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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army **Date:** May 2021

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603804A / <i>Logistics and Engineer Equipment - Adv Dev</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	7.081	8.587	7.055	-	7.055	-	-	-	-	-	-
526: <i>Marine Orien Log Eq Ad</i>	-	3.881	0.809	2.493	-	2.493	-	-	-	-	-	-
EW8: <i>Armored Engineer Vehicles</i>	-	-	3.778	4.562	-	4.562	-	-	-	-	-	-
G11: <i>Adv Elec Energy Con Ad</i>	-	3.200	4.000	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This Program Element (PE) supports advanced component development and prototypes of new and improved technologies for combat support and combat service support equipment essential to sustaining combat operations. Advancements in bridging, armored engineer vehicles to include development of a robotic capability Remote Control System for the Assault Breacher Vehicle, electric power generators, material-handling, environmental control, shelter systems, cargo aerial delivery, field service systems, mortuary affairs equipment and petroleum equipment are necessary to improve safety and increase the tactical mobility, operational capability, lethality and survivability on the digital battlefield and to provide for greater sustainment while reducing the logistics support burden. Army Watercraft funding supports initiatives to enhance the seaworthiness, safety, survivability, supportability, energy efficiency, environmental, bulk fuel, water generation, regulatory compliance and reliability of existing systems.

B. Program Change Summary (\$ in Millions)

	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>
Previous President's Budget	7.339	4.761	7.723	-	7.723
Current President's Budget	7.081	8.587	7.055	-	7.055
Total Adjustments	-0.258	3.826	-0.668	-	-0.668
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	4.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.258	-0.174			
• Adjustments to Budget Years	-	-	-0.668	-	-0.668

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

Project: G11: *Adv Elec Energy Con Ad*

Congressional Add: *Contract Activity*

	FY 2020	FY 2021
	0.582	4.000

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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603804A / <i>Logistics and Engineer Equipment - Adv Dev</i>
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Congressional Add Details (\$ in Millions, and Includes General Reductions)

	FY 2020	FY 2021
Congressional Add Subtotals for Project: G11	0.582	4.000
Congressional Add Totals for all Projects	0.582	4.000

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Army **Date:** May 2021

Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603804A / Logistics and Engineer Equipment - Adv Dev	Project (Number/Name) 526 / Marine Orien Log Eq Ad
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
526: Marine Orien Log Eq Ad	-	3.881	0.809	2.493	-	2.493	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project line supports the family of Army Ship to Shore (S2S) connectors that support Dynamic Force Repositioning (DFR) by providing the Combatant, Multi-Domain Operations (MDO) and Joint All Domain Operations (JADO) Commanders with the ability to access multiple entry points via littorals and inland waterways (waterborne corridor) IOT sustain forces within an anti-access/area denial (A2/AD) bubble. The family of S2S connectors include the Maneuver Support Vessel (Light) and the Ship to Shore / Over the Shore Logistics Vessel (SSLV), which are the Army's first digital architecture vessels (with improved draft, speed, and payload) and critical modernization efforts in support of the Army's Watercraft Systems Transformation Strategy (AWSTS). S2S connectors will provide Surge, Precision and Dispersed Logistics to move and maneuver tailored forces, combat ready troops, platforms, equipment, and supply bulk fuel and water across the full spectrum of operations. S2S connectors mitigate A2/AD threats by providing access to shallow coastal waters, rivers, in narrow inland waterways in support of dispersed force elements in austere environments and where mature ports or road networks are unavailable.

In general, all Army Watercraft funding supports initiatives to enhance the seaworthiness, safety, and survivability while increasing the lethality, tactical mobility, and operational capability of the Army Mariner to preserve the Combatant Commanders requirement of "freedom of seas" access in all areas of the world particularly the littorals, to support maneuver operations in all Areas of Responsibility. All modification and services efforts are critical enablers for the success Army's Watercraft Systems Transformation Strategy (AWSTS) and continued fulfillment of the AWS Title 10 mission.

In addition, funded efforts will address critical gaps in these areas for the legacy fleet, while at the same time researching, developing and testing emergent technologies. To support future acquisitions and future fleet planning, funding efforts will include conducting trade studies, Business Case Analyses to inform the requirement development process, and support Analysis of Alternatives (AoA). The funding enables Army's compliance with the National Defense Authorization Act of 1996 and 502(6) of the Clean Water Act and compliance with Environmental protection Agency (EPA) emission standards.

FY 2022 RDTE dollars in the amount of \$2.493 million supports modernization of the legacy fleet by investigating technology insertions, including, but not limited to: force protection, prognostics & preventative maintenance, vessel electronics, 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)

	FY 2020	FY 2021	FY 2022
Title: At Sea Transfer Technology	1.968	-	-
Description: At Sea Transfer Technology enables roll on and roll off (RO/RO) capability from vessels at sea and causeway transport of vehicles and equipment to the beach or shore. The current effort serves to inform development of a Service Life			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021		
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603804A / <i>Logistics and Engineer Equipment - Adv Dev</i>	Project (Number/Name) 526 / <i>Marine Oriented Log Eq Ad</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Extension Program (SLEP) for the Modular Warping Tug (MWT) and Causeway Ferry (CF) which are principle working platforms in the Modular Causeway System (MCS).				
<p>Title: Environmental Compliance Projects</p> <p>Description: Environmental projects enable compliance with requirements as defined under in the law Uniform National Discharge Standards (UNDS) and Environmental Protection Agency (EPA) emissions standards. The EPA reviews the UNDS Code of Federal Regulations (CFR) language in five-year increments separated into three batches (types of discharge). This is an ongoing assessment of statutory language which may or may not result in material solution change.</p> <p>FY 2021 Plans: Identification of Environmental Compliance Technologies IAW evolving statutory and regulatory requirements and ensure ships are compliant. This accomplishment will also fund Navy efforts for UNDS analysis and committee representation.</p> <p>FY 2022 Plans: Batch Three, Phase III - Army UNDS Implementation documentation update</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to the completion of support to establish Performance standards for Batch Three discharges and development of Implementation of DOD instruction for the Mariners.</p>		0.060	0.095	0.045
<p>Title: Force Protection Capability</p> <p>Description: Army Watercraft Systems (AWS) Force Protection capability is limited to defensive measures. Current efforts include development of gunner station and weapon station locations, integration of Common Remotely Weapon Station (CROWS) and non-lethal Escalation of Force (EoF). The EoF capability includes white light, green dazzler, an acoustic hailing device, percussion grenades, and Forward Looking Infra-Red (FLIR) cameras.</p> <p>FY 2021 Plans: Providing support to design, install, and test CROWS aboard LCU watercraft fleet. The EoF capabilities could include, but are not limited to, white light, green dazzler, an acoustic hailing device, percussion grenades, and Electro-Optical / Infrared (EO/IR) capabilities.</p> <p>FY 2022 Plans:</p>		1.575	0.414	1.597

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021		
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603804A / Logistics and Engineer Equipment - Adv Dev	Project (Number/Name) 526 / Marine Orient Log Eq Ad		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Provide support to complete design, prototype install, test, and final TDP for the CROWS aboard LCU watercraft fleet. The EoF capabilities could include, but are not limited to, white light, green dazzler, an acoustic hailing device, percussion grenades, sub surface surveillance, and Electro-Optical / Infrared (EO/IR) capabilities. FY 2021 to FY 2022 Increase/Decrease Statement: Additional funding in FY 2022 is to finalize LCU CROWS design and to kick off efforts to investigate sub-surface surveillance.				
Title: Army Watercraft Program Support Description: Matrix Salary Support includes Program Management and System Engineering resources required to manage the program projects and provide contractor oversight. It also includes benefits, travel, personnel training and other Government costs required to retain a professional acquisition workforce. FY 2021 Plans: Providing MWT Engineering test support as well as engineering and Naval support for the Fleet. FY 2022 Plans: Provide engineering support for C5ISR Studies and Force Protection design work. FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to design, install, and test CROWS aboard watercraft fleet.		0.278	0.300	0.307
Title: Trade Studies and Business Analyses Description: Conduct Affordability and Feasibility Studies for concept development concept development for future vessel platforms. FY 2022 Plans: Initiation of human factor engineer analysis and initiation of electrical power studies to support Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C5ISR) upgrades and joint operation capabilities for legacy vessels. FY 2021 to FY 2022 Increase/Decrease Statement: An increase in the budget allows for initiating these studies in FY22 to inform design decisions for future Modernized Integrated Bridge System (MIBS) technology refreshes in FY23 and beyond.		-	-	0.544
Accomplishments/Planned Programs Subtotals		3.881	0.809	2.493

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

Line Item	FY 2020	FY 2021	FY 2022	FY 2022	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Cost To	
			Base	OCO	Total					Complete	Total Cost
• MA4501: <i>MODIFICATION KITS</i>	48.916	53.386	21.300	-	21.300	-	-	-	-	-	-
• MA4502: <i>INSTALLATION OF MODIFICATIONS</i>	14.109	5.251	5.574	-	5.574	-	-	-	-	-	-
• M11101: <i>Army Watercraft Esp</i>	42.232	40.910	44.409	-	44.409	-	-	-	-	-	-
• ML5355: <i>Items Less Than \$5.0M (Float/Rail)</i>	6.920	1.844	-	-	-	-	-	-	-	-	-

Remarks

FY 2020 Accomplishments:

- LSV 7 Escalation of Force (EOF) Preliminary Design Review
- MCS SLEP Test Readiness Review
- Initiated MCS SLEP Developmental Test
- Initiated development of EO/IR capability for LSV and LCU
- Completed Identification of Environmental Compliance Technologies IAW evolving statutory and regulatory requirements

D. Acquisition Strategy

Leverage government and public research centers Ground Vehicle Systems Center (GVSC), Naval Surface Warfare Center (NSWC) Philadelphia, AWS System Technical Support (STS) contractor (McKean Defense) and known public research institutes (Battelle) along with associated contract mechanisms to prototype, test, and evaluate component technologies that may be applicable to the current and future Army Watercraft fleet.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 4				PE 0603804A / Logistics and Engineer Equipment - Adv Dev				526 / Marine Oriented Log Eq Ad							
Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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
Force Protection, Escalation of Force (EoF) Development (i.e. CROWS)	MIPR	TARDEC : Warren, MI	3.268	1.575	Feb 2020	0.414	Nov 2020	1.597	Nov 2021	-		1.597	Continuing	Continuing	-
At Sea Transfer Systems (Modular Warping Tug / Causeway Ferry)	SS/CPFF	TARDEC DTIC - I, Battelle : Fort Belvoir, VA	7.498	1.968	Nov 2019	-		-		-		-	0.000	9.466	-
Environmental Compliance Uniform National Discharge Standards (UNDS)	MIPR	Carderock : Maryland and Pennsylvania	3.281	0.060	Dec 2019	0.095	Nov 2020	0.045	Nov 2021	-		0.045	Continuing	Continuing	-
Trade Study Analyses	TBD	TBD : TBD	-	-		-		0.544	Feb 2022	-		0.544	Continuing	Continuing	-
Subtotal			14.047	3.603		0.509		2.186		-		2.186	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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
Army Watercraft Program Support	MIPR	Detroit Arsenal PMs, TARDEC, NAVSEA Carderock : Maryland, Warren, MI	2.069	0.278	Dec 2019	0.300	Dec 2020	0.307	Dec 2021	-		0.307	Continuing	Continuing	-
Subtotal			2.069	0.278		0.300		0.307		-		0.307	Continuing	Continuing	N/A
Project Cost Totals			16.116	3.881		0.809		2.493		-		2.493	Continuing	Continuing	N/A
Remarks															
COVID19: The COVID19 pandemic is driving significant cost increases across the shipbuilding industry (absenteeism, demand for skilled trades, safety protocols, and reliance on sub-contractor TDY). Although vaccinations could potentially mitigate some risks, the Army will continue to monitor the situation closely.															

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army			Date: May 2021		
Appropriation/Budget Activity 2040 / 4		R-1 Program Element (Number/Name) PE 0603804A / Logistics and Engineer Equipment - Adv Dev		Project (Number/Name) 526 / Marine Oriented Log Eq Ad	

Event Name	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
Army Watercraft Program Support	[Blue bar]																											
Force Protection: Common Remotely Operated Weapon Station	[Blue bar]																											
Force Protection: CROWS on LSV Class	[Blue bar]																											
Force Protection: CROWS on LCU Class	[Blue bar]																											
At Sea Transfer Technology (MCS)	[Blue bar]																											
Modular Warping Tug (MWT) / Causeway Ferry (CF)	[Blue bar]																											
MWT / CF - SLEP Prototype and Proof Concept	[Blue bar]																											
MWT / CF - SLEP Testing	[Blue bar]																											
Environmental Compliance	[Blue bar]																											
Uniformed National Discharge Standards (UNDS)	[Blue bar]																											
UNDS Batch 2	[Blue bar]																											
UNDS Batch 3	[Blue bar]																											
Trade Studies and Business Analyses	[Blue bar]																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603804A / <i>Logistics and Engineer Equipment - Adv Dev</i>	Project (Number/Name) 526 / <i>Marine Oriented Log Eq Ad</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Army Watercraft Program Support	1	2018	4	2026
Force Protection: Common Remotely Operated Weapon Station (CROWS)	1	2018	4	2026
Force Protection: CROWS on LSV Class	1	2018	2	2022
Force Protection: CROWS on LCU Class	1	2018	4	2023
At Sea Transfer Technology (MCS)	1	2018	1	2021
Modular Warping Tug (MWT) / Causeway Ferry (CF)	1	2018	1	2021
MWT / CF - SLEP Development Contract	4	2018	4	2018
MWT / CF - SLEP Prototype and Proof Concept	1	2018	4	2020
MWT / CF - SLEP Testing	1	2020	4	2020
Environmental Compliance	1	2018	4	2026
Uniformed National Discharge Standards (UNDS)	1	2018	4	2026
UNDS Batch 2	4	2020	4	2020
UNDS Batch 3	4	2022	4	2022
Trade Studies and Business Analyses	4	2019	4	2026

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Army **Date:** May 2021

Appropriation/Budget Activity 2040 / 4					R-1 Program Element (Number/Name) PE 0603804A / Logistics and Engineer Equipment - Adv Dev				Project (Number/Name) EW8 / Armored Engineer Vehicles			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
EW8: Armored Engineer Vehicles	-	-	3.778	4.562	-	4.562	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports a new start effort for the prototype development, test and evaluation of a robotic capability Remote Control System (RCS) for the Assault Breacher Vehicle (ABV), to include prototype fabrication, developmental testing, operational testing and logistics demonstration / user test events. This project also supports live fire test and evaluation, initial operational test and evaluation and production qualification testing of the Joint Assault Bridge (JAB).

Funding supports modernization of Army Bridging and Armored Engineer Vehicle fleets by investigating technology insertions including, but not limited to: condition based maintenance, increased military load capacities, autonomous operations and other emerging technologies. Funding also supports developing initial prototypes and testing to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement operating concepts.

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

	FY 2020	FY 2021	FY 2022
Title: Assault Breacher Vehicle (ABV) Remote Control System (RCS)	-	3.778	4.562
FY 2021 Plans: New start effort. Funding supports a Remote Control System (RCS) capability for the Assault Breacher Vehicle (ABV). Refurb of the ABV assets required for ABV RCS development and testing must be completed. Funding also provides for Systems Engineering Project Management (SEPM) matrix functional support.			
FY 2022 Plans: Funding supports the continuation of refurb of ABV systems, the fabrication of four (4) RCS prototypes and the completion of one (1) User Jury event to update design. Funding also provides for SEPM matrix functional support.			
FY 2021 to FY 2022 Increase/Decrease Statement: Increased funding in this line is required for ABV RCS Prototypes & fabrication and a User Jury as well as SEPM matrix support.			
Accomplishments/Planned Programs Subtotals	-	3.778	4.562

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

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• G82925: Assault Breacher Vehicle	31.697	19.500	-	-	-	-	-	-	-	-	-

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Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603804A / <i>Logistics and Engineer Equipment - Adv Dev</i>	Project (Number/Name) EW8 / <i>Armored Engineer Vehicles</i>

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

D. Acquisition Strategy

Funding will support RDT&E efforts for testing and follow-on production of Assault Bridging system. The Assault Breacher Vehicle (ABV) Remote Control System (RCS) program will pursue a competitive prototype development and testing strategy with multiple vendors to select an RCS materiel solution for production and integration into the ABV system. Prototypes will be developed and refined through one User Jury event in 2022. Competitive testing be used to down-select to one design.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army													Date: May 2021		
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)						
2040 / 4				PE 0603804A / Logistics and Engineer Equipment - Adv Dev					EW8 / Armored Engineer Vehicles						
Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ABV RCS Matrix Functional Support	MIPR	Various : Various	0.929	-		0.357	Dec 2020	0.921	Nov 2021	-		0.921	0.000	2.207	-
Subtotal			0.929	-		0.357		0.921		-		0.921	0.000	2.207	N/A
Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AME Analysis of Alternatives (AOA)	C/FFP	TBD : TBD	1.285	-		-		-		-		-	0.000	1.285	-
JAB Force Protection Development and Fabrication	SS/FFP	DRS SUSTAINMENT SYSTEMS, INC. : SAINT LOUIS, MO	2.084	-		-		-		-		-	0.000	2.084	-
ABV RCS Prototype Development and Fabrication	TBD	TBD : TBD	-	-		-		3.611	Oct 2021	-		3.611	0.000	3.611	-
ABV RCS Refurbishment of ABV assets for testing	MIPR	Anniston Army Depot : Anniston AL	-	-		3.421	Jun 2021	-		-		-	0.000	3.421	-
Subtotal			3.369	-		3.421		3.611		-		3.611	0.000	10.401	N/A
Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JAB Initial Operational Test & Evaluation (IOTE)	MIPR	Operational Test Command : Ft. Hood, TX	5.214	-		-		-		-		-	0.000	5.214	-
JAB Production Qualification Testing (PQT)	MIPR	Aberdeen Test Center : Aberdeen Proving Grounds, MD	3.936	-		-		-		-		-	0.000	3.936	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603804A / <i>Logistics and Engineer Equipment - Adv Dev</i>	Project (Number/Name) EW8 / <i>Armored Engineer Vehicles</i>

Event Name	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
Assault Breacher Vehicle (ABV) Remote Control System (RCS)																												
ABV RCS Request for Prototype Proposals									1 ▲ ABV RCS RPP																			
ABV RCS Prototype Development																												
ABV RCS User Jury													3 ▲ ABV RCS User Jury															
ABV RCS Prototype Awards 2 vendors									2 ▲ ABV RCS Awd																			
ABV RCS Production Source Selection																												
ABV RCS Contract Award																	4 ▲ ABV RCS Awd											
ABV RCS Developmental Test / Operational Test																												

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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Assault Breacher Vehicle (ABV) Remote Control System (RCS)	1	2021	2	2026
ABV RCS Request for Prototype Proposals	1	2022	1	2022
ABV RCS Prototype Development	3	2022	4	2023
ABV RCS User Jury	1	2023	1	2023
ABV RCS Prototype Awards 2 vendors	2	2022	2	2022
ABV RCS Production Source Selection	2	2023	3	2023
ABV RCS Contract Award	1	2025	1	2025
ABV RCS Developmental Test / Operational Test	3	2024	3	2026

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Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603804A / Logistics and Engineer Equipment - Adv Dev	Project (Number/Name) G11 / Adv Elec Energy Con Ad
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
G11: Adv Elec Energy Con Ad	-	3.200	4.000	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This Project supports the Army Network Modernization Strategy Line of Effort #4, Command Post (CP). The technologies in this portfolio are specifically designed to target CP challenges to enable power resilience across the operational spectrum and to resolve issues with setup and tear-down times and with the CP mobility and footprint. Additionally, this project supports enablers of the Integrated Visual Augmentation System (IVAS) which is a priority technology for the Network and Soldier Lethality CFT's.

As the DoD's Lead Standardization Activity for Tactical Electric Power (TEP), Project Manager Expeditionary Energy & Sustainment Systems (PM E2S2) matures and integrates technology that will improve the next generation of standard tactical power sources in support of all Services. It supports technical maturation of TEP systems that will extend Army operational mission reach and duration in support of the Army Operating Concept and Multi-Domain Battle.

Funding supports modernization of the current Tactical Electric Power capability with technology insertions including, but not limited to hybrid capabilities, light-weight power solutions, vehicle/tactical microgrid interoperability and Tactical Microgrid Standards (TMS). Funding also supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment an operational energy concepts.

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

	FY 2020	FY 2021	FY 2022
Title: Government System Test and Evaluation	1.010	-	-
Description: Supports in house and external performance tests of concept hardware. In addition, supports evaluation of systems at Network Integration Evaluation (NIE) and evaluation of systems at larger events such as Army Expeditionary Warrior Experiment (AEWE) and Joint Warfighting Assessment (JWA).			
Title: Other Contracts and Government agencies	1.583	-	-
Description: Matrix engineering and analysis support for continued development of technology supporting the STEP program, PDISE, and CPI2, as well as analysis and data management.			
Title: Government Program Management	0.025	-	-
Description: Continue development of technology supporting the STEP program, PDISE and CPI2.			
Accomplishments/Planned Programs Subtotals	2.618	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603804A / <i>Logistics and Engineer Equipment - Adv Dev</i>	Project (Number/Name) G11 / <i>Adv Elec Energy Con Ad</i>

	FY 2020	FY 2021
Congressional Add: Contract Activity	0.582	4.000
FY 2020 Accomplishments: Build infrastructure prototypes to enable optimized use of existing microgrid technologies. Build prototypes to integrate command post vehicle power with Tactical Electric Power systems. Build prototypes to validate feasibility of integrating energy storage with existing TEP systems to address areas of efficiency, reliability, and footprint. Perform front end analysis to assess viability of forward-deployed, mobile nuclear power plants.		
FY 2021 Plans: Execution of FY21 congressional funding to develop lightweight, portable power generation.		
Congressional Adds Subtotals	0.582	4.000

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

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• 194: <i>Engine Driven Gen Ed</i>	8.050	8.916	17.217	-	17.217	-	-	-	-	-	-
• MA9800: <i>Generators And Associated Equip</i>	115.912	101.239	47.606	-	47.606	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

Complete advanced development pre-Milestone B technology assessments and analysis, and transition products to Engineering and Manufacturing Development (EMD) phase (Milestone B) and subsequent transition to production (Milestone C). Support concept development and demonstration efforts. Products and technologies supported include tactical power and energy sources, alternative/renewable energy systems, power distribution components, and power management and distribution control systems. Perform analysis of Operational Energy related impacts to future development programs to better direct United States Army Combat Capabilities Development Command (CCDC) efforts.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 4				PE 0603804A / Logistics and Engineer Equipment - Adv Dev				G11 / Adv Elec Energy Con Ad							
Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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
Platoon Power Generation	MIPR	PM E2S2 : Ft. Belvoir, VA	0.100	-		-		-		-		-	Continuing	Continuing	Continuing
Small Tactical Electric Power (STEP) Components	MIPR	PM E2S2 : Fort Belvoir, VA	0.990	0.040		-		-		-		-	Continuing	Continuing	Continuing
Hybrid Power Sources Components	MIPR	PM E2S2 : Ft. Belvoir, VA	0.942	0.077		-		-		-		-	Continuing	Continuing	Continuing
Power Management and Distribution Systems	MIPR	PM E2S2 : Ft. Belvoir, VA	1.883	0.101		-		-		-		-	Continuing	Continuing	Continuing
Operational Energy	MIPR	PM E2S2 : Fort Belvoir, VA	1.810	-		-		-		-		-	Continuing	Continuing	Continuing
Subtotal			5.725	0.218		-		-		-		-	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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
Platoon Power Generation	MIPR	CERDEC : Fort Belvoir, VA	0.750	-		-		-		-		-	Continuing	Continuing	Continuing
Small Tactical Electric Power (STEP) Components	Various	CERDEC : Fort Belvoir, VA	4.331	0.090		4.000		-		-		-	Continuing	Continuing	Continuing
Hybrid Power Sources Components	Various	Multiple Vendors : TBD	2.875	0.170		-		-		-		-	Continuing	Continuing	Continuing
Power Management and Distribution Systems	Various	CERDEC : Fort Belvoir, VA	5.936	0.334		-		-		-		-	Continuing	Continuing	Continuing
Operational Energy	TBD	TBD : TBD (FY15)	3.158	-		-		-		-		-	Continuing	Continuing	Continuing
Metering and Monitoring Demo	Various	TBD : TBD	0.455	-		-		-		-		-	Continuing	Continuing	Continuing
Subtotal			17.505	0.594		4.000		-		-		-	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army **Date:** May 2021

Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603804A / Logistics and Engineer Equipment - Adv Dev	Project (Number/Name) G11 / Adv Elec Energy Con Ad
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Small Tactical Electric Power (STEP) Components	MIPR	CERDEC : Fort Belvoir, VA	2.259	0.236		-		-		-		-	Continuing	Continuing	Continuing
Hybrid Power Sources Components	MIPR	CERDEC : Fort Belvoir, VA	1.819	0.436		-		-		-		-	Continuing	Continuing	Continuing
Power Management and Distribution Control Systems	MIPR	CERDEC : Fort Belvoir, VA	2.236	0.696		-		-		-		-	Continuing	Continuing	Continuing
Platoon Power Generation	MIPR	CERDEC : Fort Belvoir, VA	0.101	-		-		-		-		-	Continuing	Continuing	Continuing
Modular Power	MIPR	Idaho National Labs; Air Force Civil Engineer Center : xxxx	3.000	-		-		-		-		-	Continuing	Continuing	Continuing
Operational Energy	MIPR	Dept of Energy Sandia National Labs : Washington DC	1.857	-		-		-		-		-	Continuing	Continuing	Continuing
Subtotal			11.272	1.368		-		-		-		-	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Platoon Power Generation (PPG)	MIPR	CERDEC : Fort Belvoir, VA	0.250	-		-		-		-		-	Continuing	Continuing	Continuing
Small Tactical Electric Power (STEP) Components	MIPR	CERDEC : Fort Belvoir, VA	1.530	0.439		-		-		-		-	Continuing	Continuing	Continuing
Hybrid Power Sources Components	MIPR	CERDEC : Fort Belvoir, VA	0.829	0.581		-		-		-		-	Continuing	Continuing	Continuing
Power Management and Distribution Systems	MIPR	CERDEC : Fort Belvoir, VA	2.011	-		-		-		-		-	Continuing	Continuing	Continuing

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603804A / Logistics and Engineer Equipment - Adv Dev	Project (Number/Name) G11 / Adv Elec Energy Con Ad	

Event Name	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
SMALL TACTICAL ELECTRIC POWER (STEP) PROGRAM																												
Assess Technologies, such as STEP, to Meet Gaps-STEP	█	█																										
Develop prototypes for modular, scalable STEP systems		█	█	█																								
AMMPS Hybrid Power Integration																												
AMMPS Hybrid Technology Assessment		█																										
AMMPS Hybrid Prototype Development	█	█	█	█																								
PDISE Expansion																												
TMS interface & test methodology development		█	█	█																								
ASSESSMENT OF TECHNOLOGIES Across TEP line																												
Assess Technologies (remote start adapter) to Meet Gaps and	█	█	█	█																								
Lightweight portable power																												
Modeling, Development and Test of lightweight portable power						█	█	█	█	█	█	█																

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603804A / <i>Logistics and Engineer Equipment - Adv Dev</i>	Project (Number/Name) G11 / <i>Adv Elec Energy Con Ad</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
SMALL TACTICAL ELECTRIC POWER (STEP) PROGRAM	1	2016	4	2020
Assess Technologies, such as STEP, to Meet Gaps-STEP	1	2016	2	2020
Develop prototypes for modular, scalable STEP systems	2	2020	4	2020
AMMPS Hybrid Power Integration	1	2020	2	2020
AMMPS Hybrid Technology Assessment	1	2020	2	2020
AMMPS Hybrid Prototype Development	3	2019	4	2020
PDISE Expansion	1	2017	2	2021
TMS interface & test methodology development	1	2019	2	2021
ASSESSMENT OF TECHNOLOGIES Across TEP line	1	2017	4	2020
Assess Technologies (remote start adapter) to Meet Gaps and Improve Efficiencies	1	2017	4	2020
OPERATIONAL ENERGY (OE)	1	2016	4	2019
Evaluation of OE-Related Impacts, Systems and Improvements	1	2016	4	2019
Lightweight portable power	2	2021	4	2022
Modeling, Development and Test of lightweight portable power	2	2021	4	2022