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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army										Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	-	76.030	76.388	103.226	-	103.226	51.605	50.348	35.741	16.485	Continuing	Continuing
194: Engine Driven Gen Ed	-	6.513	1.801	8.395	-	8.395	15.485	14.475	14.163	7.810	0.000	68.642
EC9: Contingency Basing Infrastructure	-	3.789	3.057	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.846
EJ9: Maneuver Support Vessel - Light (MSV-L)	-	18.583	34.203	29.446	-	29.446	7.449	0.000	0.000	0.000	0.000	89.681
FG4: Ultra-Lightweight Camouflage Net System (ULCANS)	-	4.854	3.388	4.400	-	4.400	1.604	1.501	0.000	0.000	0.000	15.747
H01: Combat Engineer Eq Ed	-	3.734	2.742	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.476
H02: Tactical Bridging - Engineering Development	-	15.884	9.268	49.452	-	49.452	13.781	22.805	8.341	0.000	0.000	119.531
H14: Materials Handling Equipment - Ed	-	0.714	0.333	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
L39: Field Sustainment Support Ed	-	4.750	2.220	1.675	-	1.675	1.720	1.773	1.807	1.800	0.000	15.745
L41: Water And Petroleum Distribution - Ed	-	6.127	10.761	7.540	-	7.540	7.559	7.620	7.935	5.685	0.000	53.227
L43: ENGINEER SUPPORT EQUIPMENT - ED	-	3.644	0.341	1.242	-	1.242	2.904	0.200	0.000	0.000	0.000	8.331
L46: Maintenance Support Equipment	-	1.971	1.410	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.381
L47: Improved Environmental Control Units Ed	-	1.873	2.337	1.076	-	1.076	1.103	1.974	3.495	1.190	0.000	13.048
VR7: Combat Service Support Systems	-	3.594	4.527	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.121

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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				
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 control, field service equipment, camouflage systems and aerial delivery equipment), water purification equipment, petroleum distribution equipment, and mobile electric power.						
The FY 2020 funding request was reduced by \$4.382 million to account for the availability of prior year execution balances.						
B. Program Change Summary (\$ in Millions)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget		90.965	79.706	107.608	-	107.608
Current President's Budget		76.030	76.388	103.226	-	103.226
Total Adjustments		-14.935	-3.318	-4.382	-	-4.382
• Congressional General Reductions		-0.070	-0.093			
• Congressional Directed Reductions		-4.332	-3.225			
• Congressional Rescissions		-	-			
• Congressional Adds		2.000	-			
• Congressional Directed Transfers		-	-			
• Reprogrammings		-9.169	-			
• SBIR/STTR Transfer		-3.364	-			
• Adjustments to Budget Years		-	-	-4.382	-	-4.382

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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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
194: Engine Driven Gen Ed	-	6.513	1.801	8.395	-	8.395	15.485	14.475	14.163	7.810	0.000	68.642
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Note The FY 2019 decrease is due to the Large Advanced Mobile Power Sources EMD phase contract termination for convenience.												
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) program (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 and MEPDS. 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 Network / Command, Control, Communications & Intelligence (C3I), lift, combat zone footprint, and costs for logistical support. FY 2020 funds will continue to develop the Power Distribution Illumination Systems Electrical (PDISE) Expansion which includes the Prime Power Connection Kit (PPCK), and Large Advanced Mobile Power Sources (LAMPS) Engineering and Manufacturing Development (EMD), which includes power generation and distribution developmental testing.  Funding supports modernization of the current TEP sources by investigating technology insertions that improve efficiency, reliability, maintainability, and interoperability in support of the Army Operating Concept and Multi-Domain Battle. Funding also supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational energy concepts.												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Power Distribution Illumination Systems Electrical (PDISE) expansion								0.756	1.801	3.945	-	3.945
Description: Prepare PDISE expansion with Prime Power Connection Kit 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												
FY 2019 Plans:												

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army								Date: March 2019				
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 funds will continue to develop the Large Power Distribution Unit (PDU) and the Prime Power Connection Kit (PPCK) performance specification to include developmental testing.  <b>FY 2020 Base Plans:</b> Continue PDISE expansion EMD Phase.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Increase in funding from FY 2019 to FY 2020 supports re-start of LAMPS EMD phase after original EMD contract was terminated for convenience.												
<b>Title:</b> Large Advanced Mobile Power Sources (LAMPS) Engineering & Manufacturing Development (EMD) Phase  <b>Description:</b> Revise LAMPS performance specification and continue EMD Phase. LAMPS generators will increase readiness and operational reach while reducing noise and sustainment burdens. LAMPS replaces 100-200kW legacy generators in either a skid or trailer mounted configuration, while adding a microgrid capability and an ability to interface with newer technologies.  <b>FY 2020 Base Plans:</b> Continue LAMPS EMD Phase.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Program remains in engineering phase and manufacturing development (EMD) phase. Operational requirements are being re-evaluated. Contract awarded in FY20 to develop 100-200kW power solution; plan to produce 100-200kW generator in FY23 (milestone C).								5.757	-	4.450	-	4.450
Accomplishments/Planned Programs Subtotals								6.513	1.801	8.395	-	8.395
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost	
• G11: Adv Elec Energy Con Ad	4.982	6.331	3.338	-	3.338	3.201	3.405	3.201	3.328	0.000	27.786	
• MA9800: Generators And Associated Equip	115.704	134.341	58.566	2.436	61.002	62.126	75.155	73.228	76.022	Continuing	Continuing	
Remarks												

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Army		<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 194 / <i>Engine Driven Gen Ed</i>
<p><b><u>D. Acquisition Strategy</u></b></p> <p>The Power Distribution Illumination Systems Electrical (PDISE) expansion will use a multi-phase acquisition strategy, continue to consolidate requirements and provide solutions to known power distribution gaps. The PDISE expansion will include the current Army power distribution equipment (PDISE), the multi-input Power Distribution Unit (PDU) being developed for use with large tactical electric power generators and 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.</p> <p>Large Advanced Mobile Power Sources (LAMPS) Engineering &amp; Manufacturing Development (EMD) Phase: The EMD phase will require the vendor to integrate components and fabricate prototypes, verify prototype performance through contractor testing, deliver production representative generator sets and conduct Instructor and Key Personnel Training (I&amp;KPT) for Government testing. Major data deliverables will include the Technical Data Package (TDP), Integrated Product Support (IPS), test reports and cost data reporting. The Government will purchase the TDP from the vendor with the intent of using it in future competitive re-procurements for LAMPS. A Failure Mode, Effects and Criticality Analysis (FMECA), Level of Repair Analysis (LORA), Functional Configuration Audit (FCA) and a Physical Configuration Audit (PCA) will be completed to verify that the TDP accurately describes the qualified production sets.</p> <p><b><u>E. Performance Metrics</u></b></p> <p>N/A</p>		

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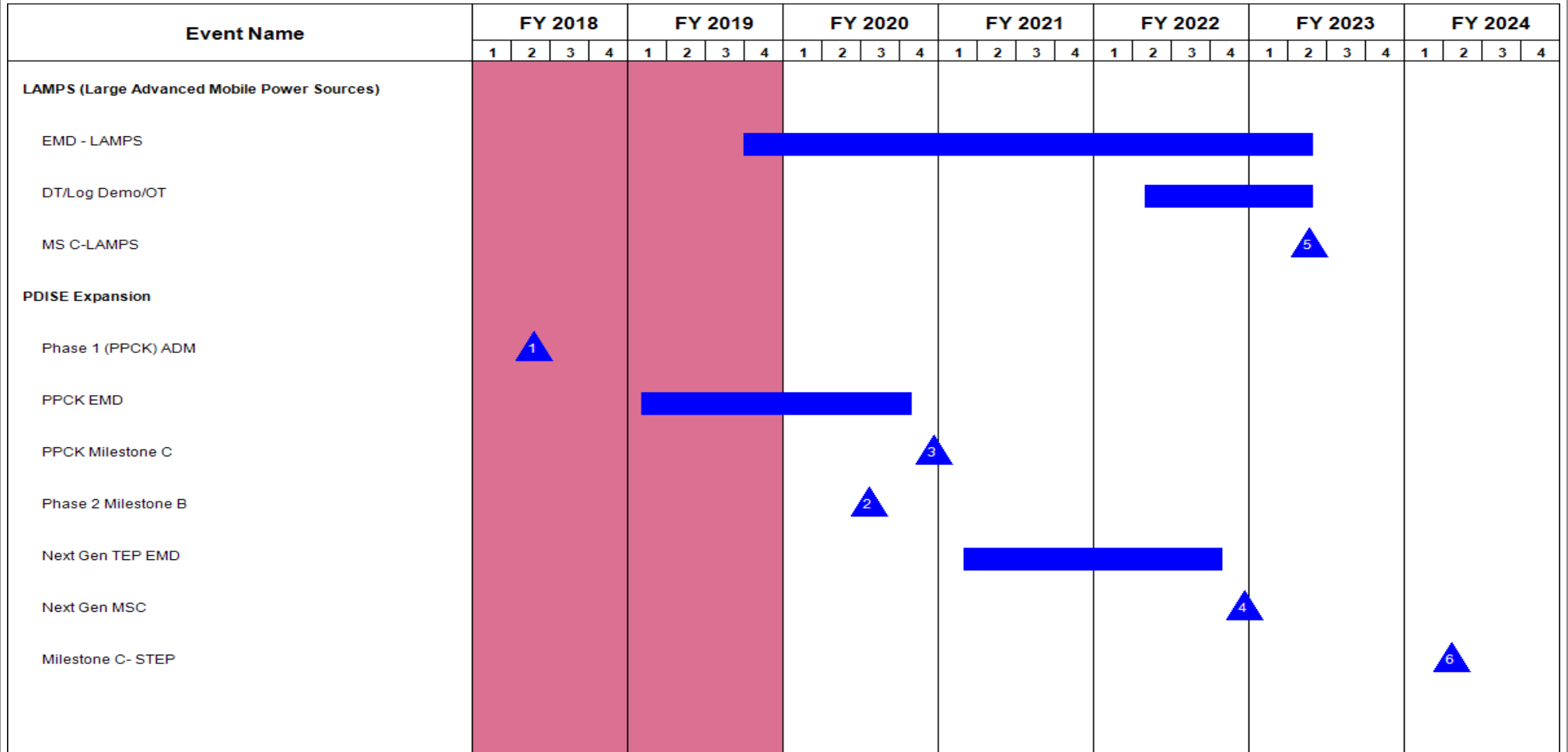
Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
Appropriation/Budget Activity 2040 / 5						R-1 Program Element (Number/Name) PE 0604804A / Logistics and Engineer Equipment - Eng Dev						Project (Number/Name) 194 / Engine Driven Gen Ed			
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PDISE Expansion	Various	PM E2S2 : Ft. Belvoir	1.275	-		1.801		0.750		-		0.750	Continuing	Continuing	Continuing
Large Advanced Mobile Power Sources (LAMPS) (100-200kW)	Various	PM E2S2 Ft. Belvior : Ft. Belvior	1.132	0.369		-		0.500		-		0.500	0.000	2.001	-
Subtotal			2.407	0.369		1.801		1.250		-		1.250	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PDISE Expansion	C/CPFF	TBD : TBD	1.750	0.756		-		1.745		-		1.745	Continuing	Continuing	Continuing
Large Advanced Mobile Power Sources (LAMPS) (100-200kW)	C/FPIF	L-3 Communications, Westwood Corporation, Tulsa, OK : Various	36.224	3.117		-		3.000		-		3.000	Continuing	Continuing	Continuing
Subtotal			37.974	3.873		-		4.745		-		4.745	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Large Advanced Mobile Power Sources (LAMPS) (100-200kW)	MIPR	CECOM LCMC : Aberdeen Proving Ground (APG), MD	4.617	0.771		-		0.450		-		0.450	Continuing	Continuing	Continuing
PDISE Expansion	Various	Various : Various	-	-		-		0.500		-		0.500	0.000	0.500	-
Subtotal			4.617	0.771		-		0.950		-		0.950	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2020 Army</b>													<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>					<b>Project (Number/Name)</b> 194 / <i>Engine Driven Gen Ed</i>					
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Large Advanced Mobile Power Sources (LAMPS) (100-200kW)	MIPR	Army Test & Evaluation Ctr (ATEC) : APG, MD	6.318	1.500		-		0.700		-		0.700	Continuing	Continuing	Continuing
PDISE Expansion	MIPR	Army Test & Evaluation Ctr (ATEC) : APG, MD	1.310	-		-		0.750		-		0.750	0.000	2.060	-
<b>Subtotal</b>			7.628	1.500		-		1.450		-		1.450	Continuing	Continuing	N/A
			<b>Prior Years</b>	<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>			52.626	6.513		1.801		8.395		-		8.395	Continuing	Continuing	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2020 Army</b>			<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> 194 / <i>Engine Driven Gen Ed</i>	





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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Army			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 194 / <i>Engine Driven Gen Ed</i>	

## Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
LAMPS (Large Advanced Mobile Power Sources)	4	2020	4	2024
EMD - LAMPS	4	2019	2	2023
DT/Log Demo/OT	2	2022	2	2023
MS C-LAMPS	2	2023	2	2023
PDISE Expansion	3	2017	4	2024
Phase 1 (PPCK) ADM	2	2018	2	2018
PPCK EMD	1	2019	4	2020
PPCK Milestone C	4	2020	4	2020
Phase 2 Milestone B	3	2020	3	2020
Next Gen TEP EMD	1	2021	4	2022
Next Gen MSC	4	2022	4	2022
Milestone C- STEP	2	2024	2	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
EC9: Contingency Basing Infrastructure	-	3.789	3.057	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.846
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Note: Project EC9 efforts are complete in FY19.

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 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)**

	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
<b>Title:</b> Toolset Development	0.738	0.551	-	-	-
<b>Description:</b> 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 2019.					
<b>FY 2019 Plans:</b> Funding is planned to continue model based systems engineering tool maturation of multiple analytical tools, Base Camp Master Planning Tool, Contingency Basing Interface to the Warfighter (CBIWar), update systems data to the Joint Construction Management System (JCMS), and perform Design Charrettes in support of					

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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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
finalizing the Core Set Development of the Armor Brigade Combat Team (ABCT) Base Camp and beginning the Stryker Brigade Combat Team (SBCT) Base Camp layout.						
FY 2019 to FY 2020 Increase/Decrease Statement: Army efforts complete in FY 2019, funding reallocated to support higher priorities.						
Title: Integrated Analysis and Design		1.495	1.493	-	-	-
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 optimize the usage of fuel, water, waste and manpower. Funding is provided for the following efforts in FY 2018 and 2019.						
FY 2019 Plans: Funding is planned to support an Integrated Design Review in support of the Core Set Development of the Armor Brigade Combat Team (ABCT) Base Camp layout. Funding is also planned to begin the Core Set Development of the Stryker Brigade Combat Team Base Camp Layout. Additionally, providing analysis to the FY 2023 contingency basing infrastructure enhanced equipment set to support PD CBI's Annual Report which will inform Army Project Managers and other decision makers the resource implications of their respective product lines and provide investment recommendations for out-year funding.						
FY 2019 to FY 2020 Increase/Decrease Statement: Army efforts complete in FY 2019, funding reallocated to support higher priorities.						
Title: Capabilities Implementation and Materiel Requirements		0.673	0.686	-	-	-
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 2019.						
FY 2019 Plans:						

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>						
		<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
Funding is planned to continue supporting the development of the design of different sized contingency base camps, capability sets specifically focusing on expansion sets, and the planning to manage the base camp capability sets.						
<b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Army efforts complete in FY 2019, funding reallocated to support higher priorities.						
<b>Title:</b> Program Management  <b>Description:</b> 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 2019.  <b>FY 2019 Plans:</b> Oversight and management of integrated analysis and design, capabilities implementation and materiel requirements, and toolset development. Funding to support managing cost, schedule, performance, risk, personnel, and operational activities. Also oversight, analysis and management of operational energy related impacts and technology gaps. Funding will continue to support the review the Facilities Capability Development Document (CDD) which will include master planning capability of base camps.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Army efforts complete in FY 2019, funding reallocated to support higher priorities.		0.883	0.327	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>		3.789	3.057	-	-	-
<b>C. Other Program Funding Summary (\$ in Millions)</b>						
N/A						
<b>Remarks</b>						
<b>D. Acquisition Strategy</b>						
N/A						
<b>E. Performance Metrics</b>						
N/A						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
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)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	PM E2S2 / PEO CS&CSS : Fort Belvoir, VA / Warren, MI	2.048	0.883		0.327		-		-		-	0.000	3.258	-
Subtotal			2.048	0.883		0.327		-		-		-	0.000	3.258	N/A
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Toolset Development	Various	Various : Various	2.293	0.738		0.551		-		-		-	0.000	3.582	-
Integrated Analysis and Design	Various	Various : Various	3.811	1.495		1.493		-		-		-	0.000	6.799	-
Capabilities Implementation and Materiel Requirements	Various	Various : Various	1.560	0.673		0.686		-		-		-	0.000	2.919	-
Subtotal			7.664	2.906		2.730		-		-		-	0.000	13.300	N/A
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			9.712	3.789		3.057		-		-		-	0.000	16.558	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army			Date: March 2019		
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	

Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
Toolset Development																												
Toolset Development																												
Integrated Analysis and Design																												
Integrated Analysis and Design																												
Initial Data Transition to JCMS, Initial Operational Capability (IOC)																												
Armor Brigade Combat Team Core, Expansion/Enhancement Sets (ABCT)																												
Striker Brigade Combat Team Core, Expansion/Enhancement Sets (SBCT)																												
Capabilities Implementation and Materiel Requirements																												
Program Management																												
Infantry Brigade Combat Team, Core, Expansion/Enhancement Sets (IBCT)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Army			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EC9 / <i>Contingency Basing Infrastructure</i>	

**Schedule Details**

<b>Events</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
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

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019		
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 -Light (MSV-L)			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
EJ9: Maneuver Support Vessel - Light (MSV-L)	-	18.583	34.203	29.446	-	29.446	7.449	0.000	0.000	0.000	0.000	89.681
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Maneuver Support Vessel (Light) (MSV(L)) program element supports the Engineering and Manufacturing Development (EMD) phase of the program. The MSV(L) is a multifunctional waterborne mobility platform, which displaces the current Landing Craft Mechanized-8 (LCM-8). The LCM-8 does not have the speed, functional draft (shallow water capability), and maneuver capability to move today's Army; cannot transport an Abrams tank. The MSV(L) provides the ability to conduct lift operations of combat loaded personnel and equipment in austere anti-access/area denial (A2/AD) environments, with increased speed, payload, and maneuver capability in shallow coastal waters, rivers, in narrow inland waterways in support of dispersed force elements, austere environments and/or where mature ports and road networks are unavailable. This vessel's capability supports transporting multiple combat configured ready-to-fight payloads with crew (i.e. an Abrams tank; or two Strykers with bar armor; or four Joint Light Tactical Vehicles (JLTVs); or two 20 ft. or one 40 ft. ISO container (Intermodal container); or a Heavy Expandable Mobility Tactical Truck (HEMTT); or a Load Handling System (LHS), and trailer). The MSV(L) will incorporate new roll-through capability via stern access and bow ramps. The MSV(L) provides the capability to operate fully loaded at a speed of 18 knots in Beaufort Sea Scale 3 conditions, while being survivable (seaworthy) in Beaufort Sea Scale 7 conditions. The vessel's force protection attributes includes a subsurface surveillance device for obstacle detection and avoidance, protection from small arms fire, and two Common Remotely Operated Weapon Stations (CROWS II) for vessel defense, and the capacity to mitigate detection through reduction of thermal and acoustic signature. The MSV(L) provides increased capability that moves combat configured forces and supplies more efficiently than the LCM-8.

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. Vessel lethality/Escalation of Force measures have increasingly become an area of vital concern to the Combatant Commanders (CCDR) given the requirement to preserve "freedom of the seas" access in all areas of the world, particularly the littorals, to support maneuver operations in all Areas of Responsibility.

FY 2020 Funding supports modernization of the current Army Watercraft Fleet by investigating technology insertions including, but not limited to: condition based maintenance, vessel electronics, Victory Architecture, autonomous operations and other emerging technologies. Funding also supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement operating concepts. Supports full scale prototype build.

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

	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
<b>Title:</b> Engineering and Manufacturing Development (EMD) Contract	13.462	28.195	24.203	-	24.203



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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army				Date: March 2019		
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 -Light (MSV-L)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<p><b>Description:</b> 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).</p> <p><b>FY 2019 Plans:</b> FY 2019 will include building of the full scale prototype vessel, testing and evaluation activities, and initial logistics assessments.</p> <p><b>FY 2020 Base Plans:</b> Activities include completion of the full scale prototype vessel, testing and evaluation activities, and development of logistics products.</p> <p><b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Material for prototype was ordered in FY 2019 and vessel design was completed in FY 2019.</p>						
<p><b>Title:</b> Government Test and Evaluation Support</p> <p><b>Description:</b> Government test support.</p> <p><b>FY 2019 Plans:</b> Contract Systems Integration Laboratory (CSIL) testing and evaluation activities.</p> <p><b>FY 2020 Base Plans:</b> Testing evaluation activities to include various subsystems and initial contractor prototype extended acceptance trials.</p> <p><b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> CSIL testing was completed in FY 2019. Testing activities for FY 2020 will be for various subsystems and initial contractor prototype extended acceptance trials.</p>		0.490	0.880	0.950	-	0.950
<p><b>Title:</b> Government Furnished Equipment (GFE)</p> <p><b>Description:</b> GFE for prototype vessel consists of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR).</p> <p><b>FY 2019 Plans:</b></p>		0.021	0.125	0.125	-	0.125

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army				Date: March 2019		
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 -Light (MSV-L)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
GFE is required to support the full size prototype vessel.						
FY 2020 Base Plans: GFE is required to support the full size prototype vessel and base station for testing.						
Title: Program Management / Systems Engineering		3.653	2.676	3.383	-	3.383
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.						
FY 2019 Plans: Funds will cover matrix salaries for program management and engineering support to include contract execution and contractor oversight.						
FY 2020 Base Plans: Funds will cover matrix salaries for program management, logistics, and engineering support to include contract execution and contractor oversight.						
FY 2019 to FY 2020 Increase/Decrease Statement: Additional support is need for the development of log products.						
Title: Program Management Support Contract		0.655	1.074	0.785	-	0.785
Description: Program Management and Contract Support for MSV(L).						
FY 2019 Plans: Program Management Support to support MSV(L) for Cyber Security, Contract Data Requirement List (CDRL) management, IMS support, and program documentation.						
FY 2020 Base 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 2019 to FY 2020 Increase/Decrease Statement: Support will be increased to include the areas of C4ISR expertise and Milestone C program documentation.						
Title: Naval Architecture Support		0.302	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army									Date: March 2019		
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 -Light (MSV-L)			
B. Accomplishments/Planned Programs (\$ in Millions)							FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Description: Naval architecture support and travel expenses - now included in PM Systems engineering support.											
Title: 2019 SIBR/STTR Transfer							-	1.253	-	-	-
FY 2019 Plans: 2019 SIBR/STTR Transfer											
FY 2019 to FY 2020 Increase/Decrease Statement: 2019 SIBR/STTR Transfer											
Accomplishments/Planned Programs Subtotals							18.583	34.203	29.446	-	29.446
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• R03050: Maneuver Support Vessel (Light) (MSV-L)	-	-	14.185	-	14.185	76.657	73.014	91.816	128.236	0.000	383.908
Remarks											
Significant Accomplishments:											
- Successful Scale Model Testing completed in Sep 2018.											
- Preliminary Design Review held May 2018.											
- System Requirements Review held Feb 2018.											
- 100 day stop work order issued due to GAO level protest: Contractor resumed work on 24 Jan 2018.											
- MSV(L) Contract was awarded on 28 Sep 2017 to Vigor Works, LLC.											
- On 22 Sep 2017, obtained MDA approval for Milestone B and entry into the EMD phase.											
D. Acquisition Strategy											
The MSV(L) will enter at MS B with an EMD Phase, followed by Low Rate Initial Production (LRIP) and Full Rate Production (FRP). The acquisition strategy is to have a full and open competition with a down select from paper designs to one contractor at MS B. The contract will award one 10 year contract to a single vendor comprised of EMD followed by the production and development phase. Model basin testing will occur after successful execution of PDR. This sequence of events mitigate risks prior to the authorization of building the full size prototype. The full size prototype will undergo testing which will inform the updated Joint Capabilities Integration Development System (JCIDS) requirements documentation. Following successful prototype testing, at Knowledge Point (KP) 6, the program will transition to the Other Procurement Army (OPA) funding, and initiate LRIP. Upon MS C approval, the Government will authorize the Production and Deployment phase.											

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
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 -Light (MSV-L)
E. Performance Metrics N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
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 -Light (MSV-L)				
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering and Manufacturing Development (EMD)	C/FFP	Vigor Works, LLC : Clackamas, OR	9.126	13.462	Sep 2018	28.195	Nov 2018	24.000	Nov 2019	-		24.000	0.000	74.783	78.000
Government Furnished Equipment (GFE)	Reqn	Various : Various	2.272	0.021	Jul 2018	0.125	Jan 2019	0.125	Jan 2020	-		0.125	0.000	2.543	-
2019 SIBR/STTR Transfer	TBD	TBD : TBD	-	-		1.253		-		-		-	0.000	1.253	-
Subtotal			11.398	13.483		29.573		24.125		-		24.125	0.000	78.579	N/A
Remarks Contract was awarded on 28 Sep 2017 to Vigor Works, LLC.															
Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Salaries for Matrix Personnel Army Watercraft, TARDEC, ILSC PSID and ACC-Wrn.	MIPR	Detroit Arsenal : Warren, MI 48397-5000	9.342	3.653	Oct 2017	2.676	Nov 2018	3.586	Nov 2019	-		3.586	Continuing	Continuing	-
Salaries/Travel for Naval Architecture Support	C/CPFF	Picatinny Arsenal, New Jersey 07806-5000 : Warren, MI 48397-5000	0.110	0.302		-		-		-		-	0.000	0.412	-
Salaries / Travel for Program Management Support	C/CPFF	Picatinny Arsenal, New Jersey 07806-5000 : Warren, MI 48397-5000	1.928	0.655	Oct 2017	1.074	Feb 2019	0.785	Feb 2020	-		0.785	Continuing	Continuing	-
Subtotal			11.380	4.610		3.750		4.371		-		4.371	Continuing	Continuing	N/A

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PE 0604804A: *Logistics and Engineer Equipment - Eng D...*  
Army

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2020 Army</b>			<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> EJ9 / <i>Maneuver Support Vessel -Light (MSV-L)</i>	

Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
Salaries for Matrix Support																												
Knowledge Point 2 (KP2)		▲																										
Preliminary Design Review (PDR)			▲																									
Knowledge Point 3 (KP3)				▲																								
Modeling and Simulation				▲																								
Contractor System Integration Laboratory (CSIL)																												
Model Basin Testing																												
Knowledge Point 4 (KP4)								▲																				
Critical Design Review (CDR)								▲																				
Knowledge Point 5 (KP5)								▲																				
Prototype Build																												
Prototype Test and Evaluation (includes Subsystem tests)																												
Knowledge Point 6 (KP6) - Transition to OPA Funding																▲												

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army																Date: March 2019													
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 -Light (MSV-L)									
Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Milestone C													10																
Low Rate Initial Production (LRIP) Authorized													9																



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Army			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EJ9 / <i>Maneuver Support Vessel -Light (MSV-L)</i>	

**Schedule Details**

<b>Events</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
Salaries for Matrix Support	4	2016	4	2021
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)	1	2019	1	2019
Critical Design Review (CDR)	2	2019	2	2019
Knowledge Point 5 (KP5)	2	2019	2	2019
Prototype Build	2	2019	3	2020
Prototype Test and Evaluation (includes Subsystem tests)	3	2019	3	2021
Knowledge Point 6 (KP6) - Transition to OPA Funding	1	2021	1	2021
Milestone C	4	2021	4	2021
Low Rate Initial Production (LRIP) Authorized	4	2021	4	2021

**Note**

As long as program funding remains in place, PD AWS will assess designated Knowledge Points to determine opportunities for program acceleration. KP6: Successful completion of Prototype Testing with Contractor - Transitioned to OPA funding.

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
FG4: Ultra-Lightweight Camouflage Net System (ULCANS)	-	4.854	3.388	4.400	-	4.400	1.604	1.501	0.000	0.000	0.000	15.747
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).

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)**

	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
<b><i>Title:</i></b> Ultra-lightweight Camouflage Net System (ULCANS)	4.854	3.279	4.400	-	4.400
<b><i>Description:</i></b> 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 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).					
<b><i>FY 2019 Plans:</i></b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Army				<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> FG4 / <i>Ultra-Lightweight Camouflage Net System (ULCANS)</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>						
		<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
Complete development, DT/OT and logistics requirements, and obtain Milestone C production decision for Light/Dark Woodland Increment I variants. Complete development and DT/OT for Snow/Alpine Increment I variants.  <b>FY 2020 Base Plans:</b> Complete logistics requirements for Snow/ Alpine ULCANS Increment I variants. Initiate development and DT/OT, logistics requirements for Desert/Urban ULCANS Increment I variants.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Initiate development for Desert/Urban ULCANS Increment I variants.						
<b>Title:</b> SBIR/STTR  <b>FY 2019 Plans:</b> SBIR/STTR  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> SBIR/STTR		-	0.109	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>		4.854	3.388	4.400	-	4.400
<b>C. Other Program Funding Summary (\$ in Millions)</b>						
<b>Line Item</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>	<b>Cost To Complete Total Cost</b>
• VR7: <i>Combat Service Support Systems</i>	3.594	4.527	0.000	-	0.000	0.000 8.121
• VR8: <i>Combat Service Support Systems - Ad</i>	3.334	3.218	0.000	-	0.000	0.000 6.552
<b>Remarks</b>						
<b>D. Acquisition Strategy</b> The acquisition strategy is to accelerate product development and testing to transition into production.						
<b>E. Performance Metrics</b> N/A						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
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)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
ULCANS	Various	PMFSS : Natick, MA	1.000	0.872		0.877		1.040		-		1.040	0.000	3.789	-
SBIR/STTR	TBD	PMFSS : Natick, MA	-	-		0.109		-		-		-	0.000	0.109	-
Subtotal			1.000	0.872		0.986		1.040		-		1.040	0.000	3.898	N/A
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
ULCANS Increment I Woodland Variant	C/FFP	PMFSS : Natick, MA	4.000	1.750		0.857		-		-		-	0.000	6.607	-
ULCANS Increment I Arctic Variant	C/FFP	PMFSS : Natick, MA	4.000	1.632		0.857		0.900		-		0.900	0.000	7.389	-
ULCANS Incremet I Desert/Urban Increment	C/FFP	PMFSS : Natick, MA	-	-		-		1.840		-		1.840	0.000	1.840	-
Subtotal			8.000	3.382		1.714		2.740		-		2.740	0.000	15.836	N/A
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
ULCANS Increment I Woodland Variant	Various	Various : Various	2.300	0.300		0.325		-		-		-	0.000	2.925	-
ULCANS Increment I Arctic Variant	Various	Various : Various	2.300	0.300		0.363		-		-		-	0.000	2.963	-
ULCANS Incremet I Desert/Urban Increment	Various	Various : Various	-	-		-		0.620		-		0.620	0.000	0.620	-
Subtotal			4.600	0.600		0.688		0.620		-		0.620	0.000	6.508	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army										Date: March 2019					
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)					
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			13.600	4.854		3.388		4.400		-		4.400	0.000	26.242	N/A
Remarks															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2020 Army</b>			<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> FG4 / <i>Ultra-Lightweight Camouflage Net System (ULCANS)</i>	

Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Conduct contract source selection for development contract																												
Prepare documentation to support MS B decision for ULCANS Increment I Program																												
Obtain MS B decision for ULCANS Increment I Program																												
Award development contract and procure test items for all Increment I Variants																												
Build test items for ULCANS variants, conduct competitive down-select to winners																												
EMD testing for Woodland Variant																												
Complete logistics requirements to support MS C production decision for Woodland																												
Obtain MS C production decision for Woodland Variant																												
Prepare documentation for development decision for Arctic/Alpine variant																												
Obtain development decision for Arctic/Alpine Variant																												
EMD testing for Arctic/Alpine Variant																												
Complete logistic requirement to support MS C decision for Arctic/Alpine Variant																												
Obtain production decision for Arctic/Alpine Variant																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2020 Army			<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> FG4 / <i>Ultra-Lightweight Camouflage Net System (ULCANS)</i>	

Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
Prepare documentation for tailored development decision for Desert/Urban Variant																												
Obtain development decision for Desert/Urban Variant																												
EMD testing for Desert/Urban Variant																												
Complete logistics requirement to support MS C decision for Desert/Urban Variant																												
Obtain production decision for Desert/Urban Variant																												
EMD for Emerging Sensor Threat Requirements																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Army			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> FG4 / <i>Ultra-Lightweight Camouflage Net System (ULCANS)</i>	

**Schedule Details**

<b>Events</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
Prepare development contract for ULCANS Increment I	1	2017	4	2017
Conduct contract source selection for development contract	4	2017	2	2018
Prepare documentation to support MS B decision for ULCANS Increment I	3	2017	2	2018
Obtain MS B decision for ULCANS Increment I Program	2	2018	2	2018
Award development contract and procure test items for all Increment I Variants	2	2018	2	2018
Build test items for ULCANS variants, conduct competitive down-select to vendor	3	2018	4	2018
EMD testing for Woodland Variant	1	2019	2	2019
Complete logistics requirements to support MS C production decision for Woodland	1	2019	3	2019
Obtain MS C production decision for Woodland Variant	3	2019	3	2019
Prepare documentation for development decision for Arctic/Alpine variant	2	2019	4	2019
Obtain development decision for Arctic/Alpine Variant	1	2020	1	2020
EMD testing for Arctic/Alpine Variant	1	2020	3	2020
Complete logistic requirement to support MS C decision for Arctic/Alpine Variant	1	2020	4	2020
Obtain production decision for Arctic/Alpine Variant	4	2020	4	2020
Prepare documentation for tailored development decision for Desert/Urban Variant	1	2020	3	2020
Obtain development decision for Desert/Urban Variant	3	2020	3	2020
EMD testing for Desert/Urban Variant	3	2020	1	2022
Complete logistics requirement to support MS C decision for Desert/Urban Variant	3	2020	3	2021
Obtain production decision for Desert/Urban Variant	3	2021	3	2021
EMD for Emerging Sensor Threat Requirements	1	2021	4	2022



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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
H01: Combat Engineer Eq Ed	-	3.734	2.742	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.476
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
<p>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, Graders and Engineer Rapid Airfield Construction Capability (ERACC). Systems that support the MRBC included the Hydraulic Excavators (HYEX) and All Terrain Crane.</p> <p>This project also supports the effort for Construction Equipment Virtual Trainers (CEVTs) for the 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, ICW, CDRLs as well as purchase NRE's.</p>												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Mine Clearing Armor Protection (MCAP)								-	2.250	-	-	-
Description: Evaluate and integrate technologies to increase operator protection and safety during mine clearing missions. Mine Clearing Armor Protection (MCAP) Dozers were built on legacy D7G. These systems are being replaced by the D7R and will require additional equipment to allow for use in completing the MCAP mission. This includes providing greater operator protection as well as additional tools for conducting the mine clearing operation.												
FY 2019 Plans: Initiate analysis of alternatives (AOA) of solutions to increase the armor protection or remove the operator from the cab, and research of blade design to ensure the mine clearing capability is sufficient for meeting the requirement of the MCAP mission. Integrate mine clearing capabilities into Dozer vehicles. Complete analysis												

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019			
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		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
of alternatives (AOA) of solutions to increase the armor protection or remove the operator from the cab, and research of blade design to ensure the mine clearing capability is sufficient for meeting the requirement of the MCAP mission. Integrate mine clearing capabilities into Dozer vehicles.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> No funding programmed in FY 2020.						
<b>Title:</b> Weight Reduction in Transparent Armor (TA)  <b>Description:</b> Investigate technologies that will reduce the weight in TA while maintaining current protection levels or technologies that will increase protection levels with no or minimal increase in weight.		0.300	-	-	-	-
<b>Title:</b> CEVT  <b>Description:</b> These funds are for the development of the Commercial-Off-the-Shelf virtual training devices (simulators) with software modifications for military unique tasks. These will be used by the United States Army Engineer School (USAES) to train soldiers for the AIT program. The funds will also be used to purchase NRE's for the following variants: Dozer, Grader, Scraper, Loader, and HYEX.  <b>FY 2019 Plans:</b> FY19 funds will be used to purchase the first NRE for each variant.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> No Funds in FY20		3.434	0.104	-	-	-
<b>Title:</b> Telematics  <b>Description:</b> Telematics will allow the operator and owners to monitor vehicle location, hours operated, fuel consumption, and other parameters impacting maintenance and sustainment, as well as the impact to the customers through operational costs This initiative will focus on evaluating the utility, feasibility, and maintainability of utilizing vehicle telematics devices in the US Army?s fleet of Caterpillar T5 Dozers and JCB HMEE-I in the following CONUS locations: Fort Carson, Colorado and Joint Base Lewis-McChord, Washington. This will be accomplished by installing and activating the devices in ten T5 Dozers and ten HMEE-I vehicles, tracked on a daily basis, and reported on a bi-weekly basis.  <b>FY 2019 Plans:</b> Identify the required commercial industry/COTS hardware components necessary for integration into the vehicles.		-	0.300	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army							Date: March 2019				
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				
B. Accomplishments/Planned Programs (\$ in Millions)							FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<p>Identify the necessary software applications and/or access required to interface with the data collected from the hardware.</p> <p>Initiate the process for obtaining an Interim Authority to Test (IATT) to identify any cybersecurity risks.</p> <p>Identify the locations for the pilot vehicles where the devices will be installed and where the military units will operate the vehicles.</p> <p>Conduct Technical Inspections on each vehicle and record this as the baseline configuration and condition.</p> <p>Integrate the Caterpillar and JCB hardware into the vehicles.</p> <p>Once the IATT is available, acquire baseline data.</p> <p>Track fuel burn, asset utilization, asset location, and any other available parameters IAW ISO 15143-3. If additional OEM-specific parameters are available, ensure they are tracked but also clearly labeled as OEM-specific/additional to ISO 15143-3.</p> <p>Provide bi-weekly reports, monthly reports and analysis.</p> <p>Track any cost reductions and operational readiness.</p> <p>At the conclusion of the data monitoring and analysis phase, the OEMs will remove the hardware installation and revert the vehicles back to their original baseline configurations.</p> <p><b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> No Funding in FY20</p>											
							-	0.088	-	-	-
<p><b>Title:</b> FY 2019 SBIR / STTR Transfer</p> <p><b>FY 2019 Plans:</b> SBIR / STTR</p> <p><b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Adjusted for FY 2019 SBIR / STTR Transfer.</p>											
Accomplishments/Planned Programs Subtotals							3.734	2.742	-	-	-
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cos
• R05901: High Mobility Engineer Excavator (HMEE)	75.831	71.748	27.188	3.000	30.188	19.381	11.199	-	-	Continuing	Continuing
• R03801: GRADER, MTZD, HVY	0.989	-	0.000	-	0.000	5.412	-	-	-	0.000	6.401
• X01500: Hydraulic Excavator	3.850	1.355	0.500	-	0.500	5.192	3.400	-	-	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army									Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• M06100: TRACTOR FULL TRACKED, MED T-9	-	-	4.835	8.225	13.060	12.945	-	-	-	0.000	26.005
• R06701: All Terrain Cranes	8.935	13.031	23.936	-	23.936	55.947	81.703	77.344	7.272	Continuing	Continuing
• R02800: SCRAPER, EARTHMOVING, 14-18 CU YD	11.180	7.961	0.000	4.669	4.669	4.951	0.250	2.450	-	0.000	31.461
• R07001: Enhanced Rapid Airfield Construction Capap	2.563	8.480	0.000	-	0.000	-	-	-	-	0.000	11.043
• R07003: ERACC Type II, Enhanced Earthmoving	2.563	8.480	0.000	-	0.000	-	-	-	-	Continuing	Continuing
• M05500: Const Equip ESP	19.032	33.760	34.790	3.870	38.660	25.119	0.544	3.000	3.000	Continuing	Continuing
• ML5350: Items Less Than \$5.0M (Const Equip)	6.899	6.103	4.381	0.350	4.731	-	1.410	1.410	1.424	0.000	21.977
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.											
E. Performance Metrics											
N/A											

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2020 Army</b>												<b>Date: March 2019</b>			
<b>Appropriation/Budget Activity</b> 2040 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>						<b>Project (Number/Name)</b> H01 / <i>Combat Engineer Eq Ed</i>			
<b>Management Services (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
SBIR+STIR	TBD	TACOM : Warren, Michigan	0.167	-		-		-		-		-	0.000	0.167	-
<b>Subtotal</b>			0.167	-		-		-		-		-	0.000	0.167	N/A
<b>Product Development (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
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, Orlando, FL	8.983	3.434	Feb 2019	0.104	Jul 2019	-		-		-	0.000	12.521	-
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	Mar 2019	-		-		-		-	0.000	0.300	-
Telematics	C/TBD	TBD : TBD	-	-		0.300	Jul 2019	-		-		-	0.000	0.300	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army													Date: March 2019		
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)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	-	-		0.088		-		-		-	0.000	0.088	-
Subtotal			30.641	3.734		0.492		-		-		-	0.000	34.867	N/A
Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering/ 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)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
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	-
Mine Clearing Armor Protection (MCAP)	TBD	TBD : TBD	-	-		2.250	Feb 2019	-		-		-	0.000	2.250	-
Subtotal			1.356	-		2.250		-		-		-	0.000	3.606	N/A
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			34.405	3.734		2.742		-		-		-	0.000	40.881	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army							Date: March 2019			
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			
	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract	
Remarks										

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army												Date: March 2019																
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												
Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
Mine Clearing Armor Protection (MCAP)																												
Weight Reduction in Transparent Armor (TA)																												
CEVT																												
Telematics																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Army			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H01 / <i>Combat Engineer Eq Ed</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Mine Clearing Armor Protection (MCAP)	2	2019	4	2019
Weight Reduction in Transparent Armor (TA)	2	2019	4	2019
CEVT	2	2019	4	2019
Telematics	4	2019	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
H02: Tactical Bridging - Engineering Development	-	15.884	9.268	49.452	-	49.452	13.781	22.805	8.341	0.000	0.000	119.531
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 Structural Health Monitoring System, and the Family of Higher Military Load Classification Bridges (FoHMLC-B).

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

	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
<b>Title:</b> Line of Communication Bridge (LOCB)	13.685	3.107	2.684	-	2.684
<b>Description:</b> 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 300 meters wide. Actions include bridge structural strength analysis, performance assessments, and Production Qualification Testing (PQT) of the Line of Communication Bridge (LOCB) system.					
<b>FY 2019 Plans:</b> Funding supports operational, structural and pier strength testing for the Line of Communication Bridge (LOCB)					
<b>FY 2020 Base Plans:</b> 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.					
<b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding decreased from FY 2019 to FY 2020 due to lower FY 2020 requirements and scheduled completion of commercial component testing and bridge vehicle crossings testing.					
<b>Title:</b> Bridge Supplemental Set (BSS)	2.008	4.218	3.034	-	3.034
<b>Description:</b> Funding requested 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					

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army				Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
protection 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).						
<b>FY 2019 Plans:</b> FY 2019 RDTE will fund development efforts at Engineering Research and Development Center (ERDC) for the Analytical Hydrodynamics/Structural testing, anchorage, improvement matting and bridge protection device prototyping and testing.						
<b>FY 2020 Base Plans:</b> Funding supports remaining prototype development costs, Initial Operational Testing (IOT) and Logistics Demonstration events.						
<b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding decreased from FY 2019 to FY 2020 due to lower FY 2020 requirements and scheduled completion of BSS prototype hardware buy in FY 2019.						
<b>Title:</b> Family of Higher Military Load Capacity Bridges		0.191	1.500	43.734	-	43.734
<b>Description:</b> Funding provided to develop the Family of Higher Military Load Classification Bridges (FoHMLC-B). FoHMLC-B will replace - Armored Vehicle Launched Bridge on the Joint Assault Bridge(JAB), the Dry Support Bridge sections and Improved Ribbon Bridge sections, components and/or systems to support the heavier weights of next generation combat vehicles.						
<b>FY 2019 Plans:</b> FY 2019 funds will support the Family of Higher MLC Bridges (FoHMLC-B) Engineering Research and Development Center (ERDC) Bridge Gap Analysis.						
<b>FY 2020 Base Plans:</b> 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.						
<b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding increased from FY 2019 to FY 2020 to support multiple bridging platform prototype efforts as well as bridge overload and up-weight testing.						
<b>Title:</b> FY 2019 SBIR / STTR Transfer		-	0.443	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Army								<b>Date:</b> March 2019				
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>				<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>				
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>								<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
<b>Description:</b> Adjusted for FY 2019 SBIR / STTR Transfer												
<b>FY 2019 Plans:</b> SBIR / STTR												
<b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Adjusted for FY 2019 SBIR / STTR Transfer												
<b>Accomplishments/Planned Programs Subtotals</b>								15.884	9.268	49.452	-	49.452
<b>C. Other Program Funding Summary (\$ in Millions)</b>												
<b>Line Item</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	
• G06520: BRIDGE SUPPLEMENTAL SET	-	-	17.966	-	17.966	32.527	44.028	-	-	0.000	94.521	
• G82404: LINE OF COMMUNICATION BRIDGE LOCB	16.610	81.219	59.821	4.884	64.705	10.556	10.544	13.530	78.516	0.000	275.680	
<b>Remarks</b>												
<b>D. Acquisition Strategy</b> The acquisition strategy is for Research Development Test & Evaluation efforts to support prototyping, testing and follow-on production efforts for future Bridging systems.												
<b>E. Performance Metrics</b> N/A												

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2020 Army</b>												<b>Date: March 2019</b>			
<b>Appropriation/Budget Activity</b> 2040 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev						<b>Project (Number/Name)</b> H02 / Tactical Bridging - Engineering Development			
<b>Management Services (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
System Engineering and Program Management	MIPR	Various : Various	0.825	0.858	Oct 2017	1.431	Oct 2018	2.462	Oct 2019	-		2.462	Continuing	Continuing	Continuing
<b>Subtotal</b>			0.825	0.858		1.431		2.462		-		2.462	Continuing	Continuing	N/A
<b>Product Development (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Line of Communication Bridge - Development	MIPR	Rock Island Arsenal (RIA) : Rock Island, IL	17.725	-		-		-		-		-	0.000	17.725	-
Line of Communication Bridge - Connector Redesign	MIPR	TARDEC : Warren, MI	0.500	-		-		-		-		-	0.000	0.500	-
Line of Communication Bridge - OTA Dry Gap Prototype Hardware	Various	Other Transactional Agreement - ACC NJ : NJ	-	5.146	Jul 2018	-		-		-		-	0.000	5.146	-
Line of Communication Bridge - OTA Wet Gap Prototype Hardware	Various	Other Transactional Agreement - ACC NJ : NJ	-	3.020	Jul 2018	-		-		-		-	0.000	3.020	-
Bridge Supplemental Set - Hardware Development	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	3.496	-		-		-		-		-	0.000	3.496	-
Bridge Supplemental Set - ERDC - Analytical Study	MIPR	U.S. Army Engineer Research and Development Center (ERDC) : Vicksburg, MS	-	0.928	Mar 2018	0.211	Jan 2019	-		-		-	0.000	1.139	-
Bridge Supplemental Set - EMD Prototype Assets	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		1.800	Nov 2018	-		-		-	0.000	1.800	-
Family of High Military Load Capacity Bridges	MIPR	U.S. Army Engineer Research and	-	-		1.200	Jan 2019	-		-		-	0.000	1.200	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
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)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
- ERDC Bridge Gap Analysis		Development Center (ERDC) : Vicksburg, MS													
Family of High Military Load Capacity Bridges - AVL B 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	-	-		-		4.000	Apr 2020	-		4.000	0.000	4.000	-
Family of High Military Load Capacity Bridges - IRB - Upweight Overload Modeling	TBD	TBD : TBD	-	-		-		1.900	Nov 2019	-		1.900	0.000	1.900	-
Family of High Military Load Capacity Bridges - AVL B Upweight OTA Award	TBD	TBD : TBD	-	-		-		33.100	Dec 2019	-		33.100	Continuing	Continuing	Continuing
FY 2019 SBIR / STTR Transfer	TBD	N/A : N/A	-	-		0.443	Jan 2019	-		-		-	0.000	0.443	-
Subtotal			21.721	9.094		3.754		39.000		-		39.000	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Bridge Lab Spt	MIPR	TARDEC - Bridge Lab : Warren, MI	0.772	1.493	Oct 2017	0.783	Oct 2018	0.800	Oct 2019	-		0.800	Continuing	Continuing	Continuing
Test Facility SANG / ATEC Upgrades - HMLC	MIPR	TARDEC - Bridge Lab : Warren, MI	-	-		-		2.000	Oct 2019	-		2.000	0.000	2.000	-
Prototype/EMD Bridge Test Asset Transportation	TBD	TAC Code : TBD	-	-		-		0.440	Oct 2019	-		0.440	Continuing	Continuing	Continuing
Subtotal			0.772	1.493		0.783		3.240		-		3.240	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2020 Army</b>												<b>Date: March 2019</b>			
<b>Appropriation/Budget Activity</b> 2040 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev						<b>Project (Number/Name)</b> H02 / Tactical Bridging - Engineering Development			
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Line of Communication Bridge - Durability Testing	MIPR	U.S. Army Engineer Research and Development Center (ERDC) : Vicksburg, MS	-	0.794	Nov 2017	0.800	Jan 2019	-		-		-	0.000	1.594	-
Line of Communication Bridge - Commercial Component Testing	MIPR	U.S. Army Engineer Research and Development Center (ERDC) : Vicksburg, MS	-	0.831	Nov 2017	0.650	Jan 2019	-		-		-	0.000	1.481	-
Line of Communication Bridge - Structural Strength Testing	MIPR	United States Army Materiel Systems Analysis Activity (AMSAA) : Aberdeen Proving Ground, MD	-	0.542	Nov 2017	0.650	Jan 2019	-		-		-	0.000	1.192	-
Line of Communication Bridge - UMR Launch and Wet Gap Testing	MIPR	Army Test and Evaluation Command (ATEC) : Aberdeen Proving Ground, MD	-	1.525	Aug 2018	-		0.700	Nov 2019	-		0.700	0.000	2.225	-
Line of Communication Bridge - First Article Testing	TBD	TBD : TBD	-	-		-		0.750	Mar 2020	-		0.750	Continuing	Continuing	Continuing
Line of Communication Bridge - Bridge Vehicle Crossings Testing	MIPR	U.S. Army Engineer Research and Development Center (ERDC) : Vicksburg, MS	-	0.747	May 2019	-		-		-		-	0.000	0.747	-
Bridge Supplemental Set - ERDC - Prototype Testing	MIPR	U.S. Army Engineer Research and Development Center (ERDC) : Vicksburg, MS	-	-		1.200	Nov 2018	-		-		-	0.000	1.200	-
Bridge Supplemental Set - IOT / Log Demo	MIPR	TBD : TBD	-	-		-		1.800	Jan 2020	-		1.800	0.000	1.800	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
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)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Family of High Military Load Capacity Bridges - AVLB Upweight Prototype Testing	TBD	TBD : TBD	-	-		-		1.500	Jul 2020	-		1.500	Continuing	Continuing	Continuing
Subtotal			-	4.439		3.300		4.750		-		4.750	Continuing	Continuing	N/A
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			23.318	15.884		9.268		49.452		-		49.452	Continuing	Continuing	N/A
Remarks															



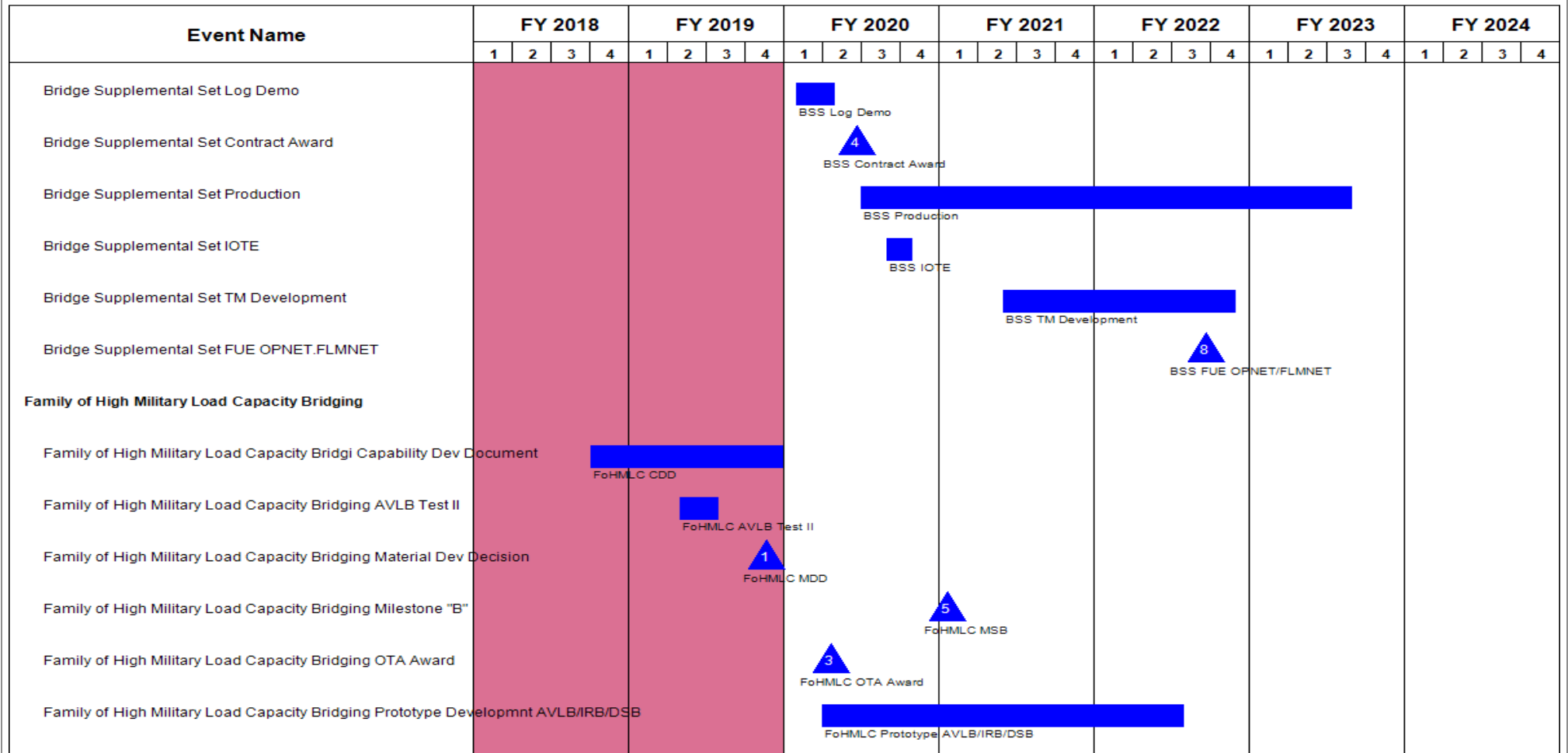
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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2020 Army</b>			<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev		<b>Project (Number/Name)</b> H02 / Tactical Bridging - Engineering Development	

Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Line Of Communication Bridge POR/ONS</b>																												
Line Of Communication Bridge UMR Live Launch Crossing					LOCB Live Launch Crossing																							
Line Of Communication Bridge Durability									LOCB Durability																			
Line of Communication Bridge UMR Production									LOCB 120/150 UMR Productions																			
Line Of Communication Bridge Milestone "C"																												
Line Of Communication Bridge PQT/OT																												
Line of Communication COTS Manual Dev/Verification																												
Line of Communication Bridge POR Production																												
Line Of Communication Bridge FMR																												
<b>Bridge Supplemental Set</b>																												
Bridge Supplemental Set Proposal Development									BSS Proposal Development																			
Bridge Supplemental Set Milestone "B/C" Decision																												
BSS Prototype Development									BSS Prototype Development																			

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2020 Army</b>			<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev		<b>Project (Number/Name)</b> H02 / Tactical Bridging - Engineering Development	



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2020 Army</b>			<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>	

Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
Family of High Military Load Capacity Bridging Log Development																												
Family of High Military Load Capacity Bridging Prototype Testing AVLB/IRB/DSB																												
Family of High Military Load Capacity Bridging Capabilities Production Doc																												
Family of High Military Load Capacity Bridging Milestone "C"																												
Family of High Military Load Capacity Bridging Low Rate Initial Production - AVL																												
Family of High Military Load Capacity Bridging Full Rate Production - AVLB																												
Family of High Military Load Capacity Bridging Low Rate Initial Production - DSB																												
Family of High Military Load Capacity Bridging Low Rate Initial Production - IRB																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Army			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>	

**Schedule Details**

<b>Events</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
Line Of Communication Bridge POR/ONS	2	2012	4	2021
Line Of Communication Bridge UMR Live Launch Crossing	1	2019	2	2019
Line Of Communication Bridge Durability	3	2019	1	2021
Line of Communication Bridge UMR Production	3	2019	2	2021
Line Of Communication Bridge Milestone "C"	1	2020	1	2020
Line Of Communication Bridge PQT/OT	2	2021	4	2022
Line of Communication COTS Manual Dev/Verification	2	2021	4	2022
Line of Communication Bridge POR Production	2	2021	4	2025
Line Of Communication Bridge FMR	4	2023	4	2023
Bridge Supplemental Set	2	2019	2	2019
Bridge Supplemental Set Proposal Development	2	2019	2	2019
Bridge Supplemental Set Milestone "B/C" Decision	1	2021	1	2021
BSS Prototype Development	3	2019	3	2020
Bridge Supplemental Set Log Demo	1	2020	2	2020
Bridge Supplemental Set Contract Award	2	2020	2	2020
Bridge Supplemental Set Production	3	2020	3	2023
Bridge Supplemental Set IOTE	3	2020	4	2020
Bridge Supplemental Set TM Development	2	2021	4	2022
Bridge Supplemental Set FUE OPNET.FLMNET	3	2022	3	2022
Family of High Military Load Capacity Bridging	1	2018	2	2022
Family of High Military Load Capacity Bridgi Capability Dev Document	4	2018	4	2019
Family of High Military Load Capacity Bridging AVLB Test II	2	2019	3	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army			Date: March 2019	
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 Material Dev Decision	4	2019	4	2019
Family of High Military Load Capacity Bridging Milestone "B"	1	2021	1	2021
Family of High Military Load Capacity Bridging OTA Award	2	2020	2	2020
Family of High Military Load Capacity Bridging Prototype Developmnt AVLB/IRB/DSB	2	2020	3	2022
Family of High Military Load Capacity Bridging Log Development	4	2021	4	2023
Family of High Military Load Capacity Bridging Prototype Testing AVLB/IRB/DSB	4	2020	4	2023
Family of High Military Load Capacity Bridging Capabilities Production Doc	1	2022	1	2022
Family of High Military Load Capacity Bridging Milestone "C"	1	2023	1	2023
Family of High Military Load Capacity Bridging Low Rate Initial Production - AVL	1	2023	1	2023
Family of High Military Load Capacity Bridging Full Rate Production - AVLB	1	2024	1	2024
Family of High Military Load Capacity Bridging Low Rate Initial Production - DSB	1	2024	1	2024
Family of High Military Load Capacity Bridging Low Rate Initial Production - IRB	2	2024	2	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604804A / Logistics and Engineer Equipment - Eng Dev				Project (Number/Name) H14 / Materials Handling Equipment - Ed			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
H14: Materials Handling Equipment - Ed	-	0.714	0.333	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This project supports engineering, manufacturing, and development of Material Handling Equipment (MHE) including the 5K Light Capability Rough Terrain Forklifts (LCRTF), Rough Terrain Container Handler (RTCH) equipment, All Terrain Lift Army System (ATLAS), and other cargo handling related items to enable Combat Service Support units to rapidly and efficiently move and deliver critical supplies worldwide to the Soldier. Efforts performed under this project include conducting market research, supporting operational requirements identification and validation, conducting trade studies, generating life cycle cost estimates, performing system engineering, developing performance specifications, conducting pre-production test and evaluation, and preparing program management and acquisition documents.

The RTCH a critical enabler of Army logistics support equipment that performs port opening operations, logistics movement, and unloading and loading of containers that handle break-bulk cargo at seaports, railheads, and airports. The RTCH represents a key enabler during Joint Logistics Over the Shore Operations (JLOTS) and lifts, moves, and stacks 20- and 40-foot ISO freight containers.

The ATLAS enables Terminal Services / Transfer Companies, Ammunition Companies, and Patriot Firing Battery Battalions with capabilities necessary to perform material handling functions up to 10,000lbs during beach, port, and air terminal operations; in material holding areas; and at marshalling yards. The ATLAS provides Commanders with multiple mission capabilities and reliable responsiveness to handle all supply classes supporting three levels of logistics - Strategic, Operational and Tactical.

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

	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
<b>Title:</b> System Engineering/Program Management	0.714	0.333	-	-	-
<b>Description:</b> System Engineering and Program Management support for Material Handling Equipment.					
<b>FY 2019 Plans:</b> Provide funds for System Engineering and Program Management support for Material Handling Equipment operations.					
<b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> No funding programmed for FY 2020.					
<b>Accomplishments/Planned Programs Subtotals</b>	0.714	0.333	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019	
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604804A / Logistics and Engineer Equipment - Eng Dev				Project (Number/Name) H14 / Materials Handling Equipment - Ed			
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• G41002: 5K LIGHT CAPABILITY ROUGH TERRAIN (LCRT) FORKLIFT	9.000	12.901	14.864	5.152	20.016	13.564	18.960	20.393	17.162	Continuing	Continuing
• MA4500: Modification Of In-Svc Equipment (OPA-3)	52.265	65.389	50.458	33.354	83.812	58.817	27.252	25.806	17.104	0.000	330.445
Remarks											
D. Acquisition Strategy											
Develop specifications for 5K Light Capability Rough Terrain Forklifts (LCRTF) improvements, and award contracts to produce test items for production verification testing. Testing LCRTF improvements to be performed using Army test facilities. Design lightweight armor solution for All Terrain Lift Army System (ATLAS) using U.S. Army TARDEC's Center for Ground Vehicle Development and Integration. Test armored ATLAS at Aberdeen Proving Ground, MD. Develop additional capabilities for existing systems such as the LCRFT, RTCH and ATLAS.											
E. Performance Metrics											
N/A											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
Appropriation/Budget Activity 2040 / 5						R-1 Program Element (Number/Name) PE 0604804A / Logistics and Engineer Equipment - Eng Dev				Project (Number/Name) H14 / Materials Handling Equipment - Ed					
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SBIR + STTR	TBD	TBD : TBD	0.032	-		-		-		-		-	0.000	0.032	-
Subtotal			0.032	-		-		-		-		-	0.000	0.032	N/A
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MHE Training Aids	SS/FFP	Kalmar Rt : Cibolo, TX	2.555	-		-		-		-		-	0.000	2.555	-
RTCH Component Modernization	SS/ Various	Various : Various	1.006	-		-		-		-		-	0.000	1.006	-
Lightweight Armor for ATLAS II	MIPR	TARDEC : Warren, MI	0.350	-		-		-		-		-	0.000	0.350	-
Sling Load Attachment for RTCH	C/FFP	Kalmar RT Center : Cibolo, TX	0.100	-		-		-		-		-	0.000	0.100	-
Platform Safety/Driver Assist	TBD	TBD : TBD	0.430	-		-		-		-		-	0.000	0.430	-
MHE System Improvement	SS/FFP	Automation Alley : Troy, MI	0.294	-		-		-		-		-	0.000	0.294	-
Subtotal			4.735	-		-		-		-		-	0.000	4.735	N/A
Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
System Improvements for LCRTF for Tactical Operations	MIPR	TARDEC : Warren, MI	0.055	-		-		-		-		-	0.000	0.055	-
Lightweight Armor for ATLAS II	MIPR	TARDEC : Warren, MI	0.110	-		-		-		-		-	0.000	0.110	-



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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2020 Army</b>													<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev						<b>Project (Number/Name)</b> H14 / Materials Handling Equipment - Ed					
<b>Support (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
System Engineering/ Program Management	MIPR	TARDEC : Warren, MI	0.200	0.714	Mar 2018	0.333	Mar 2019	-		-		-	Continuing	Continuing	-
<b>Subtotal</b>			0.365	0.714		0.333		-		-		-	Continuing	Continuing	N/A
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Lightweight Armor for ATLAS II	TBD	TBD : TBD	0.133	-		-		-		-		-	0.000	0.133	-
System Improvements for LCRTF for Tactical Operations	TBD	TBD : TBD	0.405	-		-		-		-		-	0.000	0.405	-
Investigate high speed towing for LCRTF	TBD	TBD : TBD	0.047	-		-		-		-		-	0.000	0.047	-
Testing of ATLAS II Wider Forklift	MIPR	Various : Various	0.023	-		-		-		-		-	0.000	0.023	-
<b>Subtotal</b>			0.608	-		-		-		-		-	0.000	0.608	N/A
			<b>Prior Years</b>	<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>			5.740	0.714		0.333		-		-		-	Continuing	Continuing	N/A
<b>Remarks</b>															

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army																Date: March 2019																					
Appropriation/Budget Activity 2040 / 5										R-1 Program Element (Number/Name) PE 0604804A / Logistics and Engineer Equipment - Eng Dev								Project (Number/Name) H14 / Materials Handling Equipment - Ed																			
Event Name										FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
										1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
System Engineering/Program Management																																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / Logistics and Engineer Equipment - Eng Dev	Project (Number/Name) H14 / Materials Handling Equipment - Ed	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
System Engineering/Program Management	1	2018	4	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
L39: Field Sustainment Support Ed	-	4.750	2.220	1.675	-	1.675	1.720	1.773	1.807	1.800	0.000	15.745
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)**

	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
<b>Title:</b> Advanced Low Velocity Airdrop System (ALVADS) - Light and Heavy	2.026	-	-	-	-
<b>Description:</b> ALVADS - Light and Heavy are capable of airdrop operations at an altitude down to 750-ft Above Ground Level (AGL) for ALVADS-L and 975-ft AGL for ALVADS-H, while retaining the objective altitude of 500-ft AGL for both with increased aircraft survivability, and improved accuracy. Light-Gross rigged weight of 2,520-22,000 lbs and Heavy-Gross rigged weight of 22,001-42,000 lbs.					
<b>Title:</b> Extracted High and Low High Speed Container Delivery System (EHLSCDS)	1.273	0.248	-	-	-
<b>Description:</b> 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.					
<b>FY 2019 Plans:</b>					

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019			
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Complete logistics deliverables. Obtain Milestone C decision and transition EHLSCDS into production.						
FY 2019 to FY 2020 Increase/Decrease Statement: Program completes in FY 19.						
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.  FY 2019 Plans: Complete system level testing and documentation updates to incorporate Engineering Change Proposal (ECP) changes into production.  FY 2019 to FY 2020 Increase/Decrease Statement: Program complete in FY 2019, will transition validated Technical Data Package to Integrated Logistics Support Center for procurement and sustainment.		1.451	0.989	-	-	-
Title: Rapid Rigging and DeRigging Airdrop System (RRDAS)  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 2019 Plans: Obtain Milestone B decision and award RRDAS prototype development contract. Fabricate RRDAS prototypes.  FY 2020 Base Plans: Conduct Critical Design Review and initiate Developmental Testing  FY 2019 to FY 2020 Increase/Decrease Statement: Increase to conduct Critical Design Review and initiate Developmental Testing.		-	0.912	1.675	-	1.675
Title: SBIR/STTR  FY 2019 Plans:		-	0.071	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Army				<b>Date:</b> March 2019							
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> L39 / <i>Field Sustainment Support Ed</i>							
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>											
	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>						
SBIR/STTR											
<i>FY 2019 to FY 2020 Increase/Decrease Statement:</i>											
SBIR/STTR											
<b>Accomplishments/Planned Programs Subtotals</b>	4.750	2.220	1.675	-	1.675						
<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• K39: <i>Field Sustainment Support Ad</i>	2.332	2.308	0.000	-	0.000	-	-	-	-	0.000	4.640
• MA7806: <i>Precision Airdrop</i>	4.147	5.731	0.000	2.040	2.040	2.040	-	-	-	Continuing	Continuing
<b>Remarks</b>											
<b>D. Acquisition Strategy</b>											
The acquisition strategy is to accelerate product development and testing to transition into production.											
<b>E. Performance Metrics</b>											
N/A											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
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)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Management Support	Various	PM FSS : Natick, MA	4.854	0.500		0.329		0.350		-		0.350	0.000	6.033	Continuing
SBIR+STTR	TBD	Various : Various	0.129	-		0.071		-		-		-	0.000	0.200	-
Subtotal			4.983	0.500		0.400		0.350		-		0.350	0.000	6.233	N/A
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
ALVADS-L&H	Various	Various : Various	16.160	0.992		-		-		-		-	0.000	17.152	Continuing
EHLSCDS	Various	Various : Various	0.450	-		0.150		-		-		-	0.000	0.600	-
JPADS	Various	Various : Various	-	1.465		0.250		-		-		-	0.000	1.715	-
RRDAS	Various	Various : Various	-	-		0.847		0.850		-		0.850	0.000	1.697	-
Subtotal			16.610	2.457		1.247		0.850		-		0.850	0.000	21.164	N/A
Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
EHLSCDS	Various	Various : Various	0.050	0.374		-		-		-		-	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			0.100	0.574		-		-		-		-	0.000	0.674	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
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)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
EHLSCDS	Various	Yuma Proving Ground (YPG), AZ, AEC : AZ	10.680	0.360		-		-		-		-	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	-	-		-		0.475		-		0.475	0.000	0.475	-
Subtotal			18.968	1.219		0.573		0.475		-		0.475	0.000	21.235	N/A
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			40.661	4.750		2.220		1.675		-		1.675	0.000	49.306	N/A
Remarks															



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

Date: March 2019

Appropriation/Budget Activity

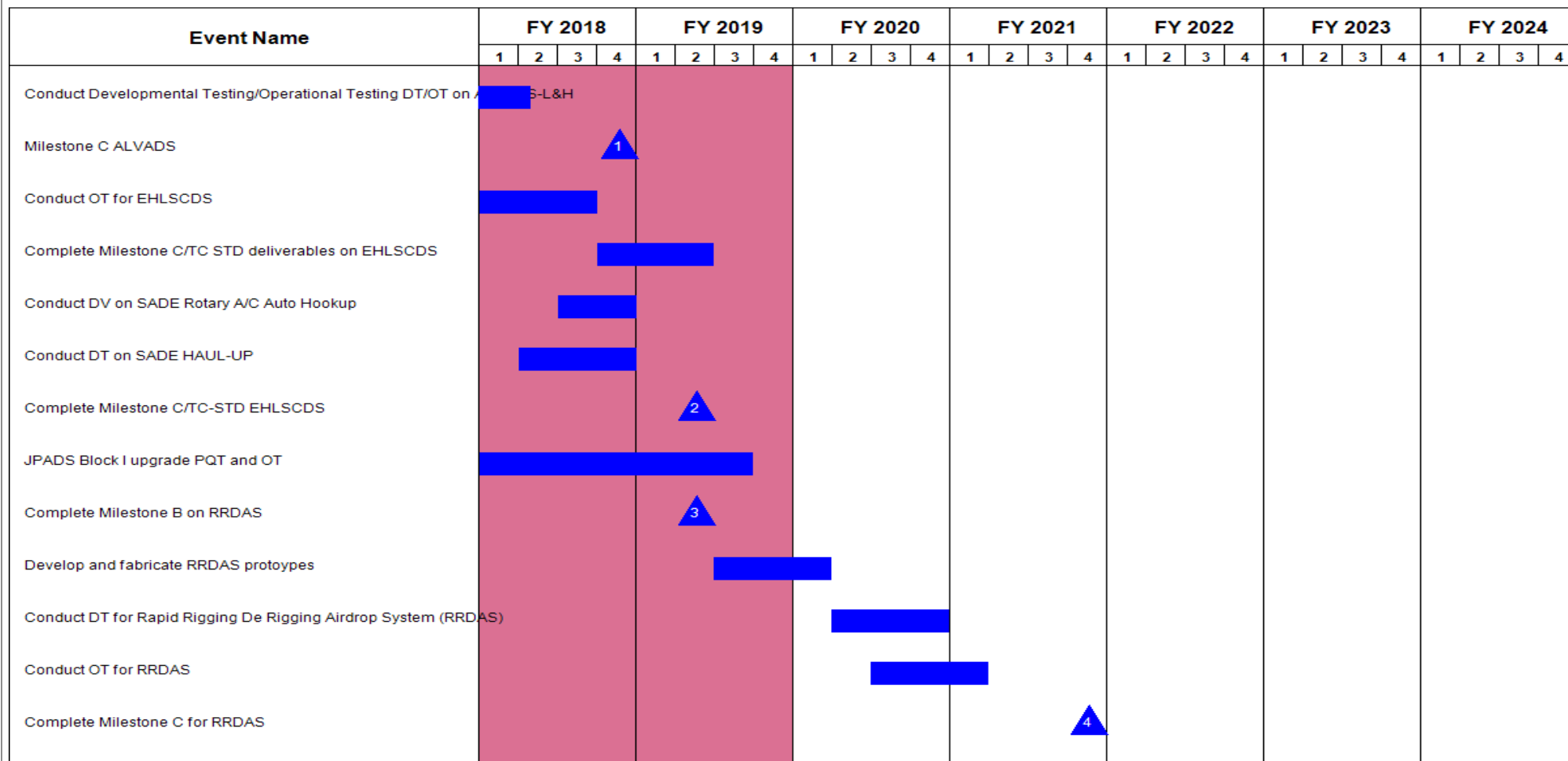
2040 / 5

R-1 Program Element (Number/Name)

PE 0604804A / Logistics and Engineer  
Equipment - Eng Dev

Project (Number/Name)

L39 / Field Sustainment Support Ed



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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army																Date: March 2019												
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										
Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
Initiate Phase II RRDAS																												
Conduct DT and OT for ALVADS DRAS capability																												
Develop and Fabricate RRDAS - Phase II Prototypes																												
Conduct DT and OT for RRDAS Phase II																												
Complete MS C/TC STD deliverables on RRDAS Phase II																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Army			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L39 / <i>Field Sustainment Support Ed</i>	

**Schedule Details**

<b>Events</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
Complete Advanced Low Velocity Airdrop System L&H (ALVADS) DV Testing	4	2014	3	2015
Conduct Developmental Testing/Operational Testing DT/OT on ALVADS-L&H	1	2016	1	2018
Milestone C ALVADS	4	2018	4	2018
Conduct OT for EHLSCDS	1	2018	3	2018
Complete Milestone C/TC STD deliverables on EHLSCDS	4	2018	2	2019
Conduct DV on SADE Rotary A/C Auto Hookup	3	2018	4	2018
Conduct DT on SADE HAUL-UP	2	2018	4	2018
Complete Milestone C/TC-STD EHLSCDS	2	2019	2	2019
JPADS Block I upgrade PQT and OT	1	2018	3	2019
Conduct PQT for EHLSCDS	1	2017	2	2017
Complete Milestone B on RRDAS	2	2019	2	2019
Develop and fabricate RRDAS prototypes	3	2019	1	2020
Conduct DT for Rapid Rigging De Rigging Airdrop System (RRDAS)	2	2020	4	2020
Conduct OT for RRDAS	3	2020	1	2021
Complete Milestone C for RRDAS	4	2021	4	2021
Initiate Phase II RRDAS	1	2022	4	2024
Conduct DT and OT for ALVADS DRAS capablity	3	2018	2	2019
Develop and Fabricate RRDAS - Phase II Prototypes	1	2022	4	2022
Conduct DT and OT for RRDAS Phase II	1	2023	2	2024
Complete MS C/TC STD deliverables on RRDAS Phase II	3	2024	4	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
L41: Water And Petroleum Distribution - Ed	-	6.127	10.761	7.540	-	7.540	7.559	7.620	7.935	5.685	0.000	53.227
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This project provides 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 Engineering and Manufacturing Development programs enable the Army to improve maneuver sustainment operations to meet the demands of the all 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 (R&D) 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. New start programs include; Tactical Fuel Distribution System (TFDS), Bulk Fuel Distribution System (BFDS), Petroleum Expeditionary Analysis Kit (PEAK), Water Bison, and Water Storage and Distribution System (WSDS) 40,000 gallon and 100,000 gallon sets.

"Funding supports modernization of the 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 initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement operating concepts".

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

	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
<b>Title:</b> 3K Tactical Water Purification System (TWPS).	0.521	1.057	1.760	-	1.760
<b>Description:</b> 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 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					

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019			
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
System (LHS)/Palletized Load System (PLS) truck compatible via Container Handling Unit (CHU)/ Enhanced Container Handling Unit (E-CHU).  <b>FY 2019 Plans:</b> Complete Milestone B and Level 2 Technical Data Package (TDP). Begin Other Transaction Authority (OTA) efforts by conducting Industry Day.  <b>FY 2020 Base Plans:</b> Develop Performance Specification based on Industry Day. Develop Request for Prototype Proposal (RPP) and award Phase I OTA.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Awaiting Milestone B package approval.						
<b>Title:</b> Modular Tactical Retail Refueling System (MTRRS)  <b>Description:</b> The Mobile Tactical Retail Refueling System (MTRRS) will replace the Tank Pump Unit (TPU) and Tank Unit Liquid Dispensing (TLUD) systems, which are nearing the end of its useful life. It provides filtered fuel to Echelons Above Brigade. It has a 1,050 gallon capacity fuel tank, 17 gallons per minute electric fuel motor/ pump, a filter separator, and a flow meter. MTRRS is compatible with multiple transport platforms including cargo trucks, trailers, and LHS flat-racks. The system can be removed from the transport platform and operated on the ground.  <b>FY 2020 Base Plans:</b> Support Costs.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Modular Tactical Retail Refueling System (MTRRS) in production.		3.460	-	0.086	-	0.086
<b>Title:</b> Water Bison  <b>Description:</b> 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 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		-	0.149	0.327	-	0.327

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019			
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 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 2019 Plans: Milestone B documentation.						
FY 2020 Base Plans: Prepare Other Transaction Authority (OTA) Request for Prototype Proposal (RPP) contract. Milestone B approval.						
FY 2019 to FY 2020 Increase/Decrease Statement: Increase - Capability Production Document (CPD) approved, awaiting Materiel Development Decision (MDD) approval.						
Title: Early Entry Fluid Distribution System (E2FDS).		0.015	3.470	1.600	-	1.600
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 2019 Plans: Test Readiness Review (TRR), test assets delivered, and conduct Developmental Testing (DT).						
FY 2020 Base Plans: Conduct Log Demo testing.						
FY 2019 to FY 2020 Increase/Decrease Statement: E2FDS will be in production.						
Title: Petroleum Expeditionary Analysis Kit (PEAK)		-	0.149	0.488	-	0.488
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						

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army				Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
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 2019 Plans: Developmental Testing. Achieve Milestone B.						
FY 2020 Base 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 2019 to FY 2020 Increase/Decrease Statement: Capability Development Document (CDD) approved, awaiting Materiel Development Decision (MDD) approval.						
Title: Bulk Fuel Distribution System (BFDS)		-	0.149	0.705	-	0.705
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 2019 Plans: Develop purchase description and Milestone C documentation. Continue Market Research activities.						
FY 2020 Base Plans: Award Other Transaction Authority (OTA) in support of ballistic requirement, conduct test and market research for production. Conduct start of work meeting and preparation of asset delivery.						
FY 2019 to FY 2020 Increase/Decrease Statement: Awaiting Material Development Decision (MDD) approval						
Title: Petroleum Water Trace Tool (PAWTL)		0.395	-	-	-	-
Description: Petroleum and Water Trace Locator (PAWTL) supports all Army petroleum and water pipeline systems. It is a geospatial based software application that allows planners to develop pipeline traces based on						

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019			
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
any mission scenario. The software identifies roadways and uses terrain elevation data to recommend pipeline routes and pump station placement.						
<b>Title:</b> Tactical Fuel Distribution System (TFDS)  <b>Description:</b> 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).  <b>FY 2019 Plans:</b> Awaiting CPD approval. Support Materiel Development Decision (MDD) and market research.  <b>FY 2020 Base Plans:</b> Continue Market Research. Milestone B document development, Request for Prototype Proposal (RPP) development.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Awaiting CPD approval support Army Requirements Oversight Counsel (AROC) .		-	0.149	0.100	-	0.100
<b>Title:</b> PM Support  <b>Description:</b> 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.  <b>FY 2019 Plans:</b> Funds matrix support, travel, and general oversight efforts.  <b>FY 2020 Base Plans:</b> Funds matrix support, travel, and general oversight efforts.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Decrease as a result of 2 systems transitioning to production, therefore less systems engineering support is required.		1.736	4.788	0.754	-	0.754
<b>Title:</b> Load Handling System (LHS) - Compatible Water Tankrack System (HIPPO)		-	0.850	1.720	-	1.720



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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army									Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<b>Description:</b> 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.											
<b>FY 2019 Plans:</b> .No funding planned.											
<b>FY 2020 Base Plans:</b> Conduct prototype fly-off test.											
<b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> No FY19 funding. FY20 funds are required in support of fly off contract effort prior to the award of a production contract. Three contracts will be awarded for prototype development and FAT fly-off where the contractor prototypes will undergo testing. One will be selected for the production contract.											
Accomplishments/Planned Programs Subtotals							6.127	10.761	7.540	-	7.540
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• K41: Water And Petroleum Distribution - Ad	3.954	-	0.000	-	0.000	-	-	-	-	Continuing	Continuing
• MA6000: Distribution Systems, Petroleum & Water	41.622	26.471	74.867	13.986	88.853	76.583	54.169	27.142	37.552	0.000	352.392
• R67500: PETROLEUM QUALITY ANALYSIS SYSTEM	6.903	-	0.000	-	0.000	-	-	-	-	0.000	6.903
Remarks											

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Army		<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>
<p><b><u>D. Acquisition Strategy</u></b></p> <p>Develop engineering prototypes for the 3K Tactical Water Purification System (3K TWPS), 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, Petroleum Expeditionary Analysis Kit (PEAK), Tactical Fuel Distribution System (TFDS), Small Unit Water Purifier (SUWP); Bulk Fuel Distribution System (BFDS) and Water Storage and Distribution System (WSDS) Black Water, Gray Water, Mobile Tactical Retail Refueling System (MTRRS). Conduct developmental and operational testing where applicable for 3K TWPS, Bison, E2FDS, Petroleum Tankers, MTRRS, Water Storage and Distribution Systems (WSDS), PEAK, SUWP, 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.</p> <p><b><u>E. Performance Metrics</u></b></p> <p>N/A</p>		

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2020 Army</b>												<b>Date: March 2019</b>			
<b>Appropriation/Budget Activity</b> 2040 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>						<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>			
<b>Management Services (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
PM Support	MIPR	TARDEC : Warren, MI	-	-		4.788	Dec 2018	0.754	Jan 2020	-		0.754	0.000	5.542	Continuing
<b>Subtotal</b>			-	-		4.788		0.754		-		0.754	0.000	5.542	N/A
<b>Product Development (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Petroleum Expeditionary Analysis Kit (PEAK)	C/FFP	TACOM : Warren, MI	-	-		-		0.416	Jan 2020	-		0.416	0.000	0.416	-
3K Tactical Water Purification System (3K TWPS)	C/FFP	TACOM : Warren, MI	-	-		1.023	Jan 2019	1.279		-		1.279	0.000	2.302	-
Early Entry Fluid Distribution System (E2FDS)	C/FFP	DRS Systems : TBD	-	-		0.014	Feb 2019	-		-		-	0.000	0.014	-
Modular Tactical Retail Refueling System (MTRRS)	C/FFP	TACOM : Warren, MI	-	3.250	Oct 2018	-		0.086	Jun 2020	-		0.086	0.000	3.336	-
Petroleum Water Trace Tool (PAWTL)	MIPR	TARDEC : Warren, MI	-	0.015	Jan 2018	-		-		-		-	0.000	0.015	-
<b>Subtotal</b>			-	3.265		1.037		1.781		-		1.781	0.000	6.083	N/A
<b>Support (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
3K Tactical Water Purification System (3K TWPS)	MIPR	NAVSEA UARC Office : Washington, DC	0.470	-		0.395	Feb 2019	0.481	Feb 2020	-		0.481	Continuing	Continuing	Continuing
Water Bison	MIPR	Various : Warren, MI	-	0.045	Nov 2017	0.045	Mar 2019	0.327		-		0.327	0.000	0.417	-

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2020 Army</b>												<b>Date: March 2019</b>			
<b>Appropriation/Budget Activity</b> 2040 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>						<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>			
<b>Support (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Early Entry Fluid Distribution System (E2FDS)	MIPR	TARDEC : Warren, MI	6.482	1.701	Dec 2017	1.024	Jan 2019	-		-		-	0.000	9.207	Continuing
Mobile Tactical Retail Refueling System (MTRRS)	MIPR	TARDEC : Warren, MI	-	0.310	Dec 2017	0.500	Jan 2019	-		-		-	0.000	0.810	-
Bulk Fuel Distribution System (BFDS)	MIPR	TARDEC : Warren, MI	-	0.045	Oct 2018	0.045	Mar 2019	0.705	Jan 2020	-		0.705	0.000	0.795	-
Petroleum Edpeditionary Analysis Kit (PEAK)	MIPR	TARDEC : Warren, MI	-	-		0.300	Feb 2019	0.072	Oct 2019	-		0.072	0.000	0.372	-
Petroleum Water Trace Tool (PAWTL)	MIPR	TARDEC : Warren, MI	-	0.360	Feb 2018	-		-		-		-	0.000	0.360	-
Tactical Fuel Distribution System (TFDS)	MIPR	TARDEC : Warren, MI	-	-		0.045	Feb 2019	0.100	Feb 2020	-		0.100	0.000	0.145	-
<b>Subtotal</b>			6.952	2.461		2.354		1.685		-		1.685	Continuing	Continuing	N/A
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Early Entry Fluid Distribution System (E2FDS)	MIPR	Aberdeen Proving Ground : APG, MD	-	0.401	Aug 2018	1.732	Jan 2019	1.600	Mar 2020	-		1.600	0.000	3.733	-
Load Handling System (LHS) Compatible Water Tank rack System (HIPPO)	MIPR	TBD : TBD	-	-		-		1.720	Jan 2020	-		1.720	0.000	1.720	-
3K Tactical Water	MIPR	APG : APG, MD	0.200	-		-		-		-		-	0.000	0.200	Continuing
Modular Tactical Retail Refueling System (MTRRS)	MIPR	Keweenaw Research Center (KRC) : Houghton, Mleew	0.317	-		0.850	Apr 2019	-		-		-	0.000	1.167	-
<b>Subtotal</b>			0.517	0.401		2.582		3.320		-		3.320	0.000	6.820	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army											Date: March 2019				
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					
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			7.469	6.127		10.761		7.540		-		7.540	Continuing	Continuing	N/A

Remarks

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2020 Army</b>			<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>			<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Expeditionary Water Packaging System (EWPS)</b>																												
<b>3K Tactical Water Purification System (3K TWPS)</b>																												
3K TWPS Milestone B								6																				
								MS B																				
3K TWPS CDR																												
								8																				
								CDR																				
3K TWPS Industry Day								4																				
								Industry Day																				
3K TWPS OTA Phase I RPP																												
<b>Water Bison</b>																												
Water Bison MDD																												
Water Bison Milestone C																												
Water Bison Full Rate Production (FRP)																												
<b>Early Entry Fluid Distribution System (E2FDS)</b>																												
E2FDS Preliminary Design Review (PDR)																												
E2FDS Critical Design Review (CDR)																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2020 Army</b>			<b>Date:</b> March 2019	
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024																
	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													
E2FDS Developmental Testing									DT																																
E2FDS Milestone C													12 MS C																												
E2FDS Limited User Test (LUT)																	LUT																								
E2FDS Full Rate Production (FRP)																	14																								
<b>Modular Tactical Retail Refueling System (MTRRS)</b>																																									
MTRRS Milestone B					3 MS B/C				DT																																
MTRRS Developmental Testing																																									
MTRRS Milestone C													16 MS C																												
MTRRS PQT													PQT																												
MTRRS Full Materiel Release (FMR)																					22 FMR																				
MTRRS Full Rate Production (FRP)													17																												
<b>Army Fuels Automated Management System (AFAMS) Tank Gauging</b>																																									
<b>Pipeline Trace Tool</b>																																									

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2020 Army</b>			<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>	

Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
Pipeline Trace Tool E2FDS - Software Development																												
Software Development																												
<b>Bulk Fuel Distribution System (BFDS)</b>																												
Bulk Fuel Distribution System Materiel Development Decision (MDD)																												
Petroleum Expeditionary Analysis Kit (PEAK)																												
PEAK Reqts. Refinement & Tech. Dev.																												
PEAK Materiel Development Decision (MDD)																												
PEAK Mileston B																												
PEAK Milestone C																												
PEAK Full Materiel Release (FMR)																												
<b>Tactical Fuel Distribution System (TFDS)</b>																												
Tactical Fuel Dist Sys (TFDS) Material Development Decision (MDD)																												
Tactical Fuel Dist Sys (TFDS) Milestone B																												
Tactical Fuel Dist Sys (TFDS) Milestone C																												



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2020 Army			<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>			<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
Tactical Fuel Dist Sys (TFDS) Operational Test (OT)																												
Tactical Fuel Dist Sys (TFDS) Full Rate Production (FRP)																												
Load Handling System (LHS) - Compatible Water Tankrack System (HIPPO)																												
HIPPO Contract Award																												
HIPPO Fly-off																												
HIPPO Milestone C																												
HIPPO Production Award																												
HIPPO Full Rate Production (FRP)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Army			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>	

**Schedule Details**

<b>Events</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
Expeditionary Water Packaging System (EWPS)	1	2018	1	2025
EWPS	1	2017	3	2017
3K Tactical Water Purification System (3K TWPS)	2	2016	2	2025
3K TWPS Milestone B	3	2019	3	2019
3K TWPS CDR	4	2019	4	2019
3K TWPS Industry Day	2	2019	2	2019
3K TWPS OTA Phase I RPP	1	2021	1	2021
Water Bison	1	2020	4	2024
Water Bison MDD	4	2019	4	2019
Water Bison Milestone C	2	2023	2	2023
Water Bison Full Rate Production (FRP)	4	2024	4	2024
Early Entry Fluid Distribution System (E2FDS)	1	2017	4	2020
E2FDS Preliminary Design Review (PDR)	1	2018	1	2018
E2FDS Critical Design Review (CDR)	3	2018	3	2018
E2FDS Developmental Testing	4	2019	4	2020
E2FDS Milestone C	3	2020	3	2020
E2FDS Limited User Test (LUT)	3	2021	2	2022
E2FDS Full Rate Production (FRP)	4	2020	4	2020
Modular Tactical Retail Refueling System (MTRRS)	1	2017	4	2022
MTRRS Milestone B	3	2018	3	2018
MTRRS Developmental Testing	3	2019	4	2019
MTRRS Milestone C	1	2021	1	2021

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army			Date: March 2019	
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	
	Start		End	
Events	Quarter	Year	Quarter	Year
MTRRS PQT	3	2020	2	2021
MTRRS Full Materiel Release (FMR)	2	2022	2	2022
MTRRS Full Rate Production (FRP)	2	2021	2	2021
Army Fuels Automated Management System (AFAMS) Tank Gauging	1	2017	4	2018
Pipeline Trace Tool	4	2016	1	2020
Pipeline Trace Tool E2FDS - Software Development	4	2016	1	2020
Bulk Fuel Distribution System (BFDS)	1	2019	2	2023
Bulk Fuel Distribution System Materiel Development Decision (MDD)	3	2019	3	2019
Petroleum Expeditionary Analysis Kit (PEAK)	1	2020	4	2022
PEAK Reqts. Refinement & Tech. Dev.	1	2020	4	2020
PEAK Materiel Development Decision (MDD)	1	2020	1	2020
PEAK Mileston B	2	2020	2	2020
PEAK Milestone C	4	2021	4	2021
PEAK Full Materiel Release (FMR)	4	2022	4	2022
Tactical Fuel Distribution System (TFDS)	1	2022	1	2025
Tactical Fuel Dist Sys (TFDS) Material Development Decision (MDD)	3	2019	3	2019
Tactical Fuel Dist Sys (TFDS) Milestone B	1	2022	1	2022
Tactical Fuel Dist Sys (TFDS) Milestone C	1	2023	1	2023
Tactical Fuel Dist Sys (TFDS) Operational Test (OT)	4	2023	4	2023
Tactical Fuel Dist Sys (TFDS) Full Rate Production (FRP)	4	2022	4	2022
Load Handling System (LHS) - Compatible Water Tankrack System (HIPPO)	3	2020	4	2022
HIPPO Contract Award	3	2020	3	2020
HIPPO Fly-off	1	2021	2	2021
HIPPO Milestone C	3	2021	3	2021
HIPPO Production Award	3	2021	3	2021

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army				Date: March 2019	
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	
		Start		End	
Events		Quarter	Year	Quarter	Year
HIPPO Full Rate Production (FRP)		4	2022	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
L43: ENGINEER SUPPORT EQUIPMENT - ED	-	3.644	0.341	1.242	-	1.242	2.904	0.200	0.000	0.000	0.000	8.331
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and 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, fire fighting, 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. 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: 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. 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)**

	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
<b>Title:</b> Family of Power Utility Kits (FoPUK)	2.190	0.050	0.050	-	0.050

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019			
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<b>Description:</b> Conduct Market Research, Develop, and Initiate procurement activities for Family of Power Utility Kits (FoPUK).  <b>FY 2019 Plans:</b> TM Development, Validation, Log Demo, Verification, Engineer/QA/PM Support  <b>FY 2020 Base Plans:</b> TM Development, Validation, Log Demo, Verification, Engineer/QA/PM Support						
<b>Title:</b> Supervisory Propulsion, Emergency and Recovery Set (SPEaRS)  <b>Description:</b> Prepare documentation, conduct market research, procure production representative, and complete required testing.  <b>FY 2019 Plans:</b> TM Development, Engineer/QA/PM Support  <b>FY 2020 Base Plans:</b> TM Development, Engineer/QA/PM Support  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding increased from FY 2019 to FY 2020 for the completion of the testing effort.		0.430	0.084	0.239	-	0.239
<b>Title:</b> Engineering and Quality Assurance  <b>Description:</b> Engineering and Quality Assurance of engineering SKOs  <b>FY 2019 Plans:</b> Engineering and Quality Assurance of engineering SKOs  <b>FY 2020 Base Plans:</b> Engineering and Quality Assurance of engineering SKOs  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding increased from FY 2019 to F 20Y20 because total project budget increased which will require additional support to complete the RDTE efforts.		0.300	0.124	0.370	-	0.370
<b>Title:</b> Airfield Damage Repair Kit (ADRK)		0.150	0.015	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army				Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Description: Conduct Market Research and Procure Market Samples for the ADRK.  FY 2019 Plans: Engineer/QA/PM Support  FY 2019 to FY 2020 Increase/Decrease Statement: Funding decreased from FY 2019 to FY 2020 because the system will be ready to enter the Production phase of the lifecycle.						
Title: Program Managment Support  Description: Program support costs associated with emerging program development.  FY 2019 Plans: Salary support in the product office for emerging programs.  FY 2020 Base Plans: Salary support in the product office for emerging programs.  FY 2019 to FY 2020 Increase/Decrease Statement: Funding increased from FY 2019 to FY 2020 because total project budget increased which will require additional support to complete the RDTE efforts.		0.249	0.048	0.086	-	0.086
Title: Special Tools  Description: Develop Rapid Deployment Sets, Kits, and Outfits (SKOs) - Special Tool and support to Engineer combat and constructions sets along with diving and boats / motors equipment.  FY 2019 Plans: Market Research for Special Tools, PRS Hardware, Test, Engineer/QA/PM Support  FY 2020 Base Plans: Market Research for Special Tools, PRS Hardware, Test, Engineer/QA/PM Support  FY 2019 to FY 2020 Increase/Decrease Statement: Funding increased from FY 2019 to FY 2020 because total project budget increased which will require allow for additional RDTE efforts for Special Tools.		0.325	0.020	0.074	-	0.074
Title: Photo Support Set		-	-	0.056	-	0.056

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Army			<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>	

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
<b>Description:</b> Photo Support Set  <b>FY 2020 Base Plans:</b> TM Development, Validation, Log Demo, Verification, Engineer/QA/PM Support  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding increased from FY 2019 to FY 2020 because this is a new requirement to be funded in FY 2020.					
<b>Title:</b> Diver Supplemental Issue Set  <b>Description:</b> Diver Supplemental Issue Set  <b>FY 2020 Base Plans:</b> TM Development, Validation, Log Demo, Verification, Engineer/QA/PM Support  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding increased from FY 2019 to FY 2020 because this is an new requirement to be funded in FY 2020.	-	-	0.153	-	0.153
<b>Title:</b> Soldier Portable System  <b>FY 2020 Base Plans:</b> TM Development, Validation, Log Demo, Verification, Engineer/QA/PM Support  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding increased from FY 2019 to FY 2020 because this is a new requirement to be funded in FY 2020.	-	-	0.214	-	0.214
<b>Accomplishments/Planned Programs Subtotals</b>	3.644	0.341	1.242	-	1.242

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• R70001: <i>Family Of Engr Combat and Construction Sets</i>	10.426	15.978	11.451	-	11.451	23.348	30.436	-	-	0.000	91.639
• R12001: <i>Family of Boats and Motors</i>	4.302	8.006	8.245	-	8.245	5.295	-	-	-	0.000	25.848

**Remarks**



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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
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>D. Acquisition Strategy</b> 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.		
<b>E. Performance Metrics</b> N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
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)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	MIPR	PM SKOT : MI	0.159	0.249	Dec 2017	0.048	Dec 2018	0.087	Dec 2019	-		0.087	Continuing	Continuing	-
Subtotal			0.159	0.249		0.048		0.087		-		0.087	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Conduct Market Research for Family of Power Utility Kits (FoPUK)	MIPR	TBD : TBD	0.540	1.300		0.040	Oct 2018	0.040	Oct 2019	-		0.040	Continuing	Continuing	-
Market Samples for Supervisory, Propulsion, Emergency and Recovery Set (SPEARS)	MIPR	TBD : TBD	0.263	-		0.040	Oct 2018	0.092	Oct 2019	-		0.092	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		0.005	Jan 2019	0.050	Jan 2020	-		0.050	0.000	0.155	-
Photo Support Set	TBD	TBD : TBD	-	-		-		0.012	Oct 2019	-		0.012	0.000	0.012	-
Soldier Portable System	TBD	TBD : TBD	-	-		-		0.168	Oct 2019	-		0.168	0.000	0.168	-
Diver Supplemental Issue Set	TBD	TBD : TBD	-	-		-		0.087	Oct 2019	-		0.087	0.000	0.087	-
Subtotal			1.696	1.455		0.085		0.449		-		0.449	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2020 Army</b>												<b>Date: March 2019</b>			
<b>Appropriation/Budget Activity</b> 2040 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>						<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>			
<b>Support (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Engineering and Quality Assurance - FoPuk	MIPR	ECBC/ARDEC : Rock Island, IL	-	0.590		0.010	Oct 2018	0.010	Oct 2019	-		0.010	Continuing	Continuing	-
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	0.087	0.080		0.045	Oct 2018	0.046	Oct 2019	-		0.046	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		0.083	Oct 2018	0.185	Oct 2019	-		0.185	Continuing	Continuing	-
Packaging Support for Engineer Portfolio SKOs	MIPR	ECBC : Rock Island, IL	-	0.080		0.040	Oct 2018	0.185	Oct 2019	-		0.185	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		0.015	Oct 2018	-		-		-	Continuing	Continuing	-
Special Tools	TBD	TBD : TBD	-	0.225		0.015	Oct 2018	0.024	Oct 2019	-		0.024	Continuing	Continuing	-
Engineering and Quality Assurance Photo Support Set	TBD	TBD : TBD	-	-		-		0.019	Oct 2019	-		0.019	0.000	0.019	-
Engineering and Quality Assurance Soldier Portable System	TBD	TBD : TBD	-	-		-		0.046	Oct 2019	-		0.046	0.000	0.046	-
Engineering and Quality Assurance Diver Supplemental Issue Set	TBD	TBD : TBD	-	-		-		0.066	Oct 2019	-		0.066	0.000	0.066	-
<b>Subtotal</b>			0.497	1.290		0.208		0.581		-		0.581	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2020 Army													<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>					<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>					
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Family of Power Utility Kits Testing	MIPR	ATEC : Aberdeen	-	0.300		-		-		-		-	0.000	0.300	-
SPEARS testing	MIPR	ATEC : Aberdeen	-	0.350		-		0.100	Oct 2019	-		0.100	0.000	0.450	-
Photo Support Sets Testing	TBD	TBD : TBD	-	-		-		0.025	Oct 2019	-		0.025	0.000	0.025	-
<b>Subtotal</b>			-	0.650		-		0.125		-		0.125	0.000	0.775	N/A
<b>Project Cost Totals</b>			2.352	3.644		0.341		1.242		-		1.242	Continuing	Continuing	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2020 Army</b>			<b>Date:</b> March 2019	
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>

Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
Market research, develop, build, test Family of Power Utility Kit																												
Procure Test Articles and Test Soldier Portable Sets																												
Procurement of test articles and testing of Airfield Damage Repair Kit																												
Procurement of test articles and testing of Special Tools																												
Procurement of test articles and testing of Photo Support Set																												
Procurement of test articles and testing of Diver Supplemental Issue Set																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Army			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Market research, develop, build, test Family of Power Utility Kit	1	2017	4	2020
Procure Test Articles and Test Soldier Portable Sets	1	2018	4	2022
Procurement of test articles and testing of Airfield Damage Repair Kit	2	2018	4	2019
Procurement of test articles and testing of Special Tools	1	2018	4	2023
Procurement of test articles and testing of Photo Support Set	1	2020	4	2020
Procurement of test articles and testing of Diver Supplemental Issue Set	1	2021	4	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
L46: Maintenance Support Equipment	-	1.971	1.410	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.381
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. 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 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 2, Mobile Ammunition Processing Facility (MAPF), Special Tools initiatives, shelter mounted system development; packaging development; and technical support for emerging JCIDS materiel requirements documents. Additive Manufacturing upgrades to the Metal Working and Machining Shop Set (MWMSS) to include a 3-D 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/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.

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019			
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<b>Title:</b> Next Generation Shop Equipment, Welding (SEW) <b>Description:</b> Develop and Test new components of Shop Equipment, Welding  <b>FY 2019 Plans:</b> Test, Technical Manual Development, Validation, Log Demo, Verification, Engineering, Quality Assurance, and Program Management.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding decreased from FY 2019 to FY 2020 because the program will enter the production phase of the life cycle.		0.565	0.340	-	-	-
<b>Title:</b> Armament Repair Shop Set (ARSS) 2 <b>Description:</b> ARSS Shelter Modernization  <b>FY 2019 Plans:</b> Test, Technical Manual Development, Validation, Log Demo, Verification, Engineering, Quality Assurance, and Program Management.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding adjustment in support of the Army's modernization priorities.		0.537	0.645	-	-	-
<b>Title:</b> Special Tools <b>Description:</b> Develop Rapid Deployment Sets, Kits, and Outfits (SKOs) - Special Tool and support to Combat and Tactical Vehicles.		0.015	-	-	-	-
<b>Title:</b> Refrigeration Tool Kit (RTK) <b>Description:</b> Develop RTK Individual and Base equipment, procure test articles and development of log products.		0.153	-	-	-	-
<b>Title:</b> MWMSS Additive Manufacturing <b>Description:</b> Develop Additive Manufacturing capability for Army systems, Limited User Experiment and Evaluation.  <b>FY 2019 Plans:</b>		-	0.050	-	-	-



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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019			
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Market Research, Development and Test of 3-D printing/Additive Manufacturing/Digital Library.						
FY 2019 to FY 2020 Increase/Decrease Statement: Funding adjustment in support of the Army's modernization priorities.						
Title: The Fire Suppression Refill System (FSRS) Description: Development and Integration efforts for the FSRS.		0.327	-	-	-	-
Title: Next Generation Shop Equipment Contact Maintenance (SECM) Description: Modernization upgrades to the SECM, mounted onto a Joint Light Tactical Vehicle (JLTV)  FY 2019 Plans: Market Research, Engineering, Quality Assurance, and Program Management.  FY 2019 to FY 2020 Increase/Decrease Statement: Funding adjustment in support of the Army's modernization priorities.		-	0.330	-	-	-
Title: Program Management Support Description: Program support costs associated with emerging program development.		0.153	-	-	-	-
Title: Packaging Support Description: Full Packaging Program Support and Packaging Data Management		0.083	-	-	-	-
Title: Engineering and Quality Assurance Support Description: Engineering Support from the Edgewood Chemical Biological Center (ECBC) and Quality Assurance Support from Armament Research, Development and Engineering Center (ARDEC)		0.138	-	-	-	-
Title: FY 2019 SBIR / STTR Transfer  FY 2019 Plans: SBIR/STTR  FY 2019 to FY 2020 Increase/Decrease Statement: Adjusted for FY 2019 SBIR/STTR Transfer.		-	0.045	-	-	-
Accomplishments/Planned Programs Subtotals		1.971	1.410	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Army										<b>Date:</b> March 2019	
<b>Appropriation/Budget Activity</b> 2040 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>				<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>			
<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• ML5345: <i>Items Less Than \$5.0M (Maint Eq)</i>	2.728	5.253	5.608	-	5.608	5.391	4.930	-	-	0.000	23.910
• G05301: <i>Mobile Maintenance Equipment Systems</i>	34.898	34.479	55.053	-	55.053	47.987	44.007	-	-	0.000	216.424
<b>Remarks</b>											
<b>D. Acquisition Strategy</b>											
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.											
<b>E. Performance Metrics</b>											
N/A											

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2020 Army</b>												<b>Date: March 2019</b>			
<b>Appropriation/Budget Activity</b> 2040 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>						<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>			
<b>Management Services (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Program Management	MIPR	PM SKOT : Warren, MI	0.159	0.153		-		-		-		-	Continuing	Continuing	-
<b>Subtotal</b>			0.159	0.153		-		-		-		-	Continuing	Continuing	N/A
<b>Product Development (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Armament Repair Shopt Set 2 design and development	MIPR	Tobyhanna Army Depot/TBD : Tobyhanna, PA	-	0.186		0.353	Mar 2019	-		-		-	Continuing	Continuing	-
Develop Rapid Deployment Sets, Kits, & Outfits - Special Tool Initiative.	MIPR	ECBC : Rock Island, IL	0.300	-		-		-		-		-	Continuing	Continuing	-
Refrigeration Tool Kit (RTK) Logistics Demonstration	MIPR	ECBC : Rock Island, IL	0.394	-		-		-		-		-	0.000	0.394	-
Modernization/Redesign efforts of Truck/Trailer transported shelters for next generation systems	MIPR	ECBC : 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	ECBC : Rock Island, IL	2.493	-		-		-		-		-	0.000	2.493	-
Next Generation Shop Equipment Contact Maintenance Hardware	MIPR	ECBC : Rock Island, IL	-	-		0.135		-		-		-	0.000	0.135	-

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2020 Army</b>												<b>Date: March 2019</b>			
<b>Appropriation/Budget Activity</b> 2040 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>						<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>			
<b>Product Development (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
FY 2019 SBIR/STTR Transfer	TBD	TBD : TBD	-	-		0.045		-		-		-	0.000	0.045	-
<b>Subtotal</b>			5.555	0.186		0.533		-		-		-	Continuing	Continuing	N/A
<b>Support (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Engineer and Quality Assurance in support of SKOs	MIPR	ECBC / ARDEC : (IL, MI)	1.425	0.138	Dec 2017	-		-		-		-	Continuing	Continuing	-
Packaging Support	MIPR	ARDEC : Rock Island, IL	0.148	0.083	Dec 2017	-		-		-		-	Continuing	Continuing	-
Next Generation Shop Equipment Welding (SEW) support	MIPR	ECBC / ARDEC / PM SKOT : (IL, MI)	-	0.250	Dec 2017	0.341	Dec 2018	-		-		-	Continuing	Continuing	-
Refrigeration Tool Kit (RTK) support	MIPR	ECBC / ARDEC / PM SKOT : (IL, MI)	-	0.153	Dec 2017	-		-		-		-	Continuing	Continuing	-
Armament Repair Shop Set 2 support	MIPR	ECBC / ARDEC / PM SKOT : (IL, MI)	-	0.101	Dec 2017	0.291	Dec 2018	-		-		-	Continuing	Continuing	-
Additive Manufacturing support	MIPR	ECBC : IL	-	-		0.050	Dec 2018	-		-		-	Continuing	Continuing	-
Fire Suppression Refill System (FSRS) support	MIPR	PM SKOT : MI	-	0.040	Dec 2017	-		-		-		-	Continuing	Continuing	-
Next Generation Shop Equipment Contact Maintenance support	MIPR	ECBC/PM SKOT : (IL, MI)	-	-		0.195	Dec 2018	-		-		-	Continuing	Continuing	-
Special Tools support	MIPR	ECBC : IL	-	0.015	Dec 2017	-		-		-		-	Continuing	Continuing	-
<b>Subtotal</b>			1.573	0.780		0.877		-		-		-	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2020 Army												<b>Date:</b> March 2019			
<b>Appropriation/Budget Activity</b> 2040 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>						<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>			
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
ARSS 2 Testing	MIPR	ATEC : Aberdeen Test Center	-	0.250		-		-		-		-	0.000	0.250	-
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	Jul 2018	-		-		-		-	0.000	0.287	-
<b>Subtotal</b>			-	0.852		-		-		-		-	0.000	0.852	N/A
<b>Project Cost Totals</b>			7.287	1.971		1.410		-		-		-	Continuing	Continuing	N/A
<b>Remarks</b>															

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army			Date: March 2019		
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	

Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Develop, Procure, and Test Special Tools for Tactical and Comb																												
Develop, Procure, and Test Refrigeration Tool Kit																												
Develop, Procure, and Test Armament Repair Shop Set 2 (ARSS																												
Develop, Procure, and Test Next Generation Shop, Equipment V																												
Develop, Procure, and Test Additive Manufacturing																												
Develop, Procure, and Test Next Generation Shop Equipment Contact Maintenance																												
Develop, Procure, and Test Fire Suppression Refill System																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Army			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>	

Schedule Details

Events	Start		End	
	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	2019
Develop, Procure, and Test Next Generation Shop Equipment Contact Maintenance	1	2019	1	2020
Develop, Procure, and Test Fire Suppression Refill System	1	2016	4	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
L47: Improved Environmental Control Units Ed	-	1.873	2.337	1.076	-	1.076	1.103	1.974	3.495	1.190	0.000	13.048
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 the new requirements coming from the Command Post Integrated Infrastructure (CPI2), Army Standard Family of Soft Walled Shelters (ASF-SWS) and Army Standard Family of Rigid Wall Shelters (ASF-RWS) Capabilities Development Documents (CDDs). In addition, supports the development/test of critical Chemical Biological Radiological and Nuclear (CBRN) modifications required to support the Chemically Protected Deployable Medical System.

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) 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 will utilize a new refrigerant which complies with mandated Environmental Protection Agency (EPA) requirements. Funding supports the development of trailer-mounted systems, shelter system integration, as well as supporting the new ECU requirements coming from the Command Post Integrated Infrastructure (CPI2) Army Standard Family of Soft Walled Shelters (ASF-SWS) and Army Standard Family of Rigid Wall Shelters (ASF-RWS) Capabilities Development Documents (CDDs). In addition, the field has identified an emerging requirement for an integrated fuel-fired /cooling system. 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)**

	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
<b>Title:</b> Technology Development	0.375	0.950	0.400	-	0.400
<b>Description:</b> Concept development for 9/18/36/60K BTUH Improved Environmental Control Unit (IECU), multiple trailer-mounted variants, Rigid Walled variants and integrated heating/cooling systems.					
<b>FY 2019 Plans:</b>					



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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019			
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Initiate development of next generation 60K IECU, build test items and develop Technical Data Package (TDP) to incorporate the latest technological advances to meet CB protection requirements. <b>FY 2020 Base Plans:</b> Conduct Physical Configuration Audit (PCA) to finalize 60K IECU Technical Data Package (TDP) to support follow-on production contract <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> To reallocate program funding to support required RDT&E development activities to support 60K IECU modification requirements						
<b>Title:</b> Government System Test and Evaluation <b>Description:</b> Testing of prototype performance for the trailer mounted and other variants of the IECUs and soft wall shelter ECUs. <b>FY 2019 Plans:</b> Conduct performance testing in environmental chambers to measure changes in output and power consumption on 9/18/36/60K BTUH IECUs with new variable capacity compressors and smart controls. <b>FY 2020 Base Plans:</b> Complete development testing of 60K IECU Block II prototypes to evaluate capabilities and performance. <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> To reallocate program funding to support required RDT&E development activities to support 60K IECU modification requirements		0.300	0.700	0.200	-	0.200
<b>Title:</b> Other Contract and Government Agency <b>Description:</b> Support engineering, logistics, and testing efforts for multiple trailer-mounted variants, soft wall ECUs, and integrated heating/cooling units. Match and right-size current IECU family to the ASF-RWS and ASF-SWS variants and/or develop and test new variants to provide the most efficient system solution. <b>FY 2019 Plans:</b>		0.898	0.307	0.276	-	0.276

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019			
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Conduct analysis and testing to match and right-size the current Family of IECUs to the ASF-RWS variants under development. Complete 60K IECU TDP conversion effort. Initiate build of 60K IECU (CB Protection) test items using baseline TDP.  <b>FY 2020 Base Plans:</b> 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.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> To reallocate program funding to support required RDT&E development activities to support 60K IECU modification requirements						
<b>Title:</b> Government Program Management  <b>Description:</b> Provide oversight and management of engineering, logistics, contracts, and testing efforts for the 9/18/36/60K IECU family and multiple trailer-mounted variants prepare for IECU variants to transition to production. Provide oversight and management of follow-on ECU variants.  <b>FY 2019 Plans:</b> Oversee the design and integration of the variable capacity compressors and smart controls into the standard 9/18/36/60K BTUH IECUs in addition to testing. Manage continuing technology improvements to include the development of IECU prototypes that utilize advanced non-ozone depleting referigerants. Coordinate with the ASF-RWS program of record to ensure proper integration of required ECUs.  <b>FY 2020 Base Plans:</b> Provide oversight and management of engineering, logistics, contracts, and testing efforts for next generation IECU system development efforts.  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> To reallocate program funding to support required RDT&E development activities to support 60K IECU modification requirements		0.300	0.305	0.200	-	0.200
<b>Title:</b> SBIR/STTR  <b>FY 2019 Plans:</b> SBIR/STTR  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b>		-	0.075	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019	
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	
SBIR/STTR											
Accomplishments/Planned Programs Subtotals						1.873	2.337	1.076	-	1.076	
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• MF9303: IMPROVED ENVIRONMENTAL CONTROL UNITS	7.675	10.122	7.336	0.008	7.344	10.030	9.245	8.474	8.556	Continuing	Continuing
Remarks											
D. Acquisition Strategy											
Support technology insertions required to adapt IECUs to support future Integrated Command Post 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 IECU Fleet and developed/ test initial prototypes of ECUs in support of ASF-SWS and ASF-RWS CDDs. This effort will support the development of Purchase Descriptions (PDs) and Technical Data Packages (TDPs) for eventual competitive procurement.											
E. Performance Metrics											
N/A											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
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)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
9,18 and 36K Improved Environmental Control Unit (IECU)	Various	PM E2S2 : various	1.174	0.160		0.105		-		-		-	0.000	1.439	Continuing
Trailer Variants	Various	PM E2S2 : various	0.575	0.058		-		-		-		-	0.000	0.633	Continuing
60K IECU	Various	PM E2S2 : various	0.141	0.160		0.200		0.198		-		0.198	0.000	0.699	-
Integrated heating/cooling units	Various	PM E2S2 : various	0.105	-		-		-		-		-	0.000	0.105	-
SBIR/STTR	Various	various : various	0.137	-		0.075		-		-		-	0.000	0.212	-
Subtotal			2.132	0.378		0.380		0.198		-		0.198	0.000	3.088	N/A
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
9 ,18 and 36K Improved Environmental Control Unit (IECU)	C/CPFF	Mainstream Engineering : Vero Beach, FL	2.064	-		0.307		0.141		-		0.141	0.000	2.512	Continuing
Trailer Mounted variants	MIPR	CERDEC Night Vision Lab : Ft Belvoir, VA	0.525	0.211		-		-		-		-	0.000	0.736	-
60K IECU	C/CPFF	TBD : TBD	2.325	0.337		0.950		0.437		-		0.437	0.000	4.049	-
Integrated heating/cooling units	MIPR	CERDEC Night Vision Lab : Ft. Belvoir, VA	0.325	-		-		-		-		-	0.000	0.325	-
Subtotal			5.239	0.548		1.257		0.578		-		0.578	0.000	7.622	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
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)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
9, 18 and 36K Improved Environmental Control Unit (IECU)	MIPR	CERDEC : Fort Belvoir, VA	2.117	-		-		-		-		-	0.000	2.117	-
60K IECU	Various	CERDEC : Fort Belvoir, VA	4.182	0.225		-		-		-		-	0.000	4.407	-
Trailer variants	MIPR	CERDEC : Fort Belvoir, VA	0.820	0.422		-		-		-		-	0.000	1.242	-
Integrated heating/cooling units	MIPR	CERDEC : Fort Belvoir, VA	0.321	-		-		-		-		-	0.000	0.321	-
Subtotal			7.440	0.647		-		-		-		-	0.000	8.087	N/A
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
9,18 and 36K Improved Environmental Control Unit (IECU)	MIPR	ATEC : APG, MD	0.478	-		0.450		-		-		-	0.000	0.928	-
Trailer Variants	MIPR	ATEC : APG, MD	0.424	-		-		-		-		-	0.000	0.424	Continuing
60K IECU	MIPR	ATEC : APG, MD	0.325	0.300		0.250		0.300		-		0.300	0.000	1.175	-
Integrated heating/cooling units	MIPR	ATEC : APG, MD	0.200	-		-		-		-		-	0.000	0.200	-
Subtotal			1.427	0.300		0.700		0.300		-		0.300	0.000	2.727	N/A
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			16.238	1.873		2.337		1.076		-		1.076	0.000	21.524	N/A
Remarks															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2020 Army</b>			<b>Date: March 2019</b>		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>			<b>Project (Number/Name)</b> L47 / <i>Improved Environmental Control Units Ed</i>

Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Develop and Test of 60K IECU NBC Modification Kit																												
Concept development for IECU integration with RWS in support																												
60K IECU TDP Conversion Effort																												
Develop and Test Modified 60K IECU																												
Design and Testing for potential product improvements to IECU Family																												
Concept Development for High Efficiency ECUs																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Army			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L47 / <i>Improved Environmental Control Units Ed</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Develop and Test of 60K IECU NBC Modification Kit	1	2018	3	2018
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	2024
Develop and Test Modified 60K IECU	1	2019	4	2024
Design and Testing for potential product improvements to IECU Family	1	2021	4	2024
Concept Development for High Efficiency ECUs	1	2022	4	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
VR7: Combat Service Support Systems	-	3.594	4.527	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.121
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Note VR7 efforts completed in FY 19.												
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Expeditionary Shelter Protection System (ESPS)								0.300	0.450	-	-	-
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.												
FY 2019 Plans: Complete logistics requirements/documentation and obtain Type Classification Standard pending Army decision on future production.												
FY 2019 to FY 2020 Increase/Decrease Statement: Funding adjustments to support the Army's modernization priorities.												
Title: Family of Space Heaters								-	0.150	-	-	-



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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army				Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<p><b>Description:</b> The family of Army Space Heaters support soldiers operating in basic, cold and extreme cold environments with a safe, portable, lightweight, multi-fueled, self-powered space heaters for use in tents and/or expeditionary shelters that do not require an external power source. These heaters provide the much needed capability of providing heated air effectively and efficiently while eliminating the shortcomings of the antiquated, dangerous and inefficient heaters they are replacing in the inventory.</p> <p><b>FY 2019 Plans:</b> Conduct evaluations for potential product improvements to the existing Family of Space Heaters. Prepare and coordinate Engineering Change Proposals that incorporate improvements into heater performance specifications.</p> <p><b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding adjustments to support the Army's modernization priorities.</p>						
<p><b>Title:</b> Resource and Energy Efficiency Enabling Solutions</p> <p><b>Description:</b> Reduces the resource, operational energy and logistics footprint of critical soldier support and sustainment systems while maintaining or improving operational effectiveness. The goal is to significantly reduce fuel, water, and power requirements to sustain multi-domain operations in addition to reducing maintenance and spare parts requirements. Systems such as Command Posts, Expeditionary Operating Bases, and Combat Support Hospitals require a significant amount of logistics and sustainment support which cost valuable resources, require extra human effort (that means a risk in the form of Soldiers on the road), limit endurance, restrict agility, and increase vulnerability.</p> <p><b>FY 2019 Plans:</b> Continue to integrate and evaluate resource and operational energy-saving solutions for Command Posts, Expeditionary Operating Bases, and Combat Support Hospitals. Complete testing on energy-efficient appliances, improved energy-efficient expeditionary lighting systems, and smart base non-intrusive monitoring. Collect data to inform and support development of logistics support and the Engineering Change Proposal to transition proven and validated capabilities into full-rate production and/or reset.</p> <p><b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding adjustments to support the Army's modernization priorities.</p>		0.199	0.200	-	-	-
<b>Title:</b> Laundry and Shower Improvements		0.898	0.850	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army				Date: March 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<p><b>Description:</b> 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.</p> <p><b>FY 2019 Plans:</b> Conduct Developmental Testing on the Laundry Advanced System (LADS) modification kits.</p> <p><b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding adjustments to support the Army's modernization priorities.</p>						
<p><b>Title:</b> Expeditionary Solid Waste Disposal (ESWDS)</p> <p><b>Description:</b> Provides an integrated waste management (reduction, treatment or disposal process) add-on capability that can safely process 1,000 pounds (lbs) or more of mixed solid waste in a single day on site. Mixed solid waste produced on a single 150 person site must be properly managed through reduction, reuse, recycling, treatment, or disposal. Most of the waste is nonhazardous solid waste. Provides a substantial improvement over the current practice of burn pits that poses a health risk to Soldiers and/or backhaul which poses an additional logistics burden.</p>		1.250	-	-	-	-
<p><b>Title:</b> Containerized Ice Making System (CIMS)</p> <p><b>Description:</b> 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.</p> <p><b>FY 2019 Plans:</b> Complete logistics requirements, prepare documentation and obtain Type Classification Standard decision pending Army decision on future production.</p> <p><b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding adjustments to support the Army's modernization priorities.</p>		0.400	0.327	-	-	-
<p><b>Title:</b> Army Standard Family of Rigid Wall Shelters (ASF-RWS)</p>		0.547	2.385	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2020 Army				<b>Date:</b> March 2019	
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</i>	

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
<p><b>Description:</b> 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.</p> <p><b>FY 2019 Plans:</b> Continue design/development of Expandable/Non-Expandable Shelter variants and initiate DT. Initiate development of logistics requirements and program documentation to support Type Classification Standard and production decision in FY20.</p> <p><b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding adjustments to support the Army's modernization priorities.</p>					
<p><b>Title:</b> SBIR/STTR</p> <p><b>FY 2019 Plans:</b> SBIR/STTR</p> <p><b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> SBIR/STTR</p>	-	0.165	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	3.594	4.527	-	-	-

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• VR8: <i>Combat Service Support Systems - Ad</i>	3.334	3.218	0.000	-	0.000	-	-	-	-	0.000	6.552
<b>Remarks</b>											

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
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>D. Acquisition Strategy</b> The acquisition strategy is to accelerate product development and testing to transition into production.		
<b>E. Performance Metrics</b> N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army												Date: March 2019			
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)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Management Support	Various	PM Force Sustainment Systems : Natick, MA	1.386	0.613		0.587	Nov 2018	-		-		-	0.000	2.586	-
CBI Support	Various	PD CBI : Warren, MI	3.747	-		-		-		-		-	0.000	3.747	-
SBIR+STTR	TBD	Various : Various	0.077	-		0.165		-		-		-	0.000	0.242	-
Subtotal			5.210	0.613		0.752		-		-		-	0.000	6.575	N/A
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Soldier Support Equipment	TBD	Various : Various	8.421	2.367		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	-	-		0.100	Nov 2018	-		-		-	0.000	0.100	-
Army Standard Family of Rigid Wall Shelters (ASF- RWS)	Various	Various : Various	-	-		1.750	Dec 2018	-		-		-	0.000	1.750	-
Subtotal			9.952	2.367		2.025		-		-		-	0.000	14.344	N/A
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Soldier Support Equipment	Various	Various : Various	7.728	0.614		0.475	Dec 2018	-		-		-	0.000	8.817	-
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	-	-		0.580	Mar 2019	-		-		-	0.000	0.580	-

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2020 Army												<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>				<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</i>				

Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
<b>Subtotal</b>			8.934	0.614		1.750		-		-		-	0.000	11.298	N/A

	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	24.096	3.594	4.527	-	-	-	0.000	32.217	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2020 Army</b>			<b>Date:</b> March 2019		
<b>Appropriation/Budget Activity</b> 2040 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</i>	

Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
Integrate, evaluate, and transition modernized equipment into F																												
Award Development Contract and procure ESPS prototypes for																												
Conduct DT on ESPS																												
Prepare for and execute Type Classification of ESPS																												
Obtain TC-STD for ESPS																												
Develop Laundry System Improvements																												
Conduct DT/OT on Laundry System Improvements																												
Conduct DT on ESWDS																												
Conduct DT on CIMS																												
Prepare for and Execute Type Classification of CIMS																												
Award EMD contract and procure prototypes for ASF-RWS (Exp/Non-Exp)																												
Conduct DT/OT on ASF-RWS (Exp/Non-Exp) variants																												
Prepare for and obtain Milestone C / TC-STD decision for ASF-RWS (Exp/Non-Exp)																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army												Date: March 2019																
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												
Event Name	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
Obtain Milestone C TC-STD decision for ASF-RWS Expandable/Non-Expandable Variant																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Army			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</i>	

**Schedule Details**

<b>Events</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
Integrate, evaluate, and transition modernized equipment into FP & Command Posts	1	2016	4	2019
Award Development Contract and procure ESPS prototypes for testing	3	2016	2	2018
Conduct DT on ESPS	2	2018	1	2019
Prepare for and execute Type Classification of ESPS	4	2018	2	2019
Obtain TC-STD for ESPS	2	2019	2	2019
Develop Laundry System Improvements	2	2017	2	2019
Conduct DT/OT on Laundry System Improvements	3	2019	4	2019
Conduct DT on ESWDS	2	2018	4	2018
Conduct DT on CIMS	2	2018	4	2018
Prepare for and Execute Type Classification of CIMS	3	2019	4	2019
Award EMD contract and procure prototypes for ASF-RWS (Exp/Non-Exp)	4	2018	3	2019
Conduct DT/OT on ASF-RWS (Exp/Non-Exp) variants	3	2019	1	2020
Prepare for and obtain Milestone C / TC-STD decision for ASF-RWS (Exp/Non-Exp)	3	2019	2	2020
Obtain Milestone C TC-STD decision for ASF-RWS Expandable/Non-Expandable Variant	2	2020	2	2020
Conduct PQT and User Evaluation for IASH Type II	1	2016	3	2016
Complete evaluation, logistics requirement and TC-STD Decision document for IASH	4	2016	3	2017
Conduct evaluations and prepare for Milestone B for ULCANS	2	2016	2	2017