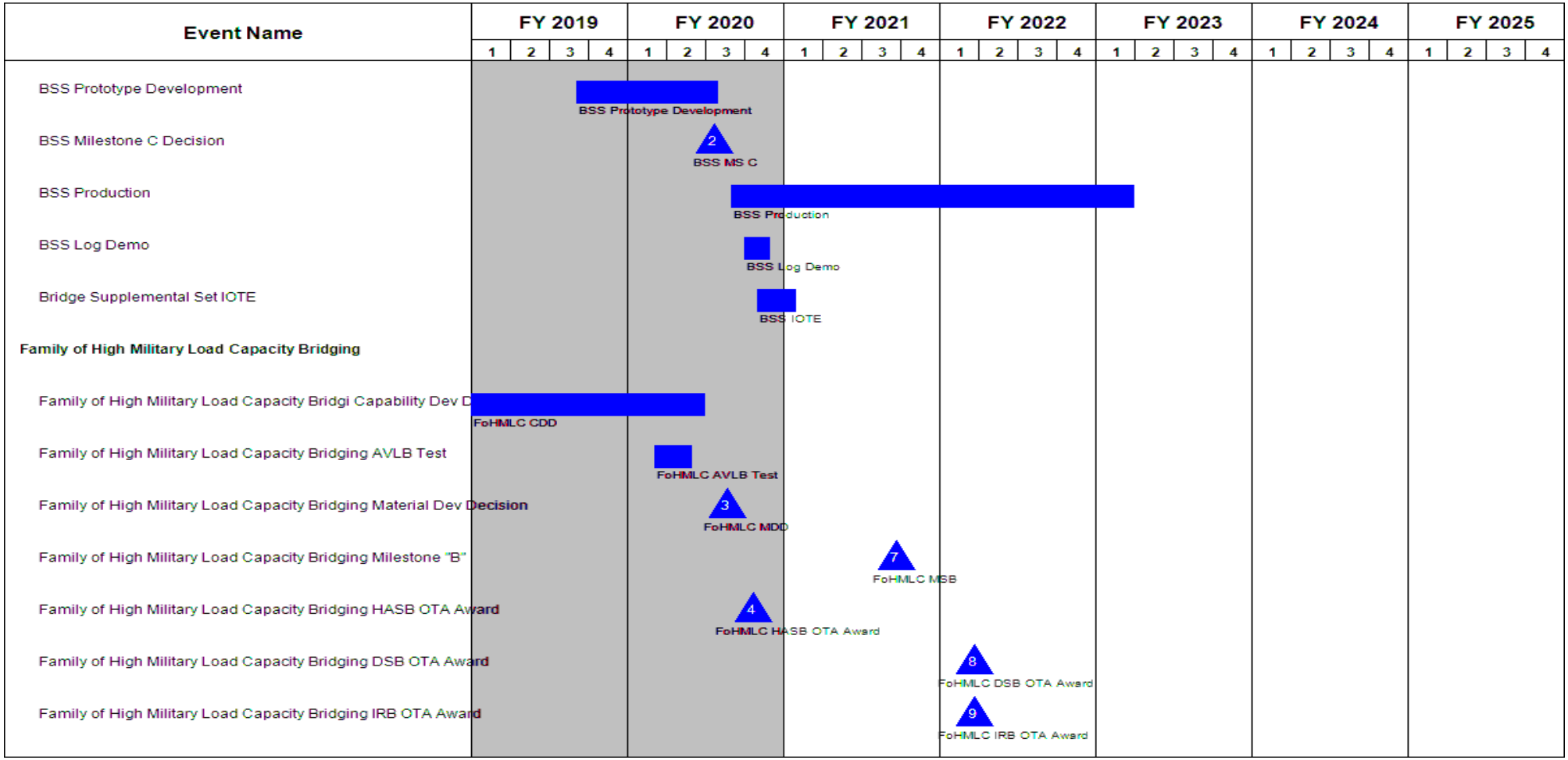

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*

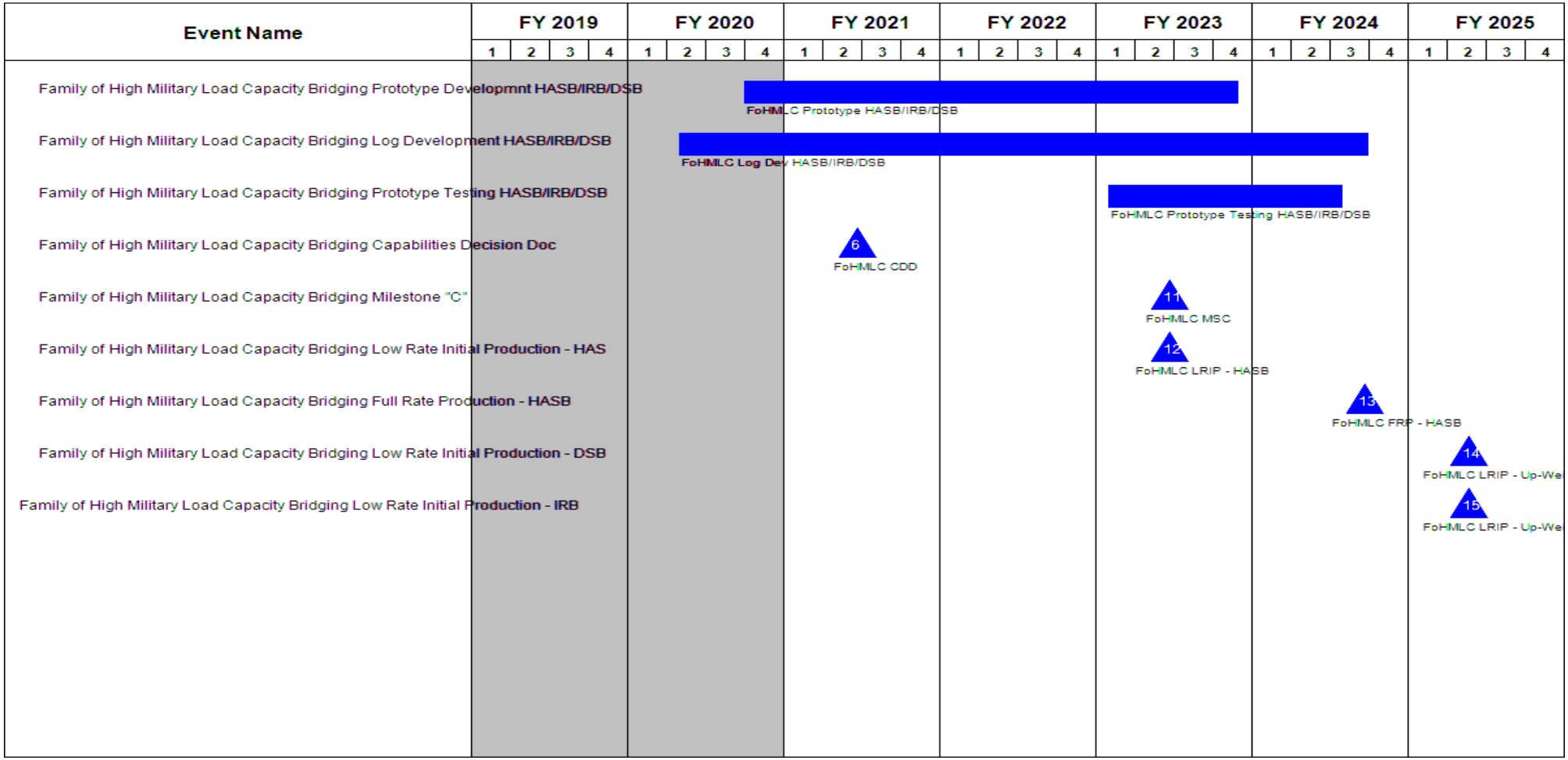

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Line Of Communication Bridge POR/ONS	2	2012	4	2021
Line Of Communication Bridge UMR Live Launch Crossing	1	2019	4	2019
Line Of Communication Bridge Durability Testing	1	2020	3	2020
Line of Communication Bridge UMR Production	3	2019	4	2021
Line Of Communication Bridge Milestone "C"	2	2021	2	2021
Line of Communication Bridge Transportability Dev	4	2020	4	2021
Line Of Communication Bridge PQT/OT	3	2021	4	2022
LIne of Communication COTS Manual Dev/Verification	3	2021	4	2022
Line of Communication Bridge POR Production	1	2022	4	2023
Line Of Communication Bridge FMR	4	2022	4	2022
Bridge Supplemental Set (BSS)	2	2019	2	2019
BSS Make-or-Buy Decision	3	2019	3	2019
BSS Technical Data Package Verification	2	2019	4	2019
BSS Prototype Development	3	2019	3	2020
BSS Milestone C Decision	3	2020	3	2020
BSS Production	3	2020	1	2023
BSS Log Demo	4	2020	4	2020
Bridge Supplemental Set IOTE	4	2020	1	2021
Family of High Military Load Capacity Bridging	1	2018	2	2022
Family of High Military Load Capacity Bridgi Capability Dev Document	4	2018	2	2020
Family of High Military Load Capacity Bridging AVLB Test	1	2020	2	2020
Family of High Military Load Capacity Bridging Material Dev Decision	3	2020	3	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Family of High Military Load Capacity Bridging Milestone "B"	3	2021	3	2021
Family of High Military Load Capacity Bridging HASB OTA Award	4	2020	4	2020
Family of High Military Load Capacity Bridging DSB OTA Award	1	2022	1	2022
Family of High Military Load Capacity Bridging IRB OTA Award	1	2022	1	2022
Family of High Military Load Capacity Bridging Prototype Developmnt HASB/IRB/DSB	4	2020	4	2023
Family of High Military Load Capacity Bridging Log Development HASB/IRB/DSB	2	2020	3	2024
Family of High Military Load Capacity Bridging Prototype Testing HASB/IRB/DSB	1	2023	3	2024
Family of High Military Load Capacity Bridging Capabilities Decision Doc	2	2021	2	2021
Family of High Military Load Capacity Bridging Milestone "C"	2	2023	2	2023
Family of High Military Load Capacity Bridging Low Rate Initial Production - HAS	2	2023	2	2023
Family of High Military Load Capacity Bridging Full Rate Production - HASB	3	2024	3	2024
Family of High Military Load Capacity Bridging Low Rate Initial Production - DSB	2	2025	2	2025
Family of High Military Load Capacity Bridging Low Rate Initial Production - IRB	2	2025	2	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L39 / *Field Sustainment Support Ed*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
L39: *Field Sustainment Support Ed*	-	2.674	1.675	1.718	-	1.718	1.771	1.805	1.798	1.798	0.000	13.239
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports the Engineering and Manufacturing Development (EMD) of critical capabilities for cargo aerial delivery for identified theater distribution and services capability gaps, improve unit sustainability, and increase combat effectiveness. Project supports the demonstration of engineering development models and Type Classification of cargo parachutes, airdrop containers and other aerial delivery equipment to improve safety, effectiveness, and efficiency of airborne operations. This project develops critical enablers that support the Army in executing future movement and maneuver operations and distributed sustainment support and the Army's Modular Force Capabilities by maintaining readiness through fielding and integrating new equipment. This project also ensures Army Expeditionary Forces are capable of rapid deployment by providing aerial delivery initiatives. This project also ensures Army Expeditionary Forces are capable of rapid deployment through aerial delivery initiatives and reduces sustainment requirements, related Combat Support/Combat Service Support (CS/CSS) demands in lift, combat zone footprint, and costs for logistical support.

Funding supports modernization of current cargo aerial delivery systems by investigating technology insertions that increase accuracy, collision avoidance, in flight communications, and reliability. Funding also supports developing initial prototypes to enable refinement of operational requirements and early user feedback to support future sustainment and operational movement concepts.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Extracted High and Low High Speed Container Delivery System (EHLSCDS) ***Description:*** Provides a high speed (230 knot) low altitude (375 A AGL) capability for up to eight Container Delivery Systems (CDS) to enhance aircraft and aircrew safety while improving accuracy and reducing dispersion for receiving ground units.	0.265	-	-	-	-
Title: Joint Precision Airdrop System-2K Block 1 upgrade (JPADS-BLK1) ***Description:*** Supports increasing the technological and design maturity, testing, and integration of several key initiatives focused on: maintaining system accuracy and reliability in Global Positioning System (GPS) denied environments; collision avoidance; more precise position determination software; and improved Guidance Navigation and Control (GN&C) hardware.	1.261	-	-	-	-
Title: Rapid Rigging and DeRigging Airdrop System (RRDAS)	1.148	1.599	1.718	-	1.718

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L39 / *Field Sustainment Support Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Description: Reduces rigging times while also providing the capability to rapidly de-rig loads on the drop zone. This will reduce the lead time to prepare Low Velocity Airdrop Load (LVADS) loads while also increasing the survivability of receiving ground forces by ensuring the airdrop loads (to include weapon systems, prime movers, trailers, etc.) are quickly de-rigged and made operational. ***FY 2020 Plans:*** Conduct Critical Design Review and initiate Developmental Testing ***FY 2021 Base Plans:*** Conduct down selection, limited user evaluation and initiate Developmental Testing.(DT). ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funds increased to support Developmental Testing.					
Title: FY 2020 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2020 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.076	-	-	-
Accomplishments/Planned Programs Subtotals	2.674	1.675	1.718	-	1.718

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• K39: *Field Sustainment Support Ad*	2.234	-	0.000	-	0.000	-	-	-	-	0.000	2.234
• MA7806: *Precision Airdrop*	5.731	2.040	0.000	2.040	2.040	-	-	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy is to accelerate product development and testing to transition into production.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L39 / *Field Sustainment Support Ed*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Management Support	Various	PM FSS : Natick, MA	5.354	0.500		0.325		0.400		-		0.400	0.000	6.579	Continuing
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.076		-		-		-	0.000	0.076	-
		Subtotal	5.354	0.500		0.401		0.400		-		0.400	0.000	6.655	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ALVADS-L&H	Various	Various : Various	17.152	-		-		-		-		-	0.000	17.152	Continuing
EHLSCDS	Various	Various : Various	0.450	0.265		-		-		-		-	0.000	0.715	-
JPADS	Various	Various : Various	1.465	0.388		-		-		-		-	0.000	1.853	-
RRDAS	Various	Various : Various	-	0.948		0.824		0.418		-		0.418	0.000	2.190	-
		Subtotal	19.067	1.601		0.824		0.418		-		0.418	0.000	21.910	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EHLSCDS	Various	Various : Various	0.424	-		-		-		-		-	0.000	0.424	-
ALVADS	Various	Various : Various	0.050	-		-		-		-		-	0.000	0.050	-
JPADS	Various	Various : Various	0.200	-		-		-		-		-	0.000	0.200	-
		Subtotal	0.674	-		-		-		-		-	0.000	0.674	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L39 / *Field Sustainment Support Ed*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EHLSCDS	Various	Yuma Proving Ground (YPG), AZ, AEC : AZ	11.040	-		-		-		-		-	0.000	11.040	Continuing
ALVADS-L&H	Various	Yuma Proving Ground (YPG), AZ/ OTC, NC : AZ	8.288	-		-		-		-		-	0.000	8.288	Continuing
JPADS	Various	Various : Various	0.859	0.573		-		-		-		-	0.000	1.432	-
RRDAS	Various	Various : Various	-	-		0.450		0.900		-		0.900	0.000	1.350	-
		Subtotal	20.187	0.573		0.450		0.900		-		0.900	0.000	22.110	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	45.282	2.674		1.675		1.718		-		1.718	0.000	51.349	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L39 / *Field Sustainment Support Ed*

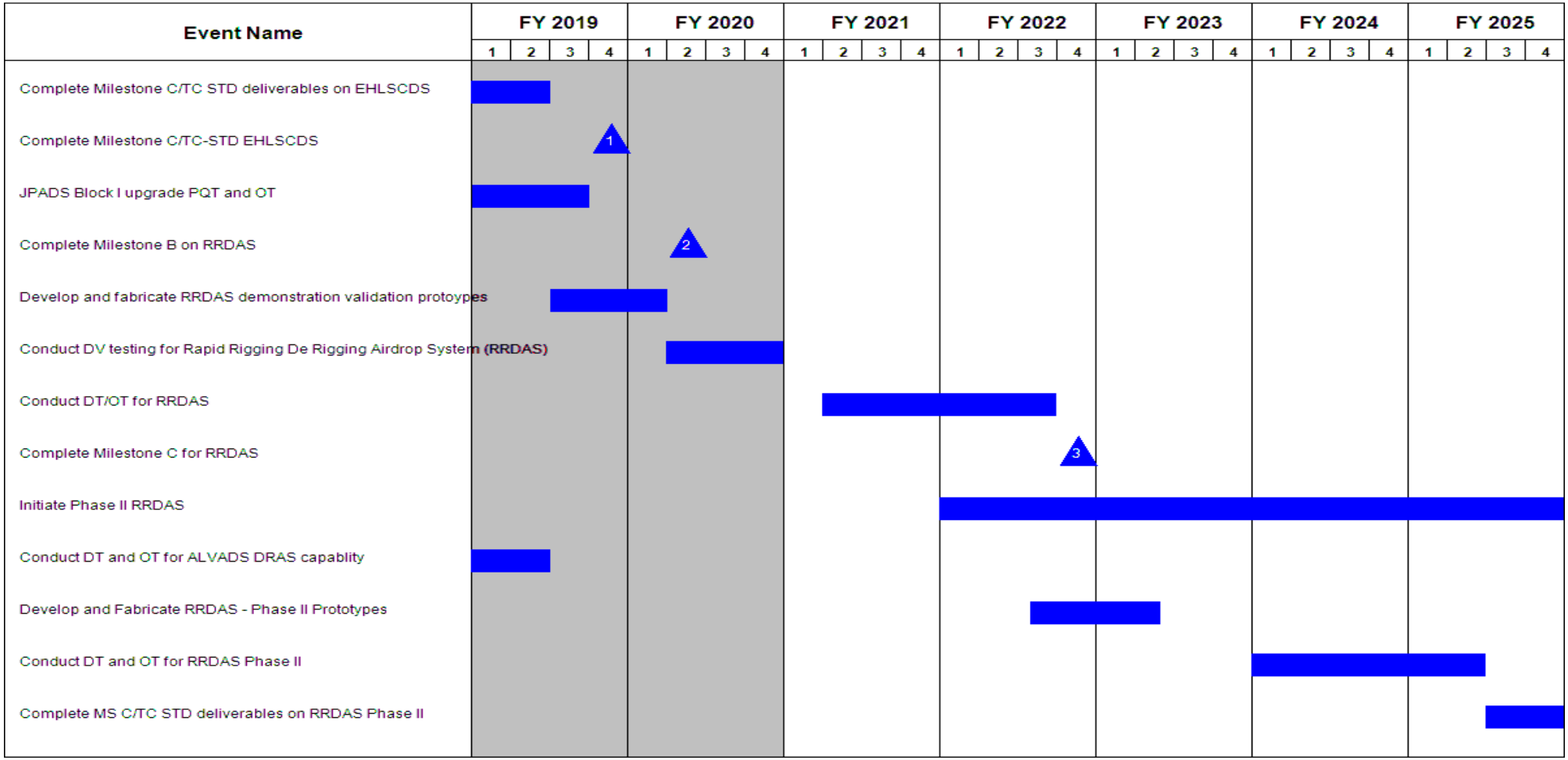

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L39 / *Field Sustainment Support Ed*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Complete Milestone C/TC STD deliverables on EHLSCDS	4	2018	2	2019
Complete Milestone C/TC-STD EHLSCDS	4	2019	4	2019
JPADS Block I upgrade PQT and OT	1	2018	3	2019
Complete Milestone B on RRDAS	2	2020	2	2020
Develop and fabricate RRDAS demonstration validation protoypes	3	2019	1	2020
Conduct DV testing for Rapid Rigging De Rigging Airdrop System (RRDAS)	2	2020	4	2020
Conduct DT/OT for RRDAS	2	2021	3	2022
Complete Milestone C for RRDAS	4	2022	4	2022
Initiate Phase II RRDAS	1	2022	4	2025
Conduct DT and OT for ALVADS DRAS capablity	3	2018	2	2019
Develop and Fabricate RRDAS - Phase II Prototypes	3	2022	2	2023
Conduct DT and OT for RRDAS Phase II	1	2024	2	2025
Complete MS C/TC STD deliverables on RRDAS Phase II	3	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L41 / *Water And Petroleum Distribution - Ed*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
L41: *Water And Petroleum Distribution - Ed*	-	8.366	7.540	10.988	-	10.988	8.492	7.492	6.494	5.495	0.000	54.867
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports engineering and manufacturing development efforts as well as the Production Qualification Testing (PQT) and First Article Testing (FAT) efforts to provide all services with ample supply of clean fuel and water, supporting all types of missions. The Army has the mission to supply fuel for all land-based forces, including the Marines and the Air Force, and for supplying bulk drinking water to Soldiers. These programs enable the Army to improve maneuver sustainment operations to meet the demands of Army units and the Future Force. The mission includes receiving and transferring petroleum from trucks, ships, pipelines, and permanent and temporary storage facilities; moving petroleum from storage to and within corps and division areas; fuel quality surveillance testing; and dispensing in support of tactical operations, including rapid refueling of aircraft. This project also supports development and analysis of technologies designed to increase survivability of petroleum and water systems that may operate or be transported in hostile environments. The mission covers water purification and waste water treatment, reutilization, storage, distribution, alternative water source acquisition, disposal, and quality control. These research and development missions support the development and enhancement of rapidly deployed Petroleum and Water equipment which enables the Army to achieve its vision by providing a highly mobile and self-sustaining systems in hostile joint operations areas. Programs funded on this Project includes: Tactical Fuel Distribution System (TFDS), Bulk Fuel Distribution System (BFDS), Petroleum Expeditionary Analysis Kit (PEAK), Water Bison and Water Bison Light, Water Storage and Distribution System (WSDS) 40,000 gallon and 100,000 gallon sets, 3K Tactical Water Purification System (TWPS), Early Entry Fluid Distribution System (E2FDS) and Pipeline Trace Tool - Software Development, Modular Tactical Retail Refueling System (MTRRS), and Load Handling System (LHS) - Compatible Water Tank-rack System (HIPPO).

This Project provides for the modernization of current Petroleum and Water System fleets by investigating technology insertions including, but not limited to: condition based maintenance, vetronics, Victory Architecture, autonomous operations and other emerging technologies. Funding also supports developing and testing initial prototypes, and production representative articles to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement operating concepts. Funding supports non-traditional and middle tier acquisitions to include Other Transaction Authority (OTA) and 804.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Water Bison	0.045	0.289	2.731	-	2.731
Description: The Unit Water Trailer (Water Bison) is a replacement for the 400 gallon Water Buffalo. A second variant, the Water Bison Lite, is also required. The Water Bison consists of a baffled, 500 gallon capacity tank and the Water Bison Lite consists of a baffled, 250 gallon capacity tank. They provide the modular force an efficient method of transporting a full day of supply (DOS) of bulk potable water. Both systems include freeze protection that are mounted on a trailer and include all hoses and fittings necessary to dispense water by					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
means of gravity flow. The Water Bison and Water Bison Lite will be used by units at all echelons. The Family of Medium Tactical Vehicles (FMTV) shall be capable of towing this system. ***FY 2020 Plans:*** Prepare Other Transaction Authority (OTA) Request for Prototype Proposal (RPP) contract. Milestone B approval. ***FY 2021 Base Plans:*** Award Other Transaction Authority (OTA) prototype contract, conduct prototype testing. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The FY 2021 increase is for OTA award and testing.					
Title: Early Entry Fluid Distribution System (E2FDS). ***Description:*** The Early Entry Fluid Distribution System (E2FDS) is a new materiel system that enhances the Inland Petroleum Distribution System (IPDS) pipeline and rapidly establishes new or extends existing pipeline traces. It is a high throughput flexible conduit system for the transport of bulk petroleum or water across the battlefield. It is rapidly-emplaced and capable of a throughput of 850,000 gallons of fuel or 650,000 gallons of raw non-potable water, per a 20 hour operational day through a trace up to 50 miles long. The E2FDS requires little to no engineer support to emplace the conduit or pump stations. Pump stations are fully automated and centrally controlled. ***FY 2020 Plans:*** Conduct Log Demo testing and complete Production Qualification Testing (PQT). ***FY 2021 Base Plans:*** Limited User Test (LUT), Conditional Material Release documentation and Full Rate Production (FRP). ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The FY 2021 increase is to complete E2FDS LUT.	2.375	1.562	1.707	-	1.707
Title: Modular Tactical Retail Refueling System (MTRRS) ***Description:*** The Mobile Tactical Retail Refueling System (MTRRS) will serve as a bulk fuel carrier and retail dispenser for military vehicles and ground support equipment, providing fuel in all operational environments. The MTRRS allows for different configurations or transport platforms including Medium Tactical Vehicle (MTV) cargo trucks, MTV Trailers, and the Palletized Load System (PLS) flat-racks. MTRRS ground operation is	1.350	0.048	0.950	-	0.950

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
possible by using Material Handling Equipment (MHE) to remove the MTRRS from the transport platform. The MTRRS provides fuel storage (900 Gallons (T), 1200 Gallons (O)), filtration, and unit-level retail capabilities with the ability to refuel ground vehicles, ground equipment, and fuel containers. MTRRS includes an electric pump that will provide a minimum flow rate of 17 Gallons per Minute (GPM) of filtered fuel. The prime mover or a separate generator provides power using an included North Atlantic Treaty Organization (NATO) slave cable. ***FY 2020 Plans:*** Support Costs. Start Production Qualification Testing (PQT) ***FY 2021 Base Plans:*** Conduct Production Qualification Testing (PQT) , Technical Manual (TM) and provisioning development and Full Rate Production (FRP). ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The FY 2021 increase is for testing.					
Title: Petroleum Expeditionary Analysis Kit (PEAK) ***Description:*** The Petroleum Expeditionary Analysis Kit (PEAK) replaces Aviation Fuels Contamination Test Kit (AFCTK) and provides fuel quality surveillance within all Brigade Combat Teams and Support Brigades. It is a stand-alone system that will rapidly verify petroleum products' suitability for use at point of consumption. The PEAK will evaluate all kerosene-based and diesel fuels used in ground systems and aircraft. It will provide the field with the capability to determine fuel type, grade, and additives. ***FY 2020 Plans:*** Award Other Transaction Authority (OTA) Request for Prototype Proposal (RPP). Milestone B approval. Conduct start of work meeting and preparation of asset delivery. ***FY 2021 Base Plans:*** Leverage a two phase Indefinite Delivery Indefinite Quantity (IDIQ) contract approach. Execute Phase I which will include delivery of one PEAK test asset by each contractor (up to five). Phase II will include down selection to one vendor for additional production delivery orders. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The FY 2021 increase is due to contract award for test assets and testing.	0.300	0.450	1.000	-	1.000
Title: Tactical Fuel Distribution System (TFDS)	0.045	0.072	2.800	-	2.800

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Description: The Tactical Fuel Distribution System (TFDS) provides theater bulk petroleum distribution to maximize throughput in order to support early entry, buildup, and onward movement of forces. It replaces the M967 and M969 tanker trailers, which are nearing the end of its useful life. The TFDS consists of a 5,000 gallon line haul tanker trailer, pulled primarily by the M1088 tractor. It shall be capable of retail fuel distribution and able to travel on unimproved roads and provides support from the Theater Army to Echelons Above Brigade (EAB). ***FY 2020 Plans:*** Continue Market Research. Milestone B document development, Request for Prototype Proposal (RPP) development. ***FY 2021 Base Plans:*** Award OTA and begin developmental testing (DT) . ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The FY 2021 increase is to prepare award Other Transaction Authority (OTA).					
Title: Load Handling System (LHS) - Compatible Water Tankrack System (HIPPO) ***Description:*** Load Handling System (LHS) - Compatible Water Tank Rack System (HIPPO) replaces the Forward Area Water Point Supply system (FAWPSS) and Semi-Trailer Mounted Fabric Tank (SMFT). It provides capability to receive, store, transport, and distribute bulk and unit retail water to the warfighter. The HIPPO consists of a 2,000 gallon potable water tank in a 20' ISO frame with integrated pump, engine, alternator, hose reel, freeze prevention, and fill stand. The HIPPO is critical for sustaining the soldier and accomplishing combat service support missions at all echelons. Legacy water distribution systems do not provide the mobility required to achieve unit distribution goals for the current and objective force. ***FY 2020 Plans:*** Award Other Transaction Authority (OTA) agreements and conduct prototype fly-off test. ***FY 2021 Base Plans:*** Funds are required to conduct testing on three prototypes and Request for Production Proposal (RFP) and evaluation. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The FY 2021 decrease is due to completion of prototype fly-off test in preparation of production contract.	-	1.682	0.800	-	0.800
Title: Bulk Fuel Distribution System (BFDS)	0.045	0.667	0.500	-	0.500

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Description: The Bulk Fuel Distribution System (BFDS) provides theater bulk petroleum distribution to maximize throughput to support early entry, buildup, and onward movement of forces. The BFDS consists of a 7,500 gallon line haul tanker trailer, pulled primarily by the M915A3 or later version tractor. The BFDS provides bulk distribution between large fuel storage areas and will include a automated level gauge sensor for mission command reporting and providing asset and in-transit visibility. The BFDS is not capable of off-road or retail operations. ***FY 2020 Plans:*** Award Other Transaction Authority (OTA), conduct test and market research for production. Conduct start of work meeting and preparation of asset delivery. ***FY 2021 Base Plans:*** Developmental Testing (DT). ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The FY 2021 decrease is due to completion of OTA award and market research for production. First Article Testing (FAT) is the only planned effort in FY 2021.					
Title: 3K Tactical Water Purification System (TWPS). ***Description:*** The 3,000 (3k) Gallons per Hour (GPH) Tactical Water Purification System (TWPS) replaces the legacy 3,000 (3k) GPH Reverse Osmosis Water Purification Unit (ROWPU), which is currently the largest water purification capability in the Army's inventory and is nearing the end of its useful life. The 3k TWPS shall be the sole bulk water capability supporting Echelons Above Brigade (EAB) and will be the primary water purification capability for laundry and shower facilities. Purifies up to 3,000 GPH from any water source, including 60,000 milligrams per liter, Total Dissolved Solids (TDS) salt water and Chemical Biological Radiological and Nuclear (CBRN) contaminated sources. Consists of feed water pumps, hoses, media and cartridge filters, high pressure pump, reverse osmosis elements, 3,000 gallon water storage and distribution system, and control panel. Supports all tactical water missions, is Load Handling System (LHS)/Palletized Load System (PLS) truck compatible via Container Handling Unit (CHU)/ Enhanced Container Handling Unit (E-CHU). ***FY 2020 Plans:*** Pending authority FY 2020 funds will support developmental efforts. ***FY 2020 to FY 2021 Increase/Decrease Statement:***	1.418	0.072	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Program funding for 3K TWPS is deferred. Milestone B for program moved to a later fiscal year pending future funding adjustments					
Title: PM Support ***Description:*** Program Management (PM) Support is matrix support that includes PM travel expenses and systems engineering oversight required to manage Research, Development, Technology and Engineering (RDT&E) projects. Includes salaries and travel for the support of programs within this Project. ***FY 2020 Plans:*** Funds matrix support, travel, and general oversight efforts. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2021 PM support is included under each system support.	2.788	2.355	-	-	-
Title: Water and Storage System (WSDS) ***Description:*** Water Storage Distribution System (WSDS) provides the large capacity capability that is tailorable in receiving, storing, and issuing to all bulk water systems in the Army inventory. The WSDS stores and issues potable water in support of individual consumption, medical treatment, Chemical, Biological, Radiological, and Nuclear (CBRN) decontamination. It is used in conjunction with the 1,500 gph Tactical Water Purification System (1.5K TWPS) or the 3,000 gph Reverse Osmosis Water Purification Unit (3K ROWPU). It is the only program of record that is designed to store bulk water in the quantities needed for the Warfighter. Both the 40,000 gallon and the 100,000 gallon WSDS are containerized . The 40K WSDS consists of the hypo-chlorination unit, 125 GPM pump, two 20K collapsible water tanks, triple container. The 100K WSDS will take the place of two 40K systems in the Composite Supply Companies. ***FY 2021 Base Plans:*** Achieve Milestone C, contract award and testing. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The FY 2021 supports "New Start" increase for contract award and testing.	-	-	0.500	-	0.500
Title: FY 2020 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2020 Plans:***	-	0.343	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Funding transferred in accordance with Title 15 USC ?638					
FY 2020 to FY 2021 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC ?638					
Accomplishments/Planned Programs Subtotals	8.366	7.540	10.988	-	10.988

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• MA6000: *Distribution Systems, Petroleum & Water*	26.471	84.527	78.448	4.374	82.822	57.952	34.371	38.086	42.678	0.000	366.907
• D02001: *Semitrailers, tankers*	-	-	17.082	-	17.082	35.963	35.963	40.059	40.060	0.000	169.127

Remarks

D. Acquisition Strategy

Develop engineering prototypes for the Petroleum Tankers, Early Entry Fluid Distribution System (E2FDS) and Load Handling System (LHS) - Compatible Water Tank Rack System (HIPPO) select Non-Development Item (NDI) based on market surveys and proposals from industry. Conduct industry days and based on additional market research will award either competitive or sole source contracts. Conduct Integrated Product Team (IPT's) and develop acquisition strategies for Water Bison and Water Bison Light, Petroleum Expeditionary Analysis Kit (PEAK), Tactical Fuel Distribution System (TFDS), Bulk Fuel Distribution System (BFDS) and Water Storage and Distribution System (WSDS), Mobile Tactical Retail Refueling System (MTRRS). Conduct developmental and operational testing where applicable for Water Bison and Water Bison Light, E2FDS, Petroleum Tankers, MTRRS, Water Storage and Distribution Systems (WSDS) 40,000 gallon and 100,000 gallon sets, PEAK, HIPPO. Conduct Source Selection Evaluation Boards (SSEBs) within the Petroleum and Water Systems portfolio. Develop documentation in support of Milestone Decisions. Will award Other Transactional Agreements (OTAs) or traditional Federal Acquisition Regulation (FAR) based contracts based on market research, industry capabilities and program risks.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PM Support	MIPR	Various TACOM : Warren, MI	-	2.788	Dec 2018	2.360	Jan 2020	-		-		-	0.000	5.148	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.343		-		-		-	0.000	0.343	-
		Subtotal	-	2.788		2.703		-		-		-	0.000	5.491	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Water Bison	C/FFP	TBD : TBD	-	-		-		2.300	Nov 2020	-		2.300	0.000	2.300	-
Early Entry Fluid Distribution System (E2FDS)	MIPR	APG : Aberdeen Proving Ground, MD	-	0.014	Feb 2019	-		-		-		-	0.000	0.014	-
Modular Tactical Retail Refueling System (MTRRS)	MIPR	Keweenaw Research Center (KRC) : Houghton, MIeew	0.317	0.850	Apr 2019	-		-		-		-	0.000	1.167	-
Petroleum Expeditionary Analysis Kit (PEAK)	C/FFP	TBD : TBD	-	-		-		0.500	Nov 2020	-		0.500	0.000	0.500	-
Tactical Fuel Distribution System (TFDS)	C/FFP	TBD : TBD	-	-		-		2.058	Nov 2020	-		2.058	0.000	2.058	-
3K Tactical Water Purification System (3K TWPS)	C/FFP	TACOM : Warren, MI	-	1.023	Jan 2019	-		-		-		-	0.000	1.023	-
Bulk Fuel Distribution System (BFDS)	C/FFP	TBD : TBD	-	-		-		0.175	Nov 2020	-		0.175	0.000	0.175	-
		Subtotal	0.317	1.887		-		5.033		-		5.033	0.000	7.237	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army		Date: February 2020
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Water Bison	MIPR	TACOM : Warren, MI	0.045	0.045	Mar 2019	0.292		0.231	Oct 2020	-		0.231	0.000	0.613	-
Mobile Tactical Retail Refueling System (MTRRS)	MIPR	GVSC : Warren, MI	0.310	0.500	Jan 2019	-		-		-		-	0.000	0.810	-
Bulk Fuel Distribution System (BFDS)	MIPR	GVSC : Warren, MI	0.045	0.045	Mar 2019	0.670	Jan 2020	-		-		-	0.000	0.760	-
Petroleum Edpeditionary Analysis Kit (PEAK)	MIPR	GVSC : Warren, MI	-	0.300	Feb 2019	0.037	Oct 2019	0.275	Oct 2020	-		0.275	0.000	0.612	-
Tactical Fuel Distribution System (TFDS)	MIPR	GVSC : Warren, MI	-	0.045	Feb 2019	0.076	Feb 2020	0.233	Oct 2020	-		0.233	0.000	0.354	-
3K Tactical Water Purification System (3K TWPS)	MIPR	NAVSEA UARC Office : Washington, DC	0.470	0.395	Feb 2019	0.076	Feb 2020	-		-		-	0.000	0.941	-
Load Handling System (LHS) Compatible Water Tank Rack System (HIPPO)	MIPR	GVSC : Warren MI	-	-		-		0.370		-		0.370	0.000	0.370	-
Water Storage and Distribution	MIPR	GVSC : Warren, MI	-	-		-		0.218		-		0.218	0.000	0.218	-
		Subtotal	0.870	1.330		1.151		1.327		-		1.327	0.000	4.678	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Water Bison	TBD	APG : Aberdeen Proving Ground, MD	-	-		-		0.200	Feb 2021	-		0.200	0.000	0.200	-
Early Entry Fluid Distribution System (E2FDS)	MIPR	APG : Aberdeen Proving Ground, MD	0.401	2.361	Jan 2019	1.566	Mar 2020	1.432	Mar 2021	-		1.432	0.000	5.760	-
Load Handling System (LHS) Compatible Water	MIPR	APG : Aberdeen Proving Ground, MD	-	-		1.686	Jan 2020	0.530	Feb 2021	-		0.530	0.000	2.216	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Tank Rack System (HIPPO)															
Petroleum Expeditionary Analysis Kit (PEAK)	MIPR	GVSC : Warren, MI	-	-		0.382	Jan 2020	0.225	Jan 2021	-		0.225	0.000	0.607	-
Bulk Fuel Distribution System (BFDS)	TBD	APG : Aberdeen Proving Ground, MD	-	-		-		0.500	Jan 2021	-		0.500	0.000	0.500	-
Water Storage Distribution System (WSDS)	TBD	Various : Various	-	-		-		0.282	Feb 2021	-		0.282	0.000	0.282	-
Modular Tactical Retail Refueling System (MTRRS)	MIPR	APG : Aberdeen Proving Ground, MD	3.250	-		0.052	Jun 2020	0.950	Oct 2020	-		0.950	0.000	4.252	-
3K Tactical Water Purification System (3K TWPS)	MIPR	APG : Aberdeen Proving Ground, MD	0.200	-		-		-		-		-	0.000	0.200	-
Tactical Fuel Distribution System (TFDS)	TBD	APG : Aberdeen Proving Ground, MD	-	-		-		0.509	Jun 2021	-		0.509	0.000	0.509	-
		Subtotal	3.851	2.361		3.686		4.628		-		4.628	0.000	14.526	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	5.038	8.366		7.540		10.988		-		10.988	0.000	31.932	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

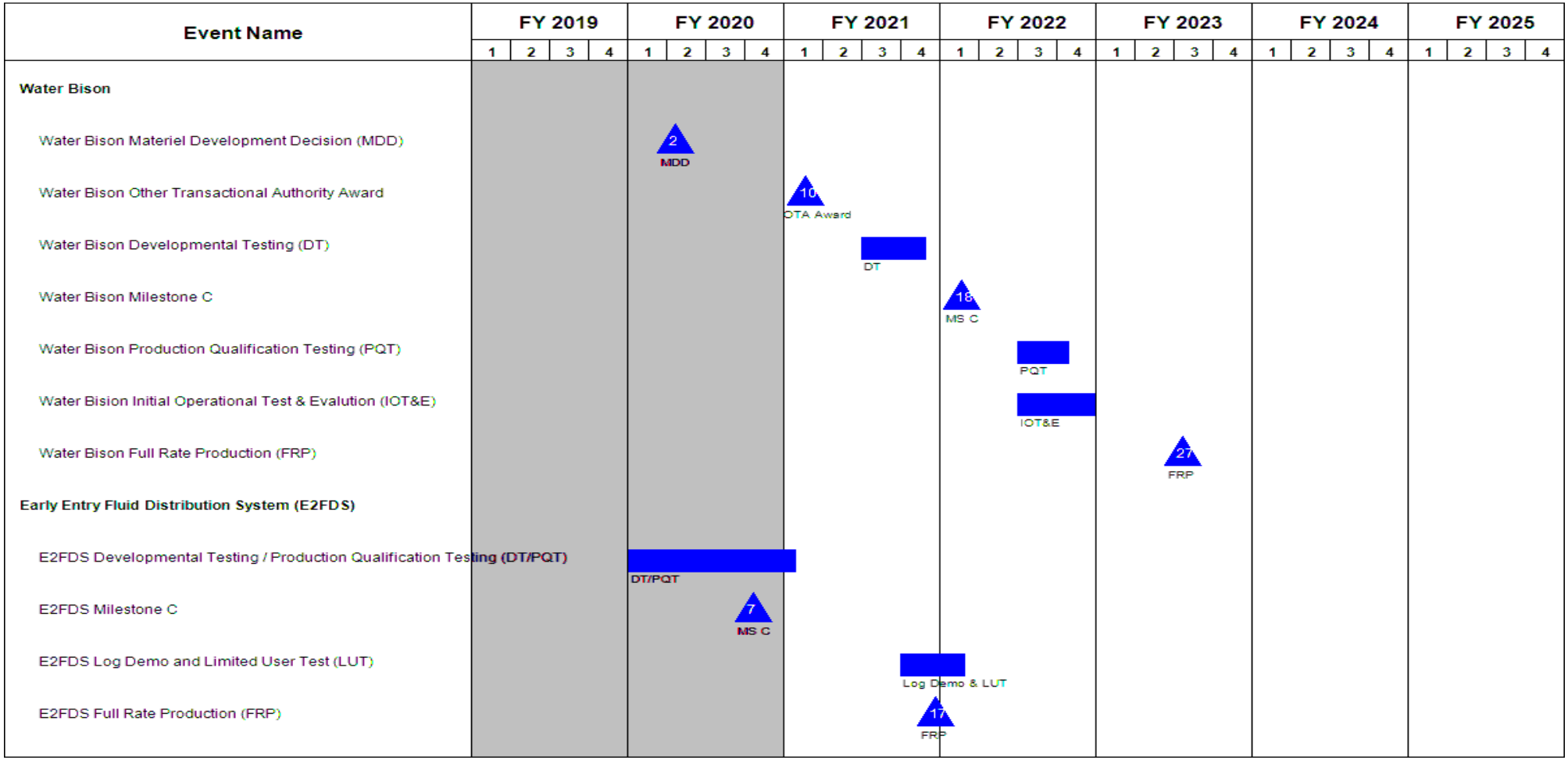

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

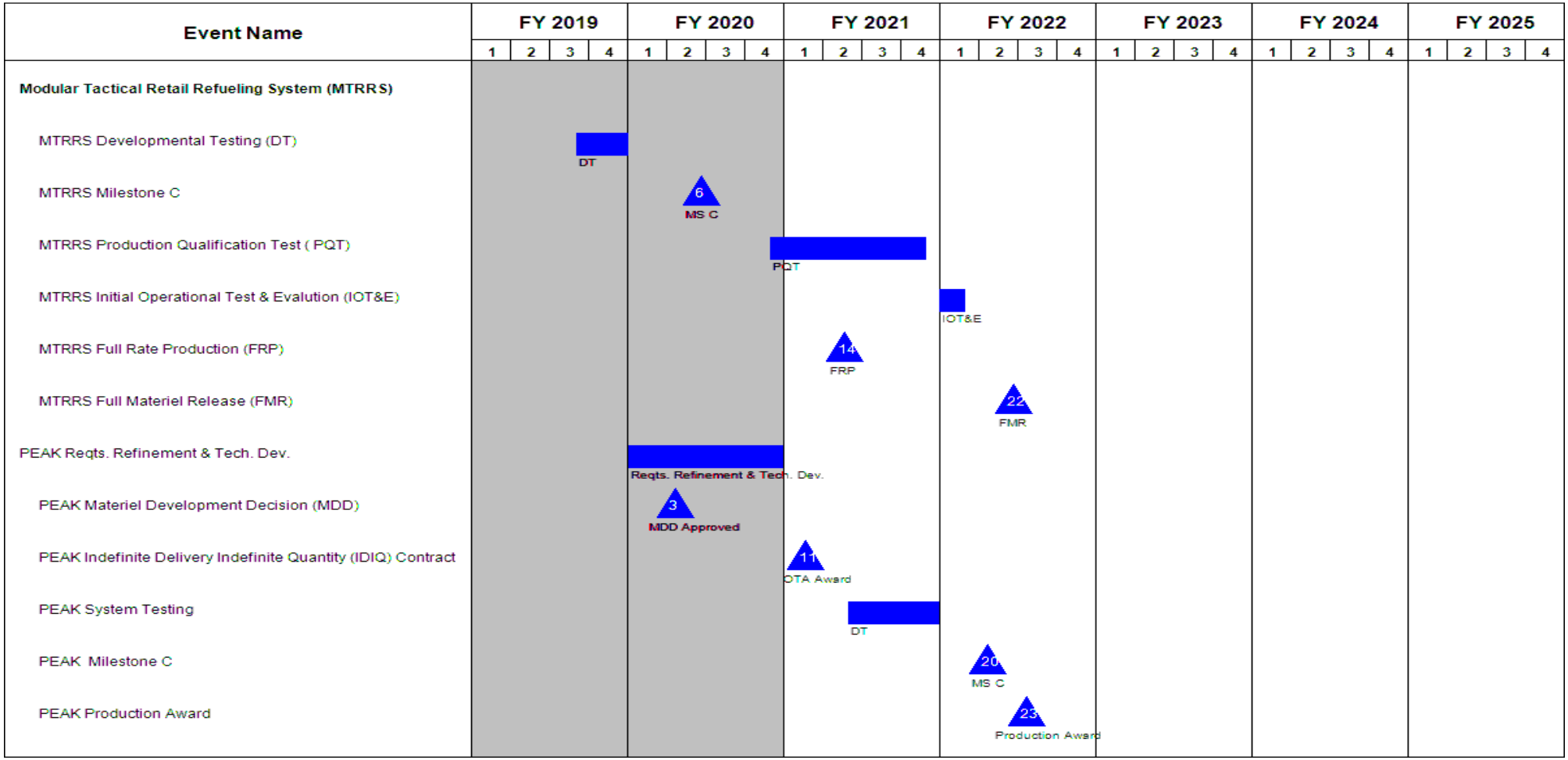

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

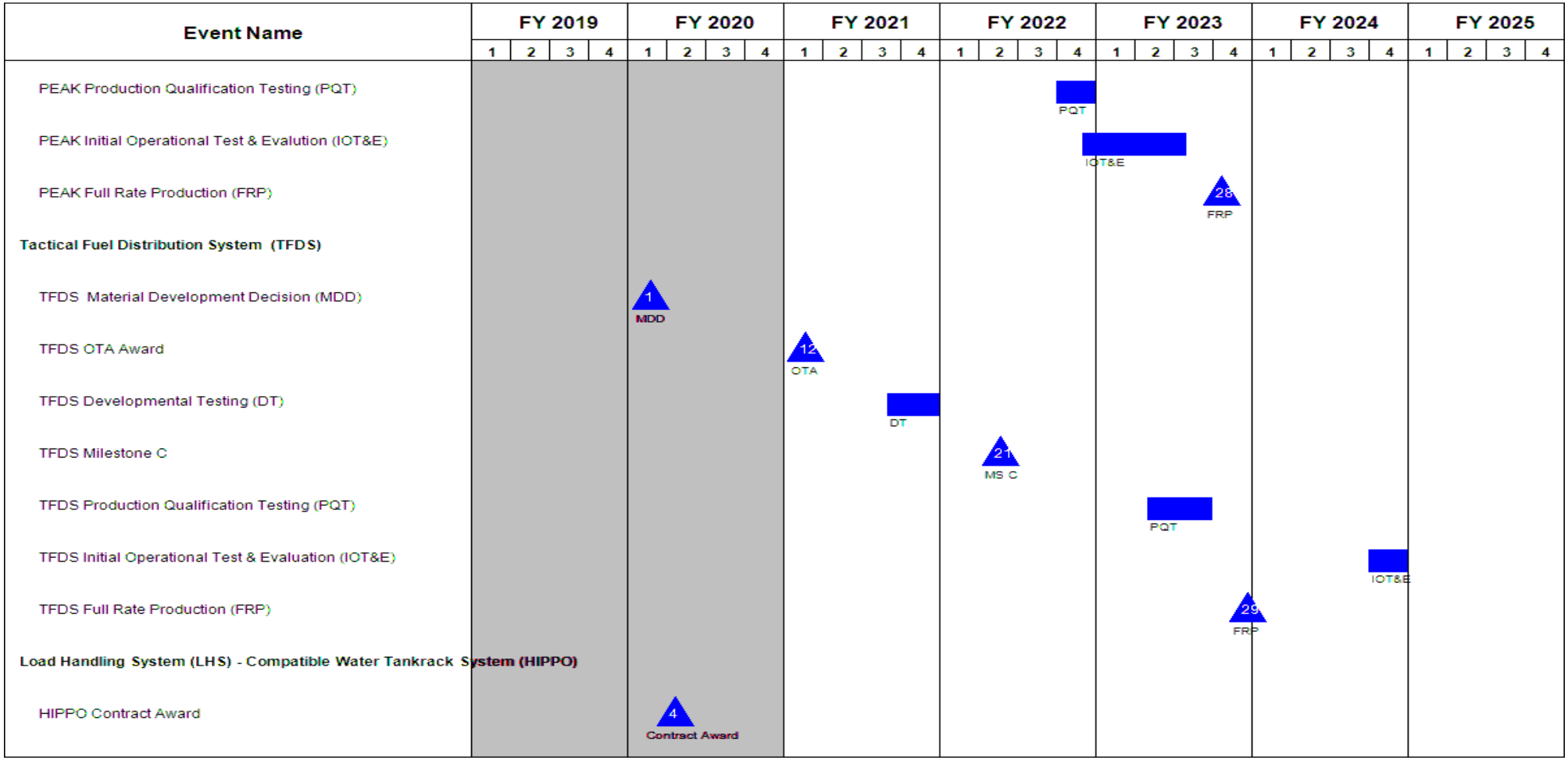

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

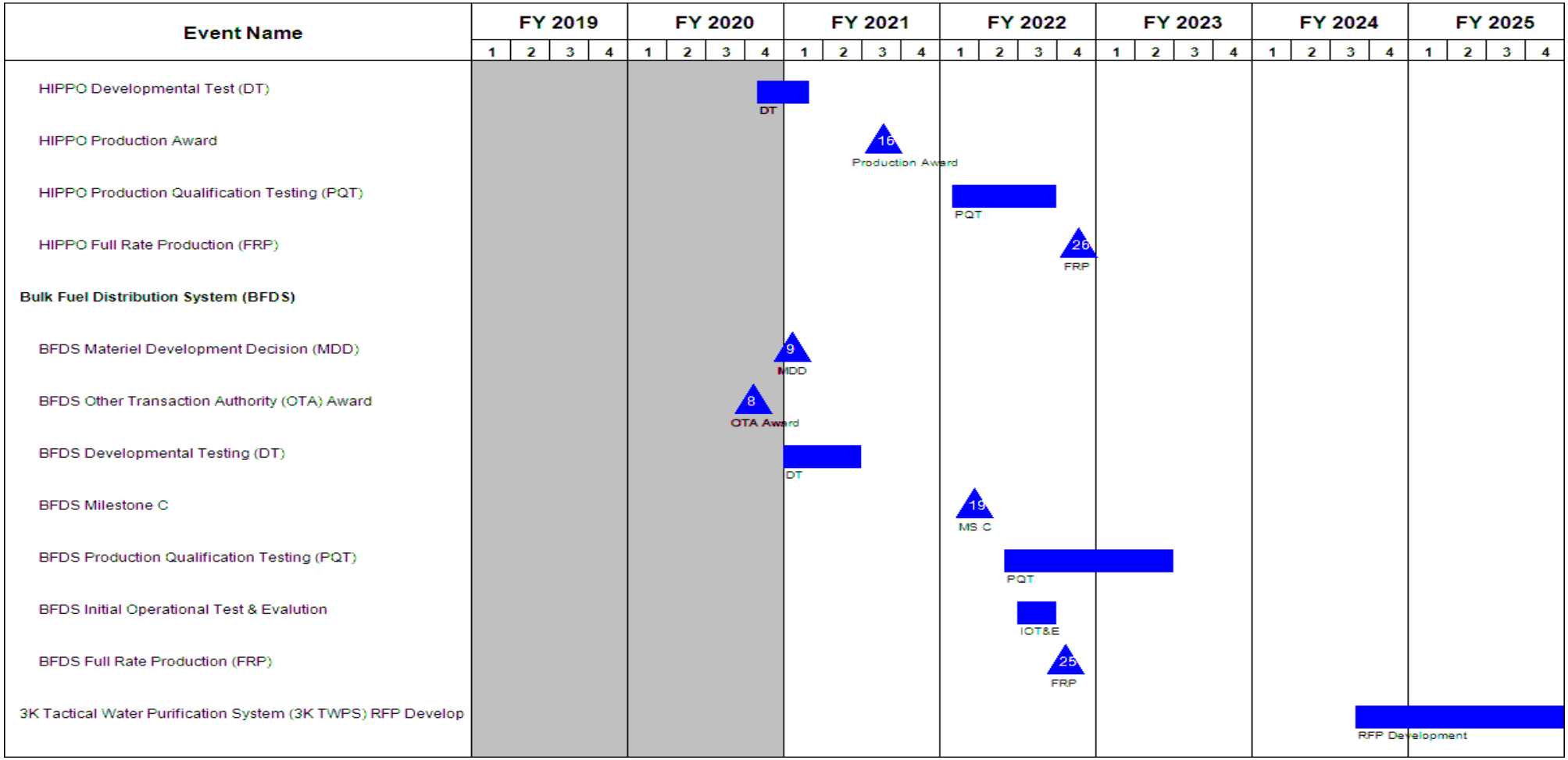

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
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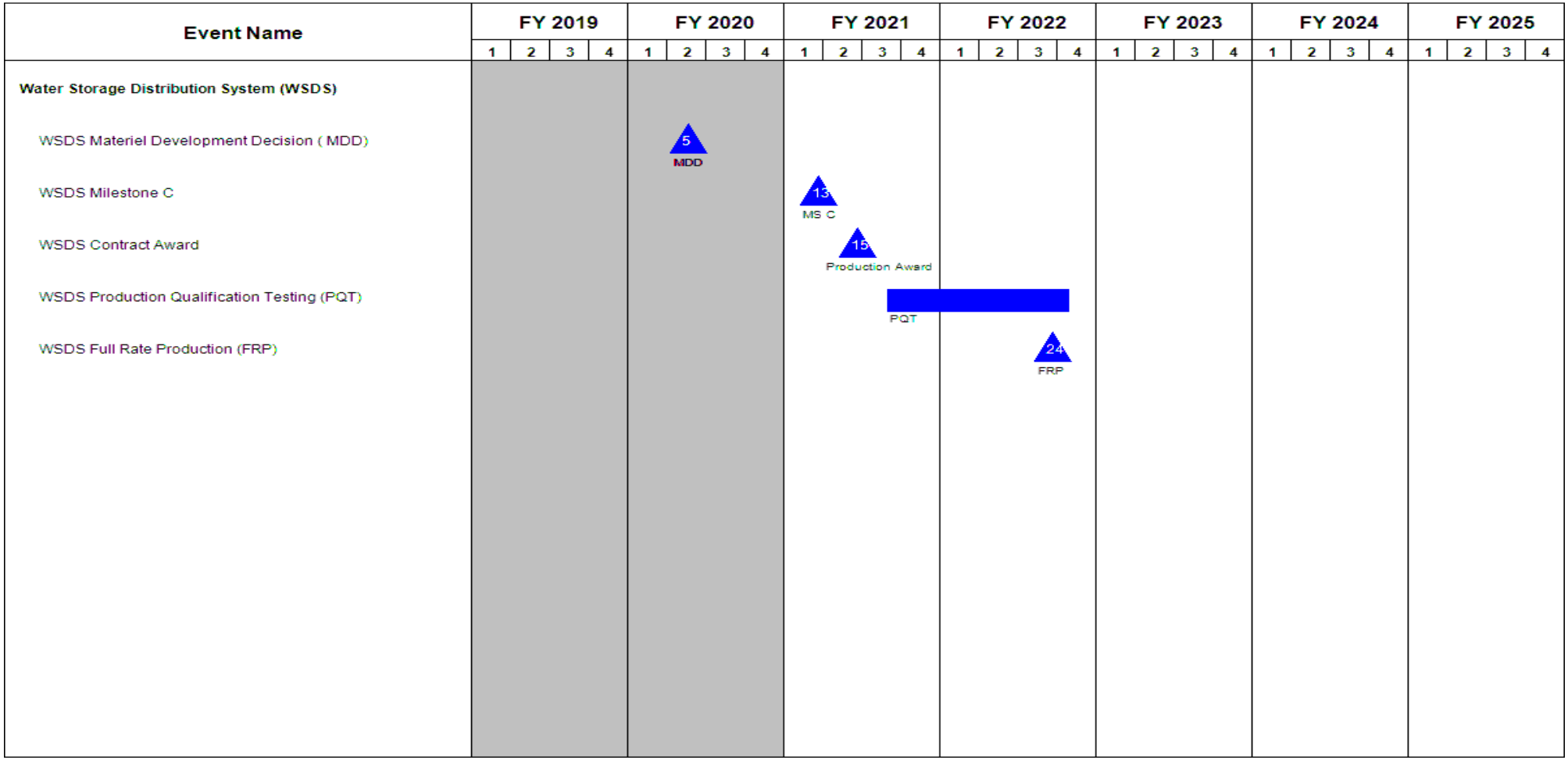

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Water Bison	1	2022	4	2025
Water Bison Materiel Development Decision (MDD)	2	2020	2	2020
Water Bison Other Transactional Authority Award	1	2021	1	2021
Water Bison Developmental Testing (DT)	3	2021	4	2021
Water Bison Milestone C	1	2022	1	2022
Water Bison Production Qualification Testing (PQT)	3	2022	4	2022
Water Bision Initial Operational Test & Evalution (IOT&E)	3	2022	4	2022
Water Bison Full Rate Production (FRP)	3	2023	3	2023
Early Entry Fluid Distribution System (E2FDS)	1	2017	4	2022
E2FDS Developmental Testing / Production Qualification Testing (DT/PQT)	1	2020	1	2021
E2FDS Milestone C	4	2020	4	2020
E2FDS Log Demo and Limited User Test (LUT)	4	2021	1	2022
E2FDS Full Rate Production (FRP)	4	2021	4	2021
Modular Tactical Retail Refueling System (MTRRS)	1	2017	4	2022
MTRRS Developmental Testing (DT)	3	2019	4	2019
MTRRS Milestone C	2	2020	2	2020
MTRRS Production Qualification Test (PQT)	4	2020	4	2021
MTRRS Initial Operational Test & Evalution (IOT&E)	1	2022	1	2022
MTRRS Full Rate Production (FRP)	2	2021	2	2021
MTRRS Full Materiel Release (FMR)	2	2022	2	2022
PEAK Reqts. Refinement & Tech. Dev.	1	2020	4	2020
PEAK Materiel Development Decision (MDD)	2	2020	2	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
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	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
PEAK Indefinite Delivery Indefinite Quantity (IDIQ) Contract	1	2021	1	2021
PEAK System Testing	2	2021	4	2021
PEAK Milestone C	2	2022	2	2022
PEAK Production Award	3	2022	3	2022
PEAK Production Qualification Testing (PQT)	4	2022	4	2022
PEAK Initial Operational Test & Evalution (IOT&E)	4	2022	3	2023
PEAK Full Rate Production (FRP)	4	2023	4	2023
Tactical Fuel Distribution System (TFDS)	1	2020	1	2025
TFDS Material Development Decision (MDD)	1	2020	1	2020
TFDS OTA Award	1	2021	1	2021
TFDS Developmental Testing (DT)	3	2021	4	2021
TFDS Milestone C	2	2022	2	2022
TFDS Production Qualification Testing (PQT)	2	2023	3	2023
TFDS Initial Operational Test & Evaluation (IOT&E)	4	2024	4	2024
TFDS Full Rate Production (FRP)	4	2023	4	2023
Load Handling System (LHS) - Compatible Water Tankrack System (HIPPO)	3	2020	4	2025
HIPPO Contract Award	2	2020	2	2020
HIPPO Developmental Test (DT)	4	2020	1	2021
HIPPO Production Award	3	2021	3	2021
HIPPO Production Qualification Testing (PQT)	1	2022	3	2022
HIPPO Full Rate Production (FRP)	4	2022	4	2022
Bulk Fuel Distribution System (BFDS)	1	2020	2	2028
BFDS Materiel Development Decision (MDD)	1	2021	1	2021
BFDS Other Transaction Authority (OTA) Award	4	2020	4	2020
BFDS Developmental Testing (DT)	1	2021	2	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
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	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
BFDS Milestone C	1	2022	1	2022
BFDS Production Qualification Testing (PQT)	2	2022	2	2023
BFDS Initial Operational Test & Evalution	3	2022	3	2022
BFDS Full Rate Production (FRP)	4	2022	4	2022
3K Tactical Water Purification System (3K TWPS) RFP Develop	3	2024	4	2025
Water Storage Distribution System (WSDS)	4	2019	4	2023
WSDS Materiel Development Decision (MDD)	2	2020	2	2020
WSDS Milestone C	1	2021	1	2021
WSDS Contract Award	2	2021	2	2021
WSDS Production Qualification Testing (PQT)	3	2021	4	2022
WSDS Full Rate Production (FRP)	3	2022	3	2022

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L43 / *ENGINEER SUPPORT EQUIPMENT - ED*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
L43: *ENGINEER SUPPORT EQUIPMENT - ED*	-	0.341	1.242	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.583
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

These systems provide state-of-the-art deployable, combat engineer and construction equipment and critical life support along with engineer safety and special unit support equipment supporting the joint warfighter. These programs enhance combat and military operations minimize transportation requirements and reduce the logistical footprint by eliminating obsolete equipment and reducing the number of programs. The Combat Engineer and Construction equipment consists of the Surveying, Firefighting Individual Requirements Equipment Support (FIRES), Fire Protection Equipment Type I, II and III, Tactical Fire Fighting Truck Tools (TFTT), Family of Power Utility Kits (FoPUK), and Soldier Portable Kits, Lineman's Tool Kit, Concrete and Masonry, Electricians, Plumbers, Pipefitters, Family of Light Sets (FoLS), Airfield Damage Repair Kit (ADRK), Diving Equipment, Surface Swimmer Support Sets, Surface Supplied Diving Set, procurement of new Technical/Special Tools, Pioneer Support Set, and the Pioneer Land Clearing and Building Erection Set. Project will explore Additive Manufacturing for Engineer systems. Funding will support the procurement of market samples and testing for Soldier Portable Sets, Kits, and Outfits (SKO), Special Tools initiative, and critical life support equipment such as the Deep Sea Set, Underwater Construction Set, Photo Support Set, Diver Supplemental Issue Set, Closed Circuit Scuba Set, Supervisor Propulsion Emergency and Recovery SCUBA (SPEaRS), Divers' Supplemental Issue Set(DSIS), Vertical Skills Engineer Construction Kit (VSECK), and Family of Boats and Motors (FOBAM).

BUDGET ITEM JUSTIFICATION: This project supports development, demonstration, testing and evaluation within the Combat Engineer and Construction Support Equipment arena. These items include critical life support equipment such as diving, firefighting, fire suppression, urban and dense urban operations, subterranean operations, breathable air compressors, and emergency and recovery sets along with engineer safety and special unit support equipment and photo support sets. Funding shall allow for development of dual use systems that support wartime use by Soldiers to include Special Forces and peacetime operations that include national disaster relief and homeland security operations. Much of this equipment has an inherent short Economic Useful Life (EUL). Investments used to revise, update and obtain equipment within this portfolio has resulted in increased readiness, safety, and effectiveness and reductions in footprint.

Funding supports modernization of the current Ordnance/Engineer equipment by investigating technology insertions due to but not limited to obsolescence and technology innovations. Funding also supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement operating concepts.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Family of Power Utility Kits (FoPUK)	0.072	0.499	-	-	-
Description: Conduct Market Research, Develop, and Initiate procurement activities for Family of Power Utility Kits (FoPUK).					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L43 / *ENGINEER SUPPORT EQUIPMENT - ED*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
FY 2020 Plans: TM Development, Validation, Log Demo, Verification, Engineer/QA/PM Support ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Zero funding for FY 2021. Transitioning into Production.					
Title: Supervisory Propulsion, Emergency and Recovery Set (SPEaRS) ***Description:*** Prepare documentation, conduct market research, procure production representative, and complete required testing. ***FY 2020 Plans:*** TM Development, Engineer/QA/PM Support ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Zero funding in FY 2021. RDTE effort complete.	0.125	0.454	-	-	-
Title: Engineering and Quality Assurance ***Description:*** Engineering and Quality Assurance of engineering SKOs	0.100	-	-	-	-
Title: Program Managment Support ***Description:*** Program support costs associated with emerging program development. ***FY 2020 Plans:*** Salary support in the product office for emerging programs. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Zero funding in FY 2021. RDTE effort complete.	0.044	0.232	-	-	-
Title: FY 2020 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2020 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2020 to FY 2021 Increase/Decrease Statement:***	-	0.057	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L43 / *ENGINEER SUPPORT EQUIPMENT - ED*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Funding transferred in accordance with Title 15 USC ?638					
Accomplishments/Planned Programs Subtotals	0.341	1.242	-	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• R70001: *Family Of Engr Combat and Construction Sets*	13.010	11.451	23.324	-	23.324	30.404	-	-	-	0.000	78.189
• R12001: *Family of Boats and Motors*	8.006	5.745	5.289	-	5.289	-	-	-	-	0.000	19.040
• ML5301: *Items Less Than $5M (Eng Spt)*	2.000	4.128	8.014	-	8.014	8.987	-	-	-	0.000	23.129

Remarks

D. Acquisition Strategy

Programs will progress from pre Milestone Decision Document (MDD) activities through market research, market samples, Description for Purchase, development, production representative systems and testing. Modernization and Optimization of existing tools and testing of market samples will progress from Engineering and Manufacturing Development (EMD) and transition into production. All efforts will support the two level maintenance concept utilizing commercial technologies and incorporating them into SKOs to support next generation weapon and support systems.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L43 / *ENGINEER SUPPORT EQUIPMENT - ED*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	MIPR	PM SKOT : MI	0.408	0.100	Dec 2018	0.065	Dec 2019	-		-		-	Continuing	Continuing	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.057		-		-		-	0.000	0.057	-
		Subtotal	0.408	0.100		0.122		-		-		-	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Conduct Market Research for Family of Power Utility Kits (FoPUK)	MIPR	TBD : TBD	1.840	-		0.124	Oct 2019	-		-		-	Continuing	Continuing	-
Market Samples for Supervisory, Propulsion, Emergency and Recovery Set (SPEARS)	MIPR	TBD : TBD	0.263	-		-		-		-		-	Continuing	Continuing	-
Conduct Market Research for Urban Search and Rescue	MIPR	TBD : TBD	0.893	-		-		-		-		-	0.000	0.893	-
Airfield Damage Repair Kit (ADRK)	TBD	TBD : TBD	0.055	-		-		-		-		-	0.000	0.055	-
Special Tools hardware	TBD	TBD : TBD	0.100	-		-		-		-		-	0.000	0.100	-
		Subtotal	3.151	-		0.124		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering and Quality Assurance - FoPUk	MIPR	ECBC/ARDEC : Rock Island, IL	0.590	0.072	Oct 2018	0.326	Oct 2019	-		-		-	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L43 / *ENGINEER SUPPORT EQUIPMENT - ED*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering and Quality Assurance (ES&SUS)	MIPR	ECBC/ARDEC : Rock Island, IL	0.110	-		-		-		-		-	Continuing	Continuing	-
Engineer and Quality Assurance Support - SPEARS	MIPR	ECBC/ARDEC : Rock Island, IL	0.167	0.125	Oct 2018	0.413	Oct 2019	-		-		-	Continuing	Continuing	-
Engineering and Quality Assurance - US&R	MIPR	ECBC/ARDEC : Rock Island, IL	0.300	-		-		-		-		-	Continuing	Continuing	-
General Engineer Support for Engineer Portfolio SKOs	MIPR	ECBC : Rock Island, IL	0.080	-		0.090	Oct 2019	-		-		-	Continuing	Continuing	-
Packaging Support for Engineer Portfolio SKOs	MIPR	ECBC : Rock Island, IL	0.080	0.044	Oct 2018	0.167	Oct 2019	-		-		-	Continuing	Continuing	-
Technical Manual Support	MIPR	TACOM Publications : Warren, MI	0.140	-		-		-		-		-	Continuing	Continuing	-
Engineer and Quality Assurance Airfield Damage Repair Kit (ADRK)	MIPR	ECBC/ARDEC : Rock Island, IL	0.095	-		-		-		-		-	Continuing	Continuing	-
		Subtotal	1.562	0.241		0.996		-		-		-	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Family of Power Utility Kits Testing	MIPR	ATEC : Aberdeen	0.300	-		-		-		-		-	0.000	0.300	-
SPEARS testing	MIPR	ATEC : Aberdeen	0.350	-		-		-		-		-	0.000	0.350	-
		Subtotal	0.650	-		-		-		-		-	0.000	0.650	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L43 / *ENGINEER SUPPORT EQUIPMENT - ED*	

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	5.771	0.341		1.242		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L43 / *ENGINEER SUPPORT EQUIPMENT - ED*

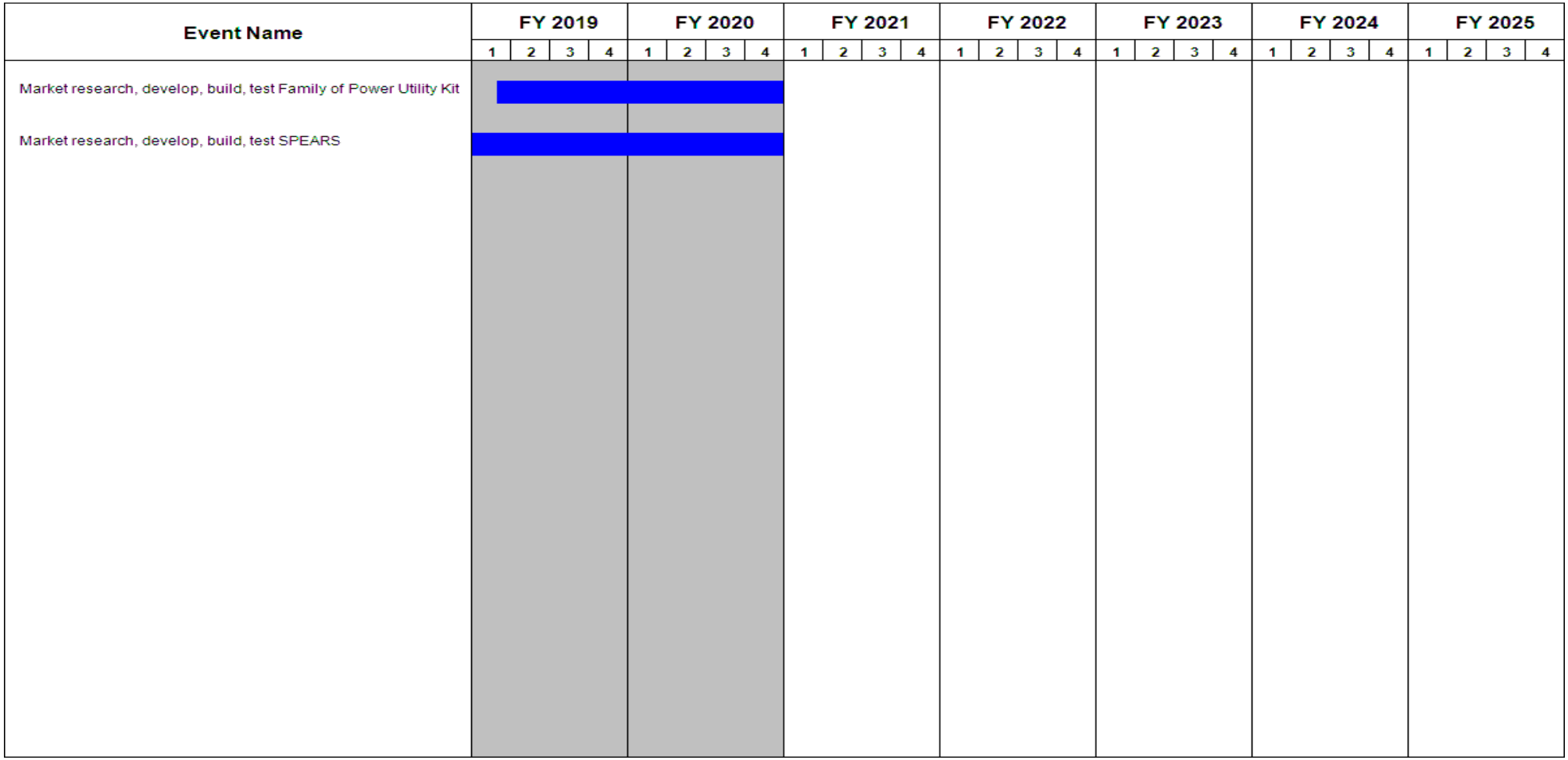

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L43 / *ENGINEER SUPPORT EQUIPMENT - ED*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Market research, develop, build, test Family of Power Utility Kit	1	2017	4	2020
Market research, develop, build, test SPEARS	1	2019	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L46 / *Maintenance Support Equipment*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
L46: *Maintenance Support Equipment*	-	1.365	5.000	1.349	-	1.349	0.839	0.000	0.000	0.000	0.000	8.553
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mobile Maintenance Equipment provides state of the art, deployable, vehicle-mounted, Soldier portable and containerized shelter tool systems supporting the readiness of the Joint warfighter directly supporting Soldier Lethality, Next Generation Combat Vehicle (NGCV) and Long Range Precision Fires (LRPF), as well as, addressing GAPs 10 and 17. These systems are equipped with industrial quality tools required for Two Level Maintenance that reduce common tool redundancy, provide tool standardization, minimize transportation requirements, reduce logistical footprint, and are backed by a Lifetime Warranty/Replacement Program which reduces sustainment costs. This is accomplished by employing a system of systems approach to maintenance acquisition. The System of Systems approach builds a maintenance capability upon each system, allowing a logical and natural approach to the Army's overall two level maintenance strategy. These inter-connected systems distributed throughout the Army at multiple levels and echelons provide a holistic repair capability in all scenarios and environments. These systems provide the Maintenance and Combat Commanders an unprecedented capability to repair wheeled, tracked, aviation, ground support and weapons systems on site at one location at one time. This approach to maintenance acquisition increases efficiencies and supports the current force while providing modular configurations designed to meet the specific needs of the Army maintainer in today's complex transforming environment.

BUDGET ITEM JUSTIFICATION: The need to develop and maintain a System of System maintenance approach is critical for maintaining readiness due to the growing complexity of today's military equipment, operational tempo, modularity, and current and evolving Tactics Techniques and Procedures (TTPs). The individual maintenance systems are comprehensive, interconnected and capable of solving and repairing any maintenance problems. The System of Systems approach does not advocate specific tools, methods or practices; instead it seeks to promote a streamlined comprehensive set of systems for solving maintenance challenges where the interactions of doctrine, technology, time and tactics techniques and procedures are the primary drivers. Funding for projects shall include test article procurement and testing of Soldier portable maintenance Sets, Kits, and Outfits (SKOs), load banks and refrigeration tool kit; investigation of new technologies for next generation mobile maintenance equipment shop sets including the Shop Equipment Welding (SEW) and Shop Equipment Contact Maintenance (SECM); development of additional Standard Automotive Tool Set (SATS) maintenance modules, Armament Repair Shop Set (ARSS), Mobile Ammunition Processing Facility (MAPF), Forward Repair System (FRS), Special Tools initiatives, shelter mounted system development; packaging development; and technical support for emerging Joint Capabilities Integration and Development System (JCIDS) materiel requirements documents. Additive Manufacturing increased capabilities to the Metal Working and Machining Shop Set (MWMSS) to include a polymer and metal printing and associated digital library capability. Modernization upgrades increase effectiveness while improving efficiency, reliability and maintainability while supporting emerging Army systems as well as using lower cost set components.

Funding supports modernization of the current Ordnance equipment by investigating technology insertions due to but not limited to obsolescence and technology innovations. Funding also supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement concepts.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L46 / *Maintenance Support Equipment*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Next Generation Shop Equipment, Welding (SEW) ***Description:*** Develop and Test new components of Shop Equipment, Welding	0.293	-	-	-	-
Title: Armament Repair Shop Set (ARSS) ***Description:*** ARSS Shelter Modernization	0.577	-	-	-	-
Title: MWMSS Additive Manufacturing ***Description:*** Develop Additive Manufacturing capability for Army systems, Limited User Experiment and Evaluation. ***FY 2021 Base Plans:*** Expeditionary Metal Additive Manufacturing options. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Zero funding in FY 2020. Restart RDTE effort in FY 2021 when funding is restored.	0.300	-	1.349	-	1.349
Accomplishments/Planned Programs Subtotals	1.170	-	1.349	-	1.349

	FY 2019	FY 2020
Congressional Add: Next Generation High Mobility Multipurpose Wheeled Vehicle (HMMWV) Shop Equipment Contact Maintenance (SECM) ***FY 2019 Accomplishments:*** Next Generation High Mobility Multipurpose Wheeled Vehicle (HMMWV) Shop Equipment Contact Maintenance (SECM) ***FY 2020 Plans:*** Next Generation High Mobility Multipurpose Wheeled Vehicle (HMMWV) Shop Equipment Contact Maintenance (SECM)	0.195	5.000
Congressional Adds Subtotals	0.195	5.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• ML5345: *Items Less Than $5.0M (Maint Eq)*	5.253	5.608	5.386	0.184	5.570	7.248	2.323	-	-	0.000	26.002

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L46 / *Maintenance Support Equipment*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• G05301: *Mobile Maintenance Equipment Systems*	34.479	140.053	40.337	7.769	48.106	43.965	-	-	-	0.000	266.603

Remarks

D. Acquisition Strategy

Programs will progress from pre Milestone Decision Document (MDD) activities through market research, market samples, Description for Purchase, development, production representative systems and testing. Modernization and Optimization of existing tools and testing of market samples will progress from Engineering and Manufacturing Development (EMD) and transition into production. All efforts will support the two level maintenance concept utilizing commercial technologies and incorporating them into SKOs to support next generation weapon and support systems.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L46 / *Maintenance Support Equipment*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	MIPR	PM SKOT : Warren, MI	0.312	-		0.500	Mar 2020	0.095	Oct 2020	-		0.095	Continuing	Continuing	-
		Subtotal	0.312	-		0.500		0.095		-		0.095	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Armament Repair Shop Set 2 design and developement	MIPR	Tobyhanna Army Depot/TBD : Tobyhanna, PA	0.186	0.278	Mar 2019	-		-		-		-	0.000	0.464	-
Develop Rapid Deployment Sets, Kits, & Outfits - Special Tool Initiative.	MIPR	CCDC : Rock Island, IL	0.300	-		-		-		-		-	0.000	0.300	-
Refrigeration Tool Kit (RTK) Logistics Demonstration	MIPR	CCDC : Rock Island, IL	0.394	-		-		-		-		-	0.000	0.394	-
Modernization/Redesign efforts of Truck/Trailer transported shelters for next generation systems	MIPR	CCDC : Rock Island, IL	2.025	-		-		-		-		-	0.000	2.025	-
Procure Ground Based Special Tools in support of Tactical Vehicles	MIPR	PM SKOT : Harrison, MI	0.343	-		-		-		-		-	0.000	0.343	-
Next Generation Shop Equipment Welding (SEW) concept design and development	MIPR	CCDC : Rock Island, IL	2.493	-		-		-		-		-	0.000	2.493	-
Additive Manufacturing Hardware	Various	TBD : TBD	-	-		-		0.543	Dec 2020	-		0.543	0.000	0.543	-
Product Dev Next Generation Shop	MIPR	CCDC : Rock Island, IL	-	-		1.550	Mar 2020	-		-		-	0.000	1.550	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L46 / *Maintenance Support Equipment*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Equipment Contact Maintenance															
		Subtotal	5.741	0.278		1.550		0.543		-		0.543	0.000	8.112	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineer and Quality Assurance in support of SKOs	MIPR	CCDC : (IL, MI)	1.563	-		-		-		-		-	Continuing	Continuing	-
Packaging Support	MIPR	CCDC Armament Center : Rock Island, IL	0.231	-		-		0.183		-		0.183	Continuing	Continuing	-
Next Generation Shop Equipment Welding (SEW) support	MIPR	ECBC / ARDEC / PM SKOT : (IL, MI)	0.250	0.293	Dec 2018	-		-		-		-	0.000	0.543	-
Refrigeration Tool Kit (RTK) support	MIPR	ECBC / ARDEC / PM SKOT : (IL, MI)	0.153	-		-		-		-		-	0.000	0.153	-
Armament Repair Shop Set 2 support	MIPR	ECBC / ARDEC / PM SKOT : (IL, MI)	0.101	0.231	Dec 2018	-		-		-		-	0.000	0.332	-
Additive Manufacturing support	MIPR	ECBC : IL	-	0.300	Dec 2018	-		0.528	Oct 2020	-		0.528	Continuing	Continuing	-
Fire Suppression Refill System (FSRS) support	MIPR	PM SKOT : MI	0.040	-		-		-		-		-	0.000	0.040	-
Next Generation Shop Equipment Contact Maintenance support	MIPR	ECBC/PM SKOT : (IL, MI)	-	0.195	Dec 2018	1.350	Mar 2020	-		-		-	0.000	1.545	-
Special Tools support	MIPR	ECBC : IL	0.015	-		-		-		-		-	0.000	0.015	-
Next Generation Shop Equipment Contact Maintenance logistic efforts	TBD	Various : Various	-	-		1.000	Jun 2020	-		-		-	0.000	1.000	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L46 / *Maintenance Support Equipment*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	2.353	1.019		2.350		0.711		-		0.711	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ARSS 2 Testing	MIPR	ATEC : Aberdeen Test Center	0.250	0.068	Dec 2018	-		-		-		-	0.000	0.318	-
Testing of the Next Generation Shop, Equipment Welding	MIPR	ATEC : Aberdeen Test Center	0.315	-		-		-		-		-	0.000	0.315	-
Fire Suppression Refill System (FSRS) testing	MIPR	ATEC : Aberdeen Test Center	0.287	-		-		-		-		-	0.000	0.287	-
Next Generation Shop Equipment Contact Maintenance test	MIPR	ATEC : Aberdeen Test Center	-	-		0.600	Jan 2021	-		-		-	0.000	0.600	-
		Subtotal	0.852	0.068		0.600		-		-		-	0.000	1.520	N/A

	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	9.258	1.365		5.000		1.349		-		1.349	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L46 / *Maintenance Support Equipment*

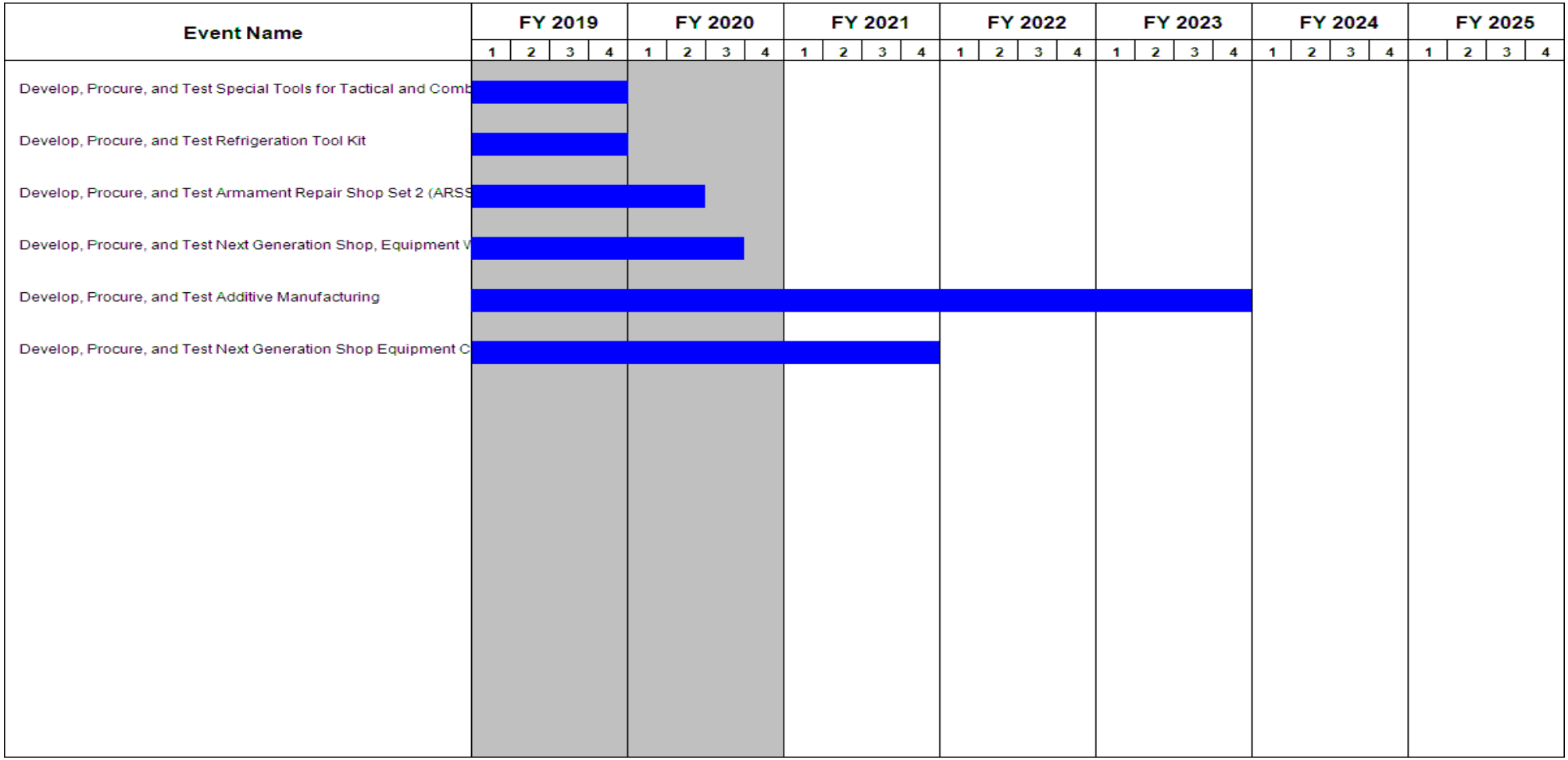

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L46 / *Maintenance Support Equipment*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Develop, Procure, and Test Special Tools for Tactical and Combat Vehicles	1	2016	4	2019
Develop, Procure, and Test Refrigeration Tool Kit	1	2017	4	2019
Develop, Procure, and Test Armament Repair Shop Set 2 (ARSS)	1	2018	2	2020
Develop, Procure, and Test Next Generation Shop, Equipment Welding (SEW)	4	2016	3	2020
Develop, Procure, and Test Additive Manufacturing	3	2016	4	2023
Develop, Procure, and Test Next Generation Shop Equipment Contact Maintenance	1	2019	4	2021
Develop, Procure, and Test Fire Suppression Refill System	1	2016	4	2018

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L47 / *Improved Environmental Control Units Ed*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
L47: *Improved Environmental Control Units Ed*	-	2.262	1.076	1.102	-	1.102	1.972	1.494	1.189	1.199	0.000	10.294
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This line supports the Army Network Modernization Strategy Line of Effort #4, Command Post. Program develops/integrates IECUs supporting current and new requirements such as the Command Post Integrated Infrastructure (CPI2), a family of Army Standard Family of Rigid Wall Shelters (ASF-RWS), and other emerging requirements. In addition, supports critical Chemical Biological Radiological and Nuclear (CBRN) modifications required to support the Chemically Protected Deployable Medical System (CP DEPMEDS).

The Improved Environmental Control Units (IECU) program will provide updates that support the new generation of Environmental Control Units (ECUs) that use environmentally approved refrigerants, with zero Ozone-Depleting Chemicals (ODCs) and low Global Warming potential refrigerants to replace the current Military Standard (MIL-STD) Family of ECUs. The IECUs will provide improved cooling, heating and dehumidification to Soldiers and critical equipment systems in combat, combat support, combat service support units, and combat support hospitals. The IECUs are required to replace currently fielded ECUs in order to comply with statutory and regulatory restrictions on the use of Class II ODCs (such as HCFC-22) and to improve the performance of military ECUs. They are form, fit, and function replacements to the current MIL-STD ECUs. Technical improvements over existing ECUs will yield significant fuel and weight savings, reduction in scheduled maintenance and increased reliability. The new family of IECUs utilizes a new refrigerant which complies with mandated Environmental Protection Agency (EPA) requirements. Funding supports the development of application specific variants, shelter system integration, as well as supporting the new ECU requirements coming from the Command Post Integrated Infrastructure (CPI2) and Army Standard Family of Rigid Wall Shelters (ASF-RWS) Capabilities Development Documents (CDD). In addition, the field has identified an emerging requirement for cooling at intermediate capacities. These variants will further standardize cooling units in the field, enable cooling of larger shelters and structures, offer increased mobility, and may be used to cool multiple tents with one unit. Funding also supports developing initial prototypes to enable refinement of operational requirement and early user feedback to support future sustainment and operational energy concepts.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Technology Development	1.370	0.388	0.277	-	0.277
Description: Concept development for the family of Improved Environmental Control Units (IECUs), integrated shelter systems, variants, and integrated heating/cooling system applications.					
FY 2020 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L47 / *Improved Environmental Control Units Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Conduct Physical Configuration Audit (PCA) to finalize 60K IECU Technical Data Package (TDP) to support follow-on production contract ***FY 2021 Base Plans:*** Conduct testing of 60K IECU CB variant and complete final design documentation. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funds moved to support Testing accomplishments.					
Title: Government System Test and Evaluation ***Description:*** Testing of prototype performance for multiple variants of the IECUs and soft wall shelter ECUs. ***FY 2020 Plans:*** Complete development testing of 60K IECU Block II prototypes to evaluate capabilities and performance. ***FY 2021 Base Plans:*** Complete testing at Aberdeen Test Center (ATC) or similar facility to evaluate capabilities and performance of 60K IECU CB Variant. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funds moved from Technology Development to support Testing accomplishments.	0.050	0.188	0.250	-	0.250
Title: Other Contract and Government Agency ***Description:*** Support engineering, logistics, and testing efforts for multiple ECU variants, and integrated heating/cooling units. Match and right-size current IECU family to applications and/or develop and test new variants to provide the most efficient system solution. ***FY 2020 Plans:*** Complete build of 60K IECUs using baseline TDP, conduct limited performance testing and PCA. Concept development for IECU integration with RWS in support of CPI2 and ASF-RWS. ***FY 2021 Base Plans:*** Complete validation of baseline TDP for 60K IECU CB variant, conduct limited performance testing and PCA. Concept development for IECU integration in support of CPI2 and Army Standard Family of Rigid Wall Shelters. ***FY 2020 to FY 2021 Increase/Decrease Statement:***	0.712	0.264	0.275	-	0.275

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L47 / *Improved Environmental Control Units Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Funds moved to support Testing accomplishments.					
Title: Government Program Management ***Description:*** Provide oversight and management of engineering, logistics, contracts, and testing efforts for the IECU family and multiple user engagements in preparation for IECU variants to transition to production. Provide oversight and management of follow-on ECU variants. ***FY 2020 Plans:*** Provide oversight and management of engineering, logistics, contracts, and testing efforts for next generation IECU system development efforts. ***FY 2021 Base Plans:*** Continue to provide oversight and management of engineering, logistics, contracts, and testing efforts for next generation IECU system development efforts including 60K IECU CB 2 and 9/18/36K IECU programs. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funds increased to support testing efforts.	0.130	0.187	0.300	-	0.300
Title: FY 2020 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2020 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.049	-	-	-
Accomplishments/Planned Programs Subtotals	2.262	1.076	1.102	-	1.102

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• MF9303: *IMPROVED ENVIRONMENTAL CONTROL UNITS*	10.122	7.344	8.200	0.370	8.570	8.339	8.086	8.164	8.096	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L47 / *Improved Environmental Control Units Ed*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

Support modernization and technology insertions required to adapt ECUs future integrated system heating and cooling requirements in support of Force 2025 and the Command Post Integrated Infrastructure (CPI2) and chemically protected deployable medical system. Evaluate requirements versus existing ECU Fleet and develop/ test initial prototypes of ECUs in support of future integrated system heating and cooling requirements. This effort will support the development of Purchase Descriptions (PDs) and Technical Data Packages (TDPs) for eventual competitive procurement.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L47 / *Improved Environmental Control Units Ed*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
9,18 and 36K Improved Environmental Control Unit (IECU)	Various	PM E2S2 : various	1.334	0.094		-		0.150		-		0.150	0.000	1.578	Continuing
Trailer Variants	Various	PM E2S2 : various	0.633	-		-		-		-		-	0.000	0.633	Continuing
60K IECU	Various	PM E2S2 : various	0.301	0.036		0.186		0.150		-		0.150	0.000	0.673	-
Integrated heating/cooling units	Various	PM E2S2 : various	0.105	-		-		-		-		-	0.000	0.105	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.049		-		-		-	0.000	0.049	-
		Subtotal	2.373	0.130		0.235		0.300		-		0.300	0.000	3.038	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
9 ,18 and 36K Improved Environmental Control Unit (IECU)	MIPR	CERDEC Night Vision Lab : Ft Belvoir, VA	2.064	-		0.129		0.150		-		0.150	0.000	2.343	Continuing
Trailer Mounted variants	MIPR	CERDEC Night Vision Lab : Ft Belvoir, VA	0.736	-		-		-		-		-	0.000	0.736	-
60K IECU	MIPR	ARDEC PIF : Huntsville. AL	2.662	1.370		0.425		0.127		-		0.127	0.000	4.584	-
Integrated heating/cooling units	MIPR	CERDEC Night Vision Lab : Ft. Belvoir, VA	0.325	-		-		-		-		-	0.000	0.325	-
		Subtotal	5.787	1.370		0.554		0.277		-		0.277	0.000	7.988	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L47 / *Improved Environmental Control Units Ed*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
9, 18 and 36K Improved Environmental Control Unit (IECU)	MIPR	CERDEC : Fort Belvoir, VA	2.117	0.712		-		-		-		-	0.000	2.829	-
60K IECU	Various	CERDEC : Fort Belvoir, VA	4.407	-		-		0.275		-		0.275	0.000	4.682	-
Trailer variants	MIPR	CERDEC : Fort Belvoir, VA	1.242	-		-		-		-		-	0.000	1.242	-
Integrated heating/cooling units	MIPR	CERDEC : Fort Belvoir, VA	0.321	-		-		-		-		-	0.000	0.321	-
		Subtotal	8.087	0.712		-		0.275		-		0.275	0.000	9.074	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
9,18 and 36K Improved Environmental Control Unit (IECU)	MIPR	ATEC : APG, MD	0.478	0.050		-		-		-		-	0.000	0.528	-
Trailer Variants	MIPR	ATEC : APG, MD	0.424	-		-		-		-		-	0.000	0.424	Continuing
60K IECU	MIPR	ATEC : APG, MD	0.625	-		0.287		0.250		-		0.250	0.000	1.162	-
Integrated heating/cooling units	MIPR	ATEC : APG, MD	0.200	-		-		-		-		-	0.000	0.200	-
		Subtotal	1.727	0.050		0.287		0.250		-		0.250	0.000	2.314	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	17.974	2.262		1.076		1.102		-		1.102	0.000	22.414	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L47 / *Improved Environmental Control Units Ed*

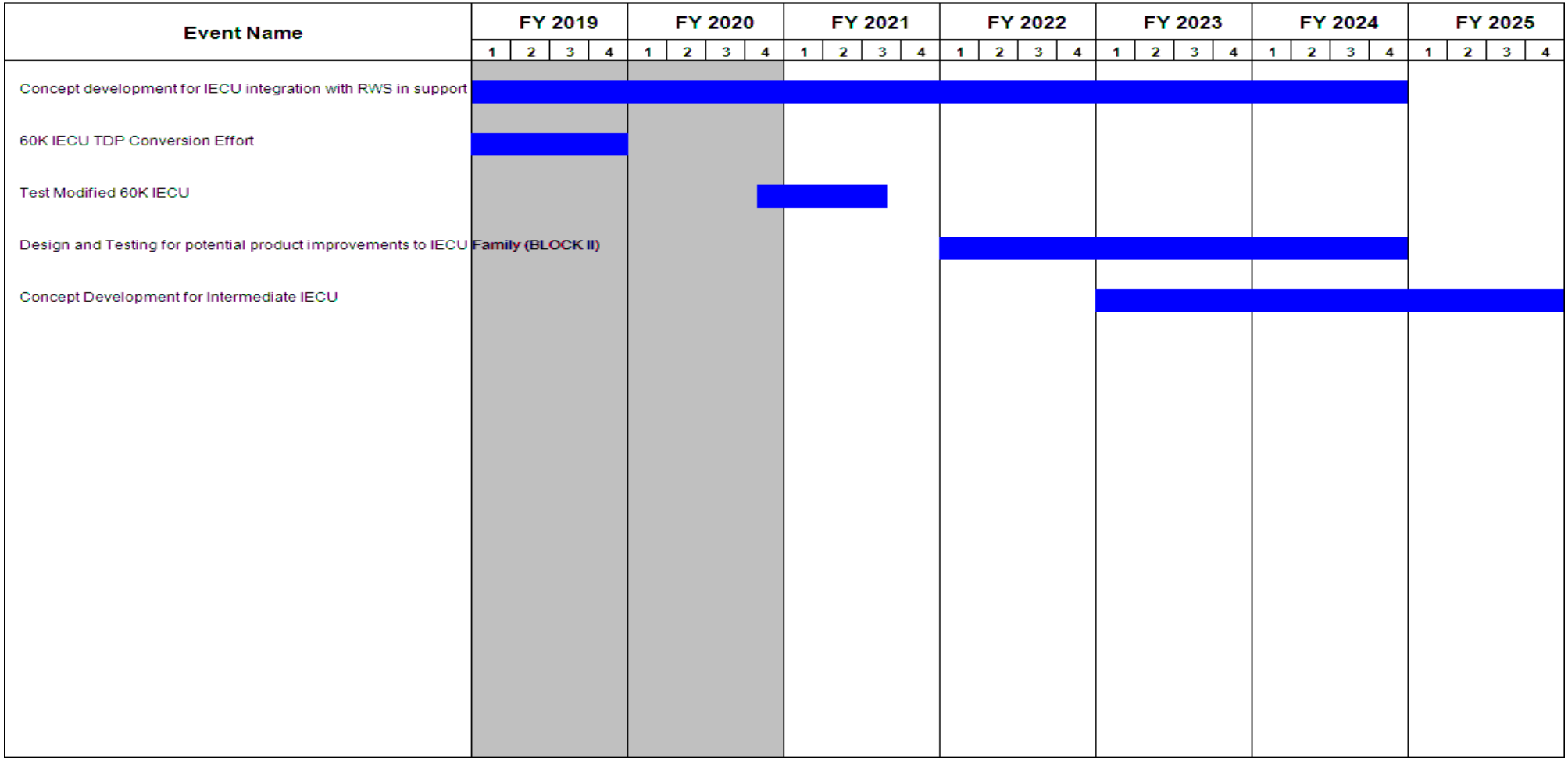

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L47 / *Improved Environmental Control Units Ed*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Concept development for IECU integration with RWS in support of CPI2 and ASF-RWS	1	2018	4	2024
60K IECU TDP Conversion Effort	4	2018	4	2019
Test Modified 60K IECU	4	2020	3	2021
Design and Testing for potential product improvements to IECU Family (BLOCK II)	1	2022	4	2024
Concept Development for Intermediate IECU	1	2023	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) VR7 / *Combat Service Support Systems*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
VR7: *Combat Service Support Systems*	-	4.837	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.837
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

VR7 efforts completed in FY 2019.

A. Mission Description and Budget Item Justification

This project supports Engineering and Manufacturing Development (EMD) of critical soldier support and sustainment systems that provide more endurance and agility to combat operations enabling success of Army Expeditionary Forces in future multi-domain scenarios. Project includes highly mobile shelter systems (rigid and soft wall), expeditionary base camp subsystems, field service systems, mortuary affairs equipment, field heaters, and other combat service support equipment. These systems will fill identified theater capability gaps, improve safety, improve unit sustainability, improve resource and energy efficiency and increase combat effectiveness. This project supports Engineering and Manufacturing Development (EMD), Prototyping, and testing of critical tactical support systems that support mobile Joint Service command and control, medical, force projection and maintenance platforms. This project develops critical enablers that support the Army Campaign Plan and Army Modernization Strategy by maintaining readiness through fielding and integrating new equipment. This project also ensures Army Expeditionary Forces are capable of rapid deployment while reducing sustainment requirements, related Combat Support/Combat Service Support (CS/CSS) demands in lift, combat zone footprint, and costs for logistical support.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Expeditionary Shelter Protection System (ESPS) ***Description:*** ESPS is a lightweight, rapidly deployable and reusable ballistic protection system that can be integrated with commonly used military shelters in expeditionary and remote base camps and outposts where more robust forms of ballistic protection (i.e. sandbags, concrete barriers) are not readily available or logistically feasible.	0.450	-	-	-	-
Title: Laundry and Shower Improvements (LADS) ***Description:*** Provides an enhanced capability for field hygiene with improved hot and cold weather performance, better compatibility with current and future combat clothing, and increased reliability, maintainability and ease of operation.	1.295	-	-	-	-
Title: Containerized Ice Making System (CIMS)	0.327	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** VR7 / *Combat Service Support Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Description: Develops an add-on ice making capability that automatically dispenses and seals 10 pound bags at a rate of a minimum of 3,600 pounds of ice per day. This capability is based upon current Army operational requirements for ice which is four pounds per Soldier per day. This capability enables support for up to 900 personnel. Current operations require external support to provide personnel with ice for cooling drinking water in extremely arid environments. This capability will reduce the sustainment risk and cost associated with transporting this commodity from external sources. The objective requirement enables stockage of ice to assist with surge operations.					
Title: Army Standard Family of Rigid Wall Shelters (ASF-RWS) ***Description:*** The ASF-RWS program will conduct formal development to incorporate the latest technologies into a fully supportable and modernized family. The intent is to eliminate the proliferation of non-standard shelters and their associated logistics burden, thereby reducing the lifecycle cost of RWS across the Services. The program will produce approved Technical Data Packages (TDPs) to support procurements by materiel developers and Program Managers (PMs) requiring RWS. Once developed and formally type-classified, ASF-RWS procurements are customer funded by PMs as a cost under their program(s). The ASF-RWS will consist of three variants: (1) Expandable/Non-Expandable; (2) Vehicle Mounted; and (3) Panelized/Collapsible with a focus on the following features and improvements: reduced cost, reduced weight, improved energy efficiency, improved corrosion resistance, and improved transportability.	2.765	-	-	-	-
Accomplishments/Planned Programs Subtotals	4.837	-	-	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• VR8: *Combat Service Support Systems - Ad*	3.115	-	0.000	-	0.000	-	-	-	-	0.000	3.115

Remarks

D. Acquisition Strategy

The acquisition strategy is to accelerate product development and testing to transition into production.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) VR7 / *Combat Service Support Systems*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Management Support	Various	PM Force Sustainment Systems : Natick, MA	1.999	0.610	Nov 2018	-		-		-		-	0.000	2.609	-
CBI Support	Various	PD CBI : Warren, MI	3.747	-		-		-		-		-	0.000	3.747	-
		Subtotal	5.746	0.610		-		-		-		-	0.000	6.356	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Soldier Support Equipment	TBD	Various : Various	10.788	0.175	Nov 2018	-		-		-		-	0.000	10.963	-
Contingency Basing Infrastructure	Various	Various : Various	1.531	-		-		-		-		-	0.000	1.531	-
Laundry Improvements	Various	Various : Various	-	0.500	Nov 2018	-		-		-		-	0.000	0.500	-
Army Standard Family of Rigid Wall Shelters (ASF-RWS)	Various	Various : Various	-	2.000	Dec 2018	-		-		-		-	0.000	2.000	-
		Subtotal	12.319	2.675		-		-		-		-	0.000	14.994	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Soldier Support Equipment	Various	Various : Various	8.342	0.275	Dec 2018	-		-		-		-	0.000	8.617	-
Contingency Basing Infrastructure	Various	Various : Various	1.206	-		-		-		-		-	0.000	1.206	-
Laundry Improvements	Various	Various : Various	-	0.695	Dec 2018	-		-		-		-	0.000	0.695	-
Army Standard Family of Rigid Wall Shelters (ASF-RWS)	Various	Various : Various	-	0.582	Mar 2019	-		-		-		-	0.000	0.582	-
		Subtotal	9.548	1.552		-		-		-		-	0.000	11.100	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) VR7 / *Combat Service Support Systems*	

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	27.613	4.837		0.000		-		-		-	0.000	32.450	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** VR7 / *Combat Service Support Systems*

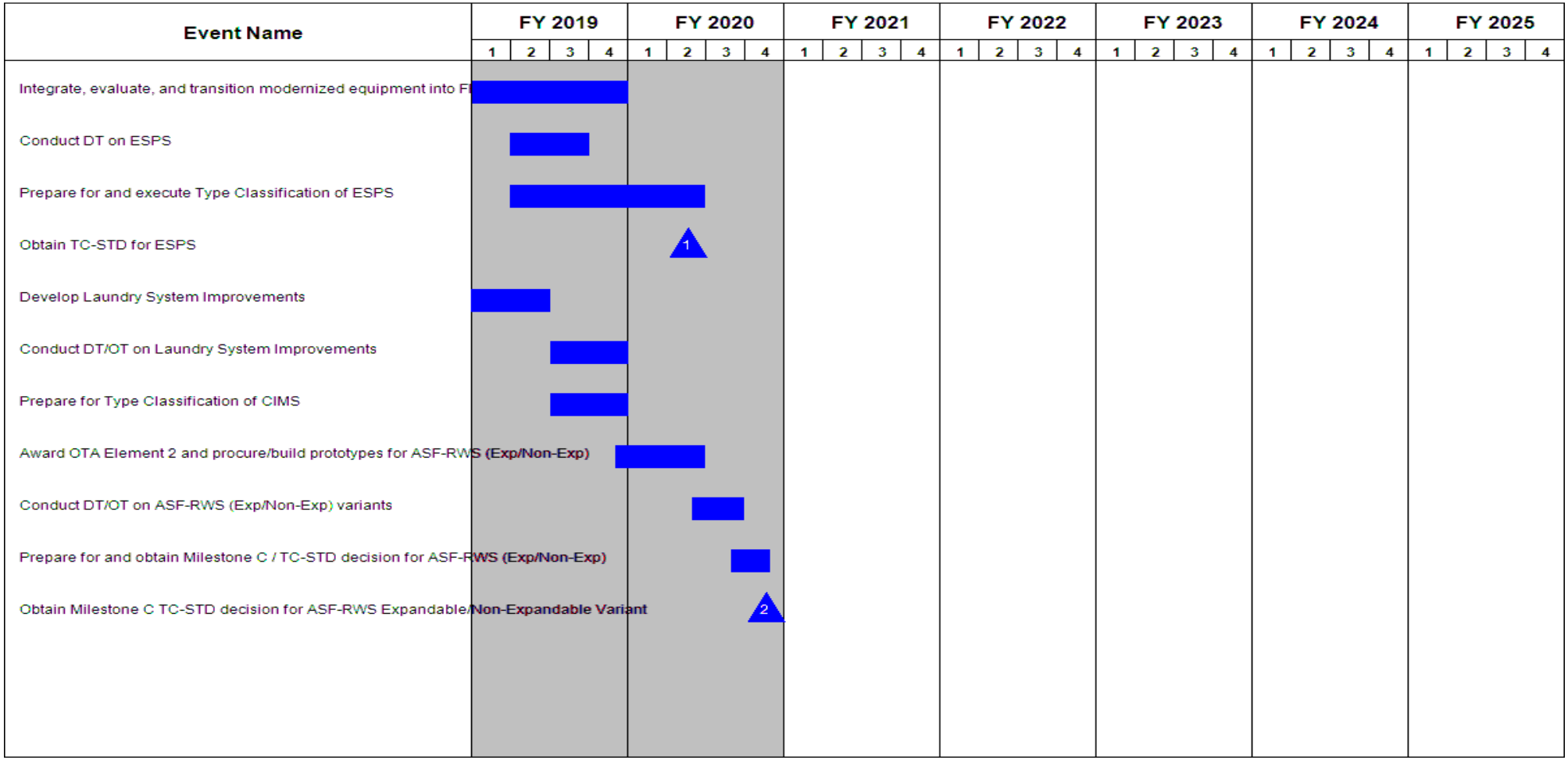

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** VR7 / *Combat Service Support Systems*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Integrate, evaluate, and transition modernized equipment into FP & Command Posts	1	2016	4	2019
Conduct DT on ESPS	1	2019	3	2019
Prepare for and execute Type Classification of ESPS	1	2019	2	2020
Obtain TC-STD for ESPS	2	2020	2	2020
Develop Laundry System Improvements	2	2017	2	2019
Conduct DT/OT on Laundry System Improvements	3	2019	4	2019
Prepare for Type Classification of CIMS	3	2019	4	2019
Award OTA Element 2 and procure/build prototypes for ASF-RWS (Exp/Non-Exp)	4	2019	2	2020
Conduct DT/OT on ASF-RWS (Exp/Non-Exp) variants	2	2020	3	2020
Prepare for and obtain Milestone C / TC-STD decision for ASF-RWS (Exp/Non-Exp)	3	2020	4	2020
Obtain Milestone C TC-STD decision for ASF-RWS Expandable/Non-Expandable Variant	4	2020	4	2020