Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy											Date: February 2020	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0206624M *I Marine Corps Cmbt Services Supt*							
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
Total Program Element	197.200	27.642	44.528	10.421	-	10.421	10.391	10.225	10.425	11.311	Continuing	Continuing
2316: *Combat Service Support Eng Equip*	106.222	3.898	3.336	3.484	-	3.484	3.497	3.560	3.628	3.698	Continuing	Continuing
2509: *Motor Transport Mod*	45.130	5.141	5.595	1.772	-	1.772	1.814	1.844	1.882	2.600	Continuing	Continuing
2510: *MAGTF CSSE & SE*	35.063	4.805	1.803	4.539	-	4.539	4.442	4.169	4.251	4.336	Continuing	Continuing
2929: *Testing Measuring Diag Equip & SE*	10.785	1.364	0.572	0.626	-	0.626	0.638	0.652	0.664	0.677	Continuing	Continuing
3776: *Combat Track Vehicles Mod*	0.000	12.434	25.222	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	37.656
9999: *Congressional Adds*	0.000	0.000	8.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.000

A. Mission Description and Budget Item Justification

This program element (PE) provides funding for Marine Air-Ground Task Force requirements for Combat Service Support equipment improvement. It will enhance combat breaching capabilities of the ground combat elements, logistics, maintenance and transportation. The PE also provides improvements in all areas of Combat Service Support Equipment Vehicles by determining the replacement for the light fleet of vehicles. This includes projects such as: Alternative Power Sources for Communications Equipment (APSCE) which is a suite of devices that provide the commander with the capability to use existing power to operate his communication equipment, computers and peripheral equipment instead of using batteries or fossil fuel generators; the Marine Corps Family of Automatic Test Systems (ATS), formerly TETS, which provides automatic testing capability for use by technicians both in garrison and forward edge of the battlefield; improvements in all areas of the M1A1 main battle tank, LVSR & MTVR; the High Performance Capabilities for Military Vehicles Project which is dedicated to applying the best practices of the motor sports industry to military vehicles including engineering expertise, equipment, and technology.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy	Date: February 2020
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0206624M *I Marine Corps Cmbt Services Supt*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	29.905	37.761	15.573	-	15.573
Current President's Budget	27.642	44.528	10.421	-	10.421
Total Adjustments	-2.263	6.767	-5.152	-	-5.152
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-1.233			
• Congressional Rescissions	-	-			
• Congressional Adds	-	8.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.470	0.000			
• SBIR/STTR Transfer	-0.792	0.000			
• Program Adjustments	0.000	0.000	-3.996	-	-3.996
• Rate/Misc Adjustments	-0.001	0.000	-1.156	-	-1.156

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2019	FY 2020
Project: 9999: *Congressional Adds*		
Congressional Add: *UAV alternate power generation technologies*	0.000	3.000
Congressional Add: *Airborne power generation technology*	0.000	5.000
Congressional Add Subtotals for Project: 9999	0.000	8.000
Congressional Add Totals for all Projects	0.000	8.000

Change Summary Explanation

The FY 2021 funding request was reduced by $3.996M to account for the availability of prior year execution balances.

The decrease of $34.107M from FY 2020 to FY 2021 is primarily attributed to the service decision to transition the M1A1 program to full sustainment and stop modernization.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206624M / *Marine Corps Cmbt Services Supt*	Project (Number/Name) 2316 / *Combat Service Support Eng Equip*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
2316: *Combat Service Support Eng Equip*	106.222	3.898	3.336	3.484	-	3.484	3.497	3.560	3.628	3.698	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Engineer Mods and Tool Kits line funds modifications and initiatives which are required to address operational priorities, engineering change proposals, safety concerns, support equipment inefficiencies, product quality deficiencies and other issues that affect equipment reliability, availability and readiness. This approach ensures proper equipment sustainment and life cycle management in response to evolving needs of the Marine Corps fleet. Operational needs to provide personnel survivability on engineer equipment is essential to current and future operations. Research and development funding develops and integrates new lighter, compact armor technology and supports ballistic testing for applications to existing and future acquisitions.

Corrosion Prevention and Control (CPAC): The useful life of Marine Corps assets will be extended through a comprehensive CPAC RDT&E program aimed at identifying and certifying new corrosion control products, materials, processes and procedures for legacy and new acquisitions. The CPAC RDT&E Program works to standardize and substantially improve strategies, objectives and processes to prevent, detect, and treat corrosion and its impacts on Marine Corps ground vehicles and weapons systems. This mission responds to the Congressional directives, DoD and SECNAV instruction to reduce the negative operational effects and associated total ownership cost of Marine Corps ground vehicles and weapons systems.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Engineer Mods and Tool Kits	1.740	0.517	0.528	0.000	0.528
Articles:	-	-	-	-	-
FY 2020 Plans: -Completes Modified-Full Width Mine Plow (M-FWMP) and Unmanned Breacher Vehicle (UBV) development and testing and Engineering Change Proposals (ECPs). -Initiates and completes ECP and testing of Deep Water Forging Kit (DWFK). -Initiates development and testing of ground penetrating capability.					
FY 2021 Base Plans: -Continues development and testing of ground penetrating capability.					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2316 / *Combat Service Support Eng Equip*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Increase of $0.011M from FY2020 to FY2021 is due to testing for ground penetrating capability.					
Title: Corrosion Prevention and Control (CPAC)	2.158	2.819	2.956	0.000	2.956
Articles:	-	-	-	-	-
FY 2020 Plans: - Continue to identify, review and support testing of new corrosion control products, materials, processes and procedures that impact Marine Corps corrosion control through Science and Technology initiatives such as: Thermally Sprayed Metal Coatings (TSMC), evaluation of the Chemical Agent Resistant Coating (CARC) Systems during Re-Paint, Chip Resistant Coatings, Flexible Nonslip Coatings and Corrosion Resistant Insulating Foams. - Continue stewardship of Corrosion Prevention Products and Materials (CPPM) which provides for vendor submissions to the Marine Corps to perform product qualification for chip and abrasion resistant coatings and other Corrosion Prevention Compounds that retard/arrest corrosion. - Continue field evaluations, product test and environmental monitoring in advance of fielding to determine suitability. - Continue to implement new technologies, processes and advance materials, and update technical publications to reflect same. - Continue to support field evaluation of equipment and environmental characterization of equipment storage locations such as Norway and Marine Forces Europe. - Continue review of corrosion prevention products and coatings including metal rich primer, and metal coating eliminating surface preparation.					
FY 2021 Base Plans: - Continue research, test, and evaluation of new corrosion control products, materials, processes and procedures that improve Marine Corps corrosion control through Science and Technology initiatives such as: TSMC, evaluation of the CARC Systems during Re-Paint, Chip Resistant Coatings, Flexible Nonslip Coatings and Corrosion Resistant Insulating Foams, to include assessments of metal rich primer, and metal coating eliminating surface preparation. - Continue stewardship of Corrosion Prevention Products and Materials (CPPM) which provides for vendor submissions to the Marine Corps to perform product qualification for chip and abrasion resistant coatings and other Corrosion Prevention Compounds that retard/arrest corrosion. - Continue field evaluations, product test and environmental monitoring in advance of fielding to determine suitability.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2316 / *Combat Service Support Eng Equip*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Continue to support field evaluation of equipment and environmental characterization of equipment storage locations such as Norway and Marine Forces Europe. - Continue to implement new technologies, processes and advance materials. - Complete technical publication updates. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** -FY20 to FY21 funding increase of $0.137M aligns with increased support for Corrosion Prevention Products and Materials (CPPM) Product Review and test plan development at NSWC-Carderock.					
Accomplishments/Planned Programs Subtotals	3.898	3.336	3.484	0.000	3.484

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• PMC/6670: *Items Less than $5 Million*	13.711	10.956	9.174	-	9.174	7.979	8.741	8.921	9.100	Continuing	Continuing

Remarks

D. Acquisition Strategy

(U) Engineer Mods and Tool Kits: This is a roll-up line of various engineering efforts, modifications and other related items less than $5 Million each. This program provides for significant improvements to various pieces of engineering equipment by enhancing their capabilities and improving readiness.

(U) Corrosion Prevention and Control (CPAC) Program: The Program will execute the RDT&E Program with engineering support from the Naval Surface Warfare Center - Carderock Division Corrosion Research and Engineering Branch, Naval Research Laboratory, and the Army's Tank and Armaments Command for a comprehensive program aimed at identifying, evaluating, and certifying new corrosion control products, materials, processes and procedures for legacy and new acquisitions.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2316 / *Combat Service Support Eng Equip*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Cumulative Funding	Various	Various : Various	77.673	0.000		0.000		0.000		-		0.000	0.000	77.673	-
		Subtotal	77.673	0.000		0.000		0.000		-		0.000	0.000	77.673	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CPAC	MIPR	TACOM : Warren, MI	1.313	0.260	Aug 2019	0.850	Jan 2020	0.300	Jun 2021	-		0.300	Continuing	Continuing	Continuing
CPAC	C/FFP	NSWC-CD : Bethseda, MD	2.873	0.750	Nov 2018	0.518	Jan 2020	0.532	Mar 2021	-		0.532	Continuing	Continuing	Continuing
		Subtotal	4.186	1.010		1.368		0.832		-		0.832	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineer Modifcation Kits	Various	Various : Various	2.203	1.740	Feb 2019	0.517	May 2020	0.528	Feb 2021	-		0.528	Continuing	Continuing	Continuing
CPAC	WR	Carderock, NSWC : Bethseda, MD	0.000	0.000		0.000		1.060	Mar 2021	-		1.060	Continuing	Continuing	Continuing
CPAC	WR	NSWC-CD : Bethseda, MD	13.136	1.148	Mar 2019	1.451	Nov 2019	1.064	Mar 2021	-		1.064	Continuing	Continuing	Continuing
Prior Year Cumulative Funding	Various	Various : Various	9.024	0.000		0.000		0.000		-		0.000	0.000	9.024	-
		Subtotal	24.363	2.888		1.968		2.652		-		2.652	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	106.222	3.898		3.336		3.484		-		3.484	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206624M / *Marine Corps Cmbt Services Supt*	Project (Number/Name) 2316 / *Combat Service Support Eng Equip*	

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2316 / *Combat Service Support Eng Equip*

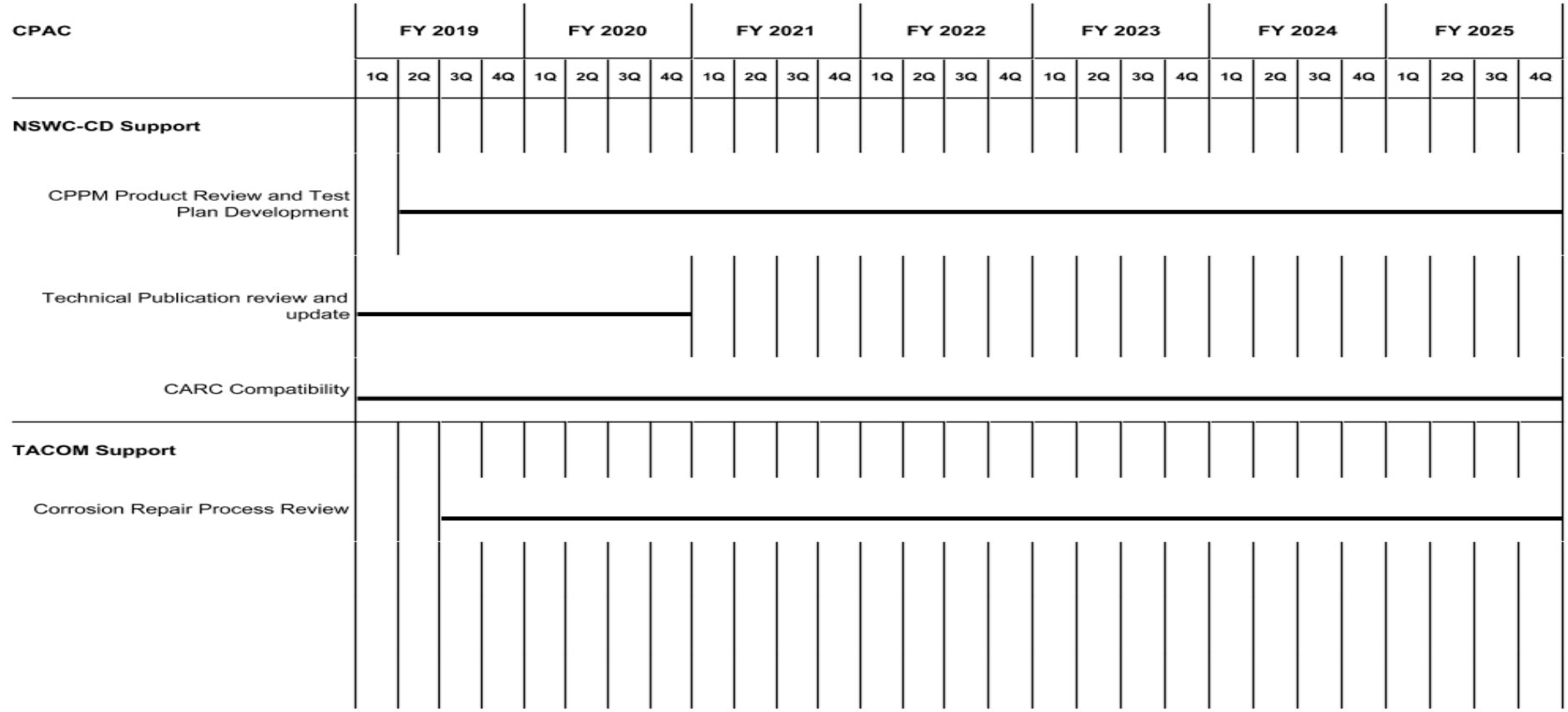

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2316 / *Combat Service Support Eng Equip*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
CPAC				
NSWC-CD Support: CPPM Product Review and Test Plan Development: Schedule Detail	2	2019	4	2025
NSWC-CD Support: Technical Publication review and update: Schedule Detail	1	2019	4	2020
NSWC-CD Support: CARC Compatibility: Schedule Detail	1	2019	4	2025
TACOM Support: Corrosion Repair Process Review: Schedule Detail	3	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206624M / *Marine Corps Cmbt Services Supt*	Project (Number/Name) 2509 / *Motor Transport Mod*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
2509: *Motor Transport Mod*	45.130	5.141	5.595	1.772	-	1.772	1.814	1.844	1.882	2.600	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

In FY19, funding for the following programs transitioned into Project 2509 in order to consolidate tactical wheeled vehicle research & development efforts into a single project unit: 0201: Logistics Vehicle System Replacement (LVSR); 9C90: MTVR Mod; 2316: Combat Service Support Eng Equip (Mine Resistant Ambush Protected (MRAP)). Funding for IRV (M88A2) HERCULES moved out of project 2509 to 3776, Combat Track Vehicles Mod.

A. Mission Description and Budget Item Justification

The Marine Corps Tactical Motor Transport Modification (MTM) Light Tactical Vehicle Modification (LTVM) project manages procurement and life cycle sustainment for more than 15,390 light fleet vehicle and tactical trailer principal end items. A sustained effort is maintained in the Marine Corps for development and testing in support of the light tactical vehicle quality deficiency resolutions, safety initiatives, environmental/state transportation mandated vehicle changes, and system component refresh modification efforts. This includes addressing deficiencies of HMMWV vehicles due to up armoring and age degradation of the fleet as well as engineering change proposals identified for the Light Tactical Vehicles. Since transportation asset operational availability declines at a steady rate over time, fleet overhauls, and enhanced depot level modifications are essential in maintaining a viable transportation capability in the Marine Corps Operating Forces.

The Family of P-19 Replacement (P-19R) is replacing the obsolete A/S32P-19A Crash Fire Rescue fleet in support of expeditionary airfield operations and the supporting establishment. The vehicle is outfitted with advanced fire suppression equipment. It provides rescue and aircraft fire fighting capabilities to permanent and expeditionary airfields throughout the Marine Corps. The P-19 Replacement is also employed to fight structural fires in support of base camps and as firefighting support to other elements of the Marine Air Ground Task Force (MAGTF), such as ammunition supply points, Petroleum, Oil and Lubricant (POL) distribution points or hazardous material storage facilities.

The Family of Trailers & Ancillary Equipment (FT&AE) management strategy will use RDT&E funding to explore new technology that can be used to achieve optimum lift within the desired weight and cube constraints in support of the "Lightening the MAGTF" initiative, as well as sustaining and/or improving capabilities, to include re-engineering the ground clearance on various trailers to improve off-road mobility. Transportation and expeditionary goals will be considered in the research and development for the medium/heavy trailer fleet to include (but not limited to) the M1076 PLS (Palletized Load System) Trailer, MK1077 Flatrack, MK593 MTVR Trailer, M870 40/50 Ton Low Bed, MK970 Tactical Refueler and the Flatrack Refueler Capability (FRC).

The Medium Tactical Vehicle Replacement (MTVR) Modification program line funds numerous modifications and initiatives required to address operational priorities, engineering change proposals, safety concerns, support equipment and other issues that affect vehicle reliability, availability, maintainability, readiness, as well as energy efficiency. A proactive and focused approach ensures proper vehicle sustainment and life-cycle management and allows the program office to develop and implement improvements as required to respond to the evolving needs of the Marine Corps. For example, the Business Case Analysis (BCA) effort will continue to explore and develop strategies and products to extend the life of the MTVR to 2042 from its original planned exit date of 2024. The MTVR BCA provides the opportunity

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2509 / *Motor Transport Mod*

to integrate critical upgrades which could be included into a Service Life Extension Program (SLEP). These upgrades would include improvements in fuel consumption, long-term maintainability and improved safety and crew survivability. The PMO is working with PM Fires to procure HIMARS Resupply Vehicles and Trailers in support of standing up a new HIMARS Battalion by FY22.

The Family of Logistics Vehicle System Replacement (LVSR) is the Marine Air-Ground Task Force (MAGTF) Heavy Lift Capability system. This line funds numerous modifications and initiatives that are required to address operational priorities, engineering change proposals, safety concerns, support equipment and other issues that affect vehicle reliability, availability, maintainability and readiness. A proactive and focused approach ensures proper vehicle sustainment and life-cycle management and allows the flexibility to develop and implement improvements as required to respond to the evolving needs of the Marine Corps.

The Family of Mine Resistant Ambush Protected (MRAP) Family of Vehicles (FoV) provides tactical mobility for Warfighters with multi-mission vehicles designed to support operational needs and protect personnel from the effects of improvised explosive devices (IEDs), underbody mines and small arms fire threats. Multiple vehicle categories (CATs) have been procured, fielded and sustained. Category I - Urban combat operations, ambulance. Category II - Multi-mission ops-convoy lead, troop transport, ambulance, utility vehicle. Category III - Mine/IED clearance ops, explosive ordnance disposal. Operational needs to provide personnel survivability is essential to current and future operations. Research and Development funding develops and integrates support efforts such as ballistic glass and other safety issues and ballistic testing.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Medium Tactical Vehicle Replacement (MTVR)	3.441	3.949	0.106	0.000	0.106
Articles:	-	-	-	-	-
FY 2020 Plans: - Continue to support the initiatives aligning with the Commandant of the Marine Corps (CMC) priority for reducing energy costs, logistics footprint, and an improved environment. - Continue Test & Evaluation efforts supporting ECP/safety mods of the MTVR as required to provide survivability upgrades in response to continual changes in the threat environment to protect the warfighter and vehicle from possible catastrophic events, in order to meet current and future operations. - Continue Service Life Extension Program (SLEP) Business Case Analysis (BCA) to inform USMC leadership on how to improve the MTVR platform and extend its service life from 2024 out to 2042. - Conduct ECP/safety mods of the MTVR as required.					
FY 2021 Base Plans: - Continue to support the initiatives aligning with the Commandant of the Marine Corps (CMC) priority for reducing energy costs, logistics footprint, and an improved environment. - Continue Test & Evaluation efforts supporting ECP/safety mods of the MTVR as required to provide survivability upgrades in response to continual changes in the threat environment to protect the warfighter and vehicle from possible catastrophic events, in order to meet current and future operations.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2509 / *Motor Transport Mod*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Conduct ECP/safety mods of the MTVR as required. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease of $3.843 from FY 2020 to FY 2021 is due to the completion of the MTVR SLEP BCA.					
Title: Light Tactical Vehicle Modification	0.566	0.675	0.690	0.000	0.690
Articles:	-	-	-	-	-
FY 2020 Plans: Continue to support the development of engineering change proposals in support of the Light Tactical Vehicles for efforts such as the alternator pulley and HMMWV modifications identified by the operating forces that will have lasting effects on future light tactical platforms and supported systems. ***FY 2021 Base Plans:*** Will continue to support the development of engineering change proposals in support of the Light Tactical Vehicles for efforts such as replacement surge filter, power study, and tire durability study and HMMWV modifications identified by the operating forces that will have lasting effects on future light tactical platforms and supported systems. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** No significant change. FY 2020 President's Budget request referenced LTVM as Motor Transport Modifications, MTM.					
Title: Combat Service Support Eng Equip MRAP	0.530	0.549	0.545	0.000	0.545
Articles:	-	-	-	-	-
FY 2020 Plans: - Continue research and development of Engineering Change Proposals (ECPs) efforts such as "material improvements" to ballistic glass, other safety issues and new armor ballistic testing in support of survivability and mobility upgrades. ***FY 2021 Base Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2509 / *Motor Transport Mod*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Will continue research and development of Engineering Change Proposals (ECPs) efforts such as "material improvements" to ballistic glass, other safety issues and new armor ballistic testing in support of survivability and mobility upgrades. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease of $0.004M from FY20 to FY21 is the result of less support dedicated to ECP safety upgrades.					
Title: Family of Trailers & Ancillary Equipment	0.172	0.209	0.213	0.000	0.213
Articles:	-	-	-	-	-
FY 2020 Plans: - Continue M870 testing efforts to ensure effectiveness of the Medium/Heavy Tactical Trailers designed for the Medium Tactical Vehicle Replacement (MTVR)/Logistics Vehicle System Replacement (LVSR), enabling the fleet to meet increased mobility requirements. - Conduct Trailer Transportability recertification with the Ground Clearance mitigation after installation of the ECP upgrade; testing completes in FY20. ***FY 2021 Base Plans:*** - Will Continue M870 testing efforts to ensure effectiveness of the Medium/Heavy Tactical Trailers designed for the Medium Tactical Vehicle Replacement (MTVR)/Logistics Vehicle System Replacement (LVSR), enabling the fleet to meet increased mobility requirements. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase of $0.004M from FY 2020 to FY 2021 accounts for increased cost for continuation of FT&AE M870 testing efforts.					
Title: Logistics Vehicle System Replacement	0.432	0.213	0.218	0.000	0.218
Articles:	-	-	-	-	-
FY 2020 Plans: - Continue autonomous driver testing.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2509 / *Motor Transport Mod*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Conduct cab armor prototype endurance testing. ***FY 2021 Base Plans:*** - Continue autonomous driver testing. - Continue cab armor prototype endurance testing. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase of $0.005M from FY20 to FY21 for improved cab floor and blast mitigation ECP upgrades.					
Accomplishments/Planned Programs Subtotals	5.141	5.595	1.772	0.000	1.772

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• PMC/5097: *Family of Tactical Trailers*	2.493	2.693	2.963	-	2.963	9.673	3.280	3.346	3.413	Continuing	Continuing
• PMC/2061-01: *M88A2 HERCULES Mod*	2.323	2.621	3.067	-	3.067	3.292	3.189	3.253	3.318	Continuing	Continuing
• PMC/5050-01: *Motor T Mod/MTVR*	28.878	14.501	7.966	15.600	23.566	8.058	8.683	8.852	9.028	Continuing	Continuing
• RDTE,N/C3776: *M88A2 HERCULES Mod*	0.359	0.367	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.726
• PMC/5050-02: *Motor T Mod/LVSR*	2.959	3.087	0.814	0.583	1.397	0.927	1.209	1.232	1.255	Continuing	Continuing
• PMC/5050-03: *Light Tactical Vehicle Modifications (LTVM)*	0.000	0.542	0.496	-	0.496	3.436	3.502	3.572	3.643	Continuing	Continuing
• PMC/5050-04: *Motor T Mod/MRAP*	22.348	0.742	1.096	-	1.096	1.178	1.219	0.552	0.562	Continuing	Continuing
• PMC/5050-05: *Motor T Mod/P19-R*	1.470	0.362	0.367	-	0.367	0.378	0.386	0.394	11.678	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Family of P-19 Replacement (P-19R) leverages COTS and NDI components in an effort to minimize costs, test requirements, and reduce development time. P-19R supplants the aging A/S32P-19A fleet in support of expeditionary airfield operations and the supporting establishment. The vehicle is outfitted with advanced fire suppression equipment. It provides rescue and aircraft fire fighting capabilities to permanent and expeditionary airfields throughout the Marine Corps. The P-19R is

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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employed to fight structure fires in support of base camps and as firefighting support to other elements of the MAGTF, such as ammunition supply points, Petroleum, Oil, and Lubricants (POL) distribution points, or hazardous material storage facilities. The P-19R ordering period with Oshkosh Defense expired May 2018. The full AAO has been procured.

Light Tactical Vehicle Modification (LTVM) funding will focus on streamlined acquisitions of Commercial-Off-The-Shelf/Non-Developmental Items (COTS/NDI) that can be identified, integrated, and tested in a short amount of time. LTVM funding will be used for modifications required to increase fleet readiness, safety and reliability. Successful modifications and tests are intended for follow-on procurement and incorporation into existing system component upgrades, or rapid COTS/NDI fielding for the Fleet Marine Forces (FMF).

The Family of Trailers & Ancillary Equipment (FT&AE) management strategy will use RDT&E funding to explore current and new technologies options that can be used to achieve optimum lift within the desired weight and cube constraints in support of the "Lightening the MAGTF" initiative, as well as sustaining and/or improving capabilities, such as re-engineering the ground clearance on various trailers. Transportation and expeditionary goals will be considered in the research and development for the light and medium/heavy trailer fleet to include (but not limited to) the M1076 PLS (Palletized Load System) Trailer, MK1077 Flatrack, MK593 MTVR Trailer, M870 40/50 Ton Low Bed, MK970 Tactical Refueler and the Flatrack Refueler Capability (FRC).

The Medium Tactical Vehicle Replacement (MTVR) program line funds numerous modifications and initiatives required to address operational priorities, engineering change proposals, safety concerns, support equipment and other issues that affect vehicle reliability, availability, maintainability, readiness, as well as energy efficiency. A proactive and focused approach ensures proper vehicle sustainment and life-cycle management and allows the program office to develop and implement improvements as required to respond to the evolving needs of the Marine Corps. For example, Business Case Analysis efforts continue to explore and develop strategies to extend the life of the MTVR to 2042 from its original planned exit date of 2024. The PMO is working with PM Fires to procure HIMARS Resupply Vehicles in support of standing up a new HIMARS Battalion by FY22, in addition to procurement and replacement of all the current HIMARS Resupply Trailers (MK38) with the Army's M1095 Resupply Trailer.

The Family of Logistics Vehicle System Replacement (LVSR) program is currently in sustainment utilizing RDT&E funding to address required Engineering Change Proposals (ECPs) to maintain relevancy on the battlefield and implement system requirements.

The Family of Mine Resistant Ambush Protected (MRAP) FoV: The program executes RDT&E funds to research, develop, and evaluate survivability and mobility upgrade efforts such as the Cougar egress upgrades, ballistic glass and other safety issues, new armor technology and ballistic testing. Work will be accomplished through centers of excellence, such as Aberdeen Test Center, Aberdeen, MD, as well as the private sector to conduct research and analysis associated with the development of modifications and modeling and simulation efforts.

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

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
IRV (M88A2) HERCULES	MIPR	TACOM : Warren, MI	2.525	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
MRAP Modifications	WR	Various : Various	0.000	0.178	Dec 2018	0.203	Dec 2019	0.189	Dec 2020	-		0.189	0.000	0.570	-
MRAP Engineering	WR	ATC : ATC	0.000	0.143	Dec 2018	0.135	Dec 2019	0.140	Dec 2020	-		0.140	0.000	0.418	-
LVSR	MIPR	Various : Various	0.000	0.432	Sep 2019	0.213	Feb 2020	0.218	Feb 2021	-		0.218	0.000	0.863	-
MTVR SLEP Development	C/FFP	OSHKOSH : Oshkosh, WI	0.000	0.000		0.588	Dec 2019	0.000		-		0.000	Continuing	Continuing	Continuing
MTVR SLEP Research and Development	MIPR	TARDEC : Warren, MI	0.000	0.362	Dec 2018	2.809	Dec 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Prior Years Cumulative Funding	Various	Various : Various	30.500	0.000		0.000		0.000		-		0.000	0.000	30.500	19.769
		Subtotal	33.025	1.115		3.948		0.547		-		0.547	Continuing	Continuing	N/A

Remarks

Decrease in MTVR Product Development from FY20 to FY21 due to ramp-down of SLEP BCA effort.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FT&AE Test/Analysis	WR	NRL : Washington, DC	0.400	0.172	Dec 2018	0.209	Dec 2019	0.213	Dec 2020	-		0.213	Continuing	Continuing	Continuing
MRAP FoV Ballistic Evaluations	MIPR	ATC : ATC	0.000	0.209	Dec 2018	0.211	Dec 2019	0.216	Dec 2020	-		0.216	0.000	0.636	-
LTVM (Light) ECPs	Various	Various : Various	0.415	0.566	Feb 2019	0.675	Feb 2020	0.690	Feb 2021	-		0.690	Continuing	Continuing	Continuing
MTVR FE Testing and FUE	MIPR	ATC : Aberdeen,MD	0.000	0.226	Nov 2018	0.000		0.000		-		0.000	0.000	0.226	-
MTVR ECP Test & Evaluation	Various	Various : Various	0.000	2.453	Dec 2018	0.152	Dec 2019	0.106	Dec 2020	-		0.106	0.000	2.711	-
MTVR ATC Testing	MIPR	ATC : Aberdeen, MD	0.000	0.400	Nov 2018	0.400	Nov 2019	0.000		-		0.000	0.000	0.800	-
Prior Years Cumulative Funding	Various	Various : Various	11.290	0.000		0.000		0.000		-		0.000	0.000	11.290	-

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

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			12.105	4.026		1.647		1.225		-		1.225	Continuing	Continuing	N/A

Remarks

LTVM- testing/analysis increase of $0.015M in FY21 will support testing of improvements related to safety and reliability of Light Tactical Vehicles for quality deficiency resolutions, safety initiatives, and system component refresh modification efforts.

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	45.130	5.141		5.595		1.772		-		1.772	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
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MTVR Integrated Program Plan

As of 30 December 2019

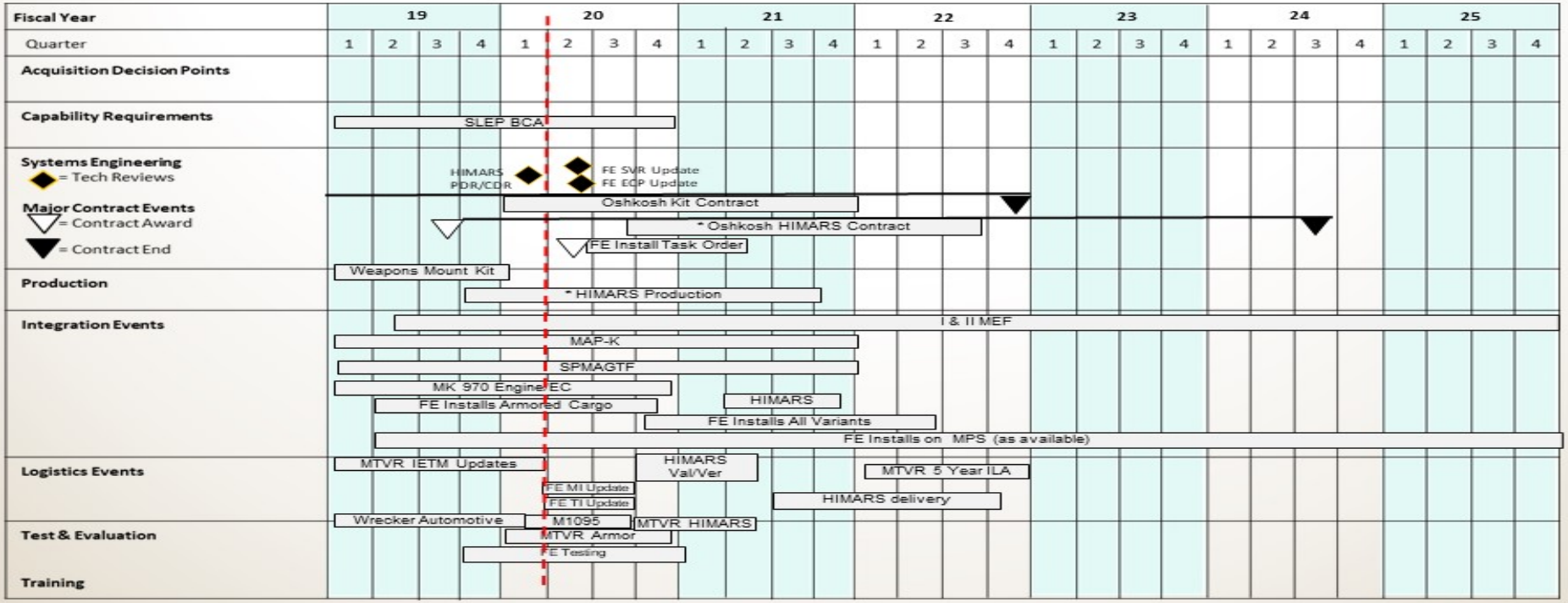

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
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Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MTVR				
Fuel Efficient Modifications (Install S/W) Armored Cargo	1	2019	4	2020
ECP/Safety Mod Development	1	2019	4	2024
SLEP BCA	1	2019	4	2020
Fuel Efficient Modifications (Install S/W) All Variants	1	2019	2	2022

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy										Date: February 2020		
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0206624M / *Marine Corps Cmbt Services Supt*				Project (Number/Name) 2510 / *MAGTF CSSE & SE*			
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
2510: *MAGTF CSSE & SE*	35.063	4.805	1.803	4.539	-	4.539	4.442	4.169	4.251	4.336	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Environmental Control Equipment, Mobile Power Equipment and Advanced Power Sources are a part of Expeditionary Energy Initiatives.

A. Mission Description and Budget Item Justification

Environmental Control Equipment:
The Family of Environmental Control Equipment (ECE) consists of Environmental Control Units (ECU), Field Refrigeration Systems (FRS), and Cooling and Refrigeration Expeditionary Tool Kits (CREK). These systems provide required heating, cooling, storage, and servicing for systems throughout the Marine Corps. Current efforts seek to replace all legacy ECE with systems of higher reliability and higher efficiency using Environmental Protection Agency (EPA) approved refrigerants, which offer more energy efficiency, enhanced mobility, are easier to repair, and quieter than their predecessors. With environmental control systems consuming 50-70% of tactical electric power in theater, these savings will be a significant contribution to reducing the USMC fuel demand, and lightening the Marine Air-Ground Task Force (MAGTF). The Warfighter benefit includes a decreased logistics footprint, less reliance on petroleum-derived fuels, increased local energy security, and reduced tanker losses (fewer on the road). The operational imperative to reduce fuel usage will consequently reduce refueling operations and exposing Marines to hazardous fuel convoy operations.
Efforts include research, development, and integration testing of:
(1) Small Field Refrigeration Systems (SFRS) replacement. This effort seeks to replace legacy SFRSs to comply with restricting EPA regulations while increasing efficiency, thus reducing overall power requirements/demands.
(2) Family of ECU replacement. This effort seeks to replace legacy ECUs to comply with restricting EPA regulations while increasing efficiency, thus reducing overall power requirements/demands.

Mobile Power Equipment:
The Family of Mobile Electric Power Equipment consists of command and control systems for power management and distribution (intelligent power management), tactical generators ranging from 2 to 100 kilowatts, power distribution systems, energy storage systems, load banks, floodlights, cabling, and electrician tool kits. This equipment is to procure, field, manage and provide electricity on the battlefield. Systems may be mounted on prime movers, skids or trailers. Systems support maneuver, combat support, and combat service support units requiring tactical power to operate weapons systems, Command, Control, Communications, Computers and Intelligence (C4I) systems, medical and messing facilities, environmental control equipment, and water purification systems. With over 10,000 generators and using diesel engines in the Operating Forces, improving their fuel efficiency and reliability will be a significant contribution to reducing the USMC fuel demand, and lightening the MAGTF. The Warfighter benefit includes a decreased logistics footprint, less reliance on petroleum derived fuels, increased local energy security, and reduced tanker losses (fewer on the road). The operational imperative to reduce fuel usage will consequently reduce refueling operations and exposing Marines to hazardous fuel convoy operations.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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Efforts encompass research, development, integration, and testing of the following item:
Intelligent Power Management Systems (IPMS) provide a robust, modular, and scalable solution to interconnect, control, store and distribute power from various sources. As a result, the power requirements will be met in a more efficient manner by matching power production to load demand, reducing spinning reserve, extending maintenance cycle times, and reducing fuel consumption. The IPMS will consist of a micro-gridding capability which will consist of the Advance Digital Control System, which is a product improvement for the Advance Medium Mobile Power Source generators, an Intelligent Power Distribution (IPD) system, an Energy Storage Unit (ESU), a Metering and Monitoring capability, and it will eventually integrate renewables.

The Advanced Power Sources:
The Advanced Power Sources (APS) efforts will focus on achieving the Marine Corps goal of lightening the Marine Air-Ground Task Force (MAGTF) through reduced logistical fuel resupply needs. The Mobile Electric Hybrid Power Source (MEHPS) Capability Development Document (CDD) addresses the USMC Expeditionary Water and Waste (E2W2) Initial Capabilities Document (ICD) and supports the MAGTF intent to: travel lighter and faster, use less fuel, depend less on the supply chain; and reduce energy production, storage, and distribution requirements. This CDD addresses the Operational Energy (OE) ICD identifying the power and energy criticalities to the Joint Force. The Mobile Electric Hybrid Power System (MEHPS) will focus on hybrid power systems using solar panels and battery storage capable of improved fuel efficiency and silent operations in the 0.5-10kW power range. These systems will be smaller, lighter and more efficient systems that reduce the demand for fossil fuels, extending the Commander's operational reach. These efforts will transition into production of systems that integrate with the Tactical Quiet Generator (TQG), Advanced Medium Mobile Power Sources (AMMPS), and future generator sets. The Lithium Battery Storage and Maintenance (LBSM) effort in coordination with large format lithium-Ion batteries integrated with MEHPS will focus on developing a modular solution to store and maintain a variety of battery form factors and chemistries. This will provide an environmentally protected, deployable battery maintenance and storage shelter with the capability to maintain and condition deployable batteries that will significantly decrease O&M costs to the Fleet by extending the life of fielded batteries.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Environmental Control Equipment	0.405	0.504	0.549	0.000	0.549
Articles:	-	-	-	-	-
FY 2020 Plans: - Perform testing of phase II prototypes for the Small Field Refrigeration System replacement to comply with restricting EPA regulations while increasing efficiency, thus reducing overall power requirements/demands.					
FY 2021 Base Plans: - Continue developmental testing of phase II prototypes for the Small Field Refrigeration System replacement. - Initiate verification testing of phase II prototypes for the Small Field Refrigeration System replacement.					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2510 / *MAGTF CSSE & SE*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Funding increase of $0.045M from FY20 to FY21 is due to additional testing of the phase II prototypes for the Small Field Refrigeration System replacement.					
Title: Mobile Power Equipment Next Gen Power Distribution System	4.023	0.152	0.759	0.000	0.759
Articles:	-	-	-	-	-
FY 2020 Plans: - Development and Testing of Intelligent Power Distribution system prototypes to be used in support of Intelligent Power Management System (IPMS).					
FY 2021 Base Plans: - Continue technology development and technical support for the Intelligent Power Management System (IPMS). - Initiate system requirement technical reviews for the Energy Storage Unit (ESU) in support of Intelligent Power Management System (IPMS).					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: Funding increase of $0.607M from FY20 to FY21 to develop the performance specifications for the Energy Storage Unit (ESU) in preparation for the FY22 ESU development/production contract award.					
Title: Advanced Power Sources	0.377	1.147	3.231	0.000	3.231
Articles:	-	-	-	-	-
FY 2020 Plans: MOBILE ELECTRIC HYBRID POWER SOURCES (MEHPS) - Complete solar panel and Light and medium system testing - Complete all user evaluations - Initiate MEHPS low rate initial production					
FY 2021 Base Plans: MOBILE ELECTRIC HYBRID POWER SOURCES (MEHPS) - Initiate battery certification testing for MEHPS - Initiate small unit power prototypes and concepts					
FY 2021 OCO Plans:					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding increase of $2.084M from FY20 to FY21 is due to the demand for small unit power requirements and lithium battery certification testing for MEHPS.					
Accomplishments/Planned Programs Subtotals	4.805	1.803	4.539	0.000	4.539

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• PMC/6054: *Environmental Control Equipment*	0.595	0.495	0.385	-	0.385	2.968	3.431	3.500	6.070	0.000	106.229
• PMC/6366-1: *Mobile Power Equipment*	8.122	12.058	7.670	-	7.670	7.954	10.012	10.212	10.416	Continuing	Continuing
• PMC/6366-2: *Advanced Power Sources*	6.561	10.383	15.760	-	15.760	16.065	16.407	16.734	17.070	Continuing	Continuing

Remarks

D. Acquisition Strategy

Environmental Control Units:
Small Field Refrigeration System replacement: Development under existing Army's Small Business Innovation Research (SBIR) which will transition into sole source procurement. Government testing to validate performance. Low Rate Initial Production (LRIP), followed by LRIP evaluation, then Full Rate Production (FRP) to procure using PMC funds on annual Delivery Orders. SFRSs are organically supported by Marines.

Family of Environmental Control Units replacement: Initial focus on development of more efficient 36,000 BTU/Hr and 60,000 BTU/Hr size model Environmental Control Units (ECUs), since they make up the greatest percentage of the inventory and are used extensively for shelter heating and cooling. Full and open competition. Three contractors to develop and deliver prototypes in two size models. Government testing to validate performance. Single contractor to produce both models using multi-year ID/IQ production contract. Low Rate Initial Production (LRIP), followed by LRIP testing, then Full Rate Production (FRP) to procure using PMC funds on annual Delivery Orders. ECUs are organically supported by Marines.

Mobile Power Sources: IPMS Strategy. Each capability of IPMS will follow its own acquisition strategy/approach and the Government will be the integrator. This is due to the differing maturity levels of the capabilities as well as the variety of vendors required to provide those capabilities. While this document is encompassing for the total program, provided below are the various strategies being used for the increments of IPMS. Microgrid Strategy. The acquisition strategy for obtaining the microgrid

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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capability is to execute a product improvement to the existing AMMPS generator systems currently employed. The US Army is the lead agency for the joint AMMPS program. MCSC has purchased the MADCS product improvement systems and developing Technical Manuals and packaging. Fielding of the MADCS is planned to occur at the end of Calendar Year 2018. IPD Strategy. The acquisition strategy for IPD is to conduct market research on industry's capacity to develop/produce IPDs. Massachusetts Institute of Technology-Lincoln Laboratories (MIT-LL) is on contract to assist the Government in developing a Performance Specification (PSPEC) and interface design criteria. This market research and PSPEC development has just been finalized. The Request for Proposal (RFP) to industry was released in January 2019, conducted source selection, awarded to one vendor, procure prototypes and execute an Engineering and Manufacturing Development (EMD) program phase. At the conclusion of successful EMD and testing at Aberdeen Test Center (ATC), optional production delivery orders will be placed against a Firm Fixed Price (FFP), Indefinite Delivery Indefinite Quantity (IDIQ) Contract Line Item Number. ESU Strategy. The acquisition strategy for ESU is to conduct market research, develop a SOW and PSPEC, and release an RFP to industry in Fiscal Year 2022. Source selection will be conducted for planned award for a development contract with procurement options. Metering and Monitoring (M/M) Strategy. The acquisition strategy for the M/M capability is to provide a Statement of Work (SOW) to US Army Communications-Electronics Research, Development and Engineering Center (CERDEC) under its program for Energy Informed Operations (EIO). EIO has developed a government owned working microgrid M/M capability. They are tailoring this existing capability to meet IPMS requirements by collaborating with MIT-LL to ensure the M/M dashboard is utilizing the correct communication protocols designed to collect and display near real time data on the health and status of a power grid on the battlefield. This capability will be tested during Developmental Testing 1 and 2.

Advanced Power Sources: The acquisition strategy is to focus on development of the Mobile Electric Hybrid Power System (MEHPS). This R&D effort will focus on achieving the Marine Corps goal of lightening the MAGTF through reduced logistical fuel resupply needs, extending the Commander's operational reach. The development will focus on making these systems smaller, lighter and more efficient. The MEHPS program will purchase 8 medium and 8 light systems from two vendors through competitively awarded EMD contracts. The MEHPS systems will undergo rigorous electrical, environmental, safety, and performance testing to ensure they are robust and meet user requirements. Information learned in the EMD phase will help define the performance specification that will be used to award a full and open production contract.

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

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MPE Micro Grid Storage/ IPMS	C/FFP	AFLCMC : HANSCOM AFB	3.194	1.142	Nov 2018	0.152	Apr 2020	0.500	Jan 2021	-		0.500	Continuing	Continuing	Continuing
MPE IPD EMD	C/FFP	MCSC : Quantico, VA	0.000	2.014	Aug 2019	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
MPE IPD Prototype Testing	C/FFP	ATC : Aberdeen, MD	0.000	0.867	Nov 2018	0.000		0.259	Nov 2020	-		0.259	Continuing	Continuing	Continuing
ECE SFRS Replacement	MIPR	NSRDEC : NATICK, MA	0.617	0.151	Nov 2018	0.000		0.225	Mar 2021	-		0.225	Continuing	Continuing	Continuing
APS Small Unit Power	TBD	TBD : TBD	0.000	0.000		0.000		1.539	Mar 2021	-		1.539	0.000	1.539	-
APS MEHPS Testing	WR	NSWC : CARDEROCK, MD	1.982	0.377	Jan 2019	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
APS MEHPS Solar Power	C/CPFF	UEC : CHARLESTON, SC	0.000	0.000		0.100	Apr 2020	0.000		-		0.000	Continuing	Continuing	Continuing
Prior Years Cumulative Funding	Various	Various : Various	17.246	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	23.039	4.551		0.252		2.523		-		2.523	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Years Cumulative Funding	Various	Various : Various	0.059	0.000		0.000		0.000		-		0.000	0.000	0.059	-
		Subtotal	0.059	0.000		0.000		0.000		-		0.000	0.000	0.059	N/A

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

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ECE SFRS Replacement Test & Evaluation	MIPR	ABERDEEN TEST CENTER : ABERDEEN MD	0.262	0.254	Feb 2019	0.504	Nov 2019	0.324	Mar 2021	-		0.324	Continuing	Continuing	Continuing
APS MEHPS User Evaluation	MIPR	NSWC CARDEROCK : CARDEROCK MD	0.410	0.000		1.047	Jan 2020	0.000		-		0.000	Continuing	Continuing	Continuing
APS MEHPS Lithium Battery Testing	WR	NSWC : CARDERROCK, MD	0.000	0.000		0.000		1.692	Apr 2021	-		1.692	Continuing	Continuing	Continuing
Prior Years Cumulative Funding	Various	Various : Various	8.868	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	9.540	0.254		1.551		2.016		-		2.016	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MPE PM support for development and test mgmt	C/FFP	MCSC : Quantico, VA	2.425	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	2.425	0.000		0.000		0.000		-		0.000	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	35.063	4.805		1.803		4.539		-		4.539	Continuing	Continuing	N/A

Remarks

Environmental Control Equipment, Mobile Power Equipment and Advanced Power Sources are part of Expeditionary Energy Initiatives.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2510 / *MAGTF CSSE & SE*

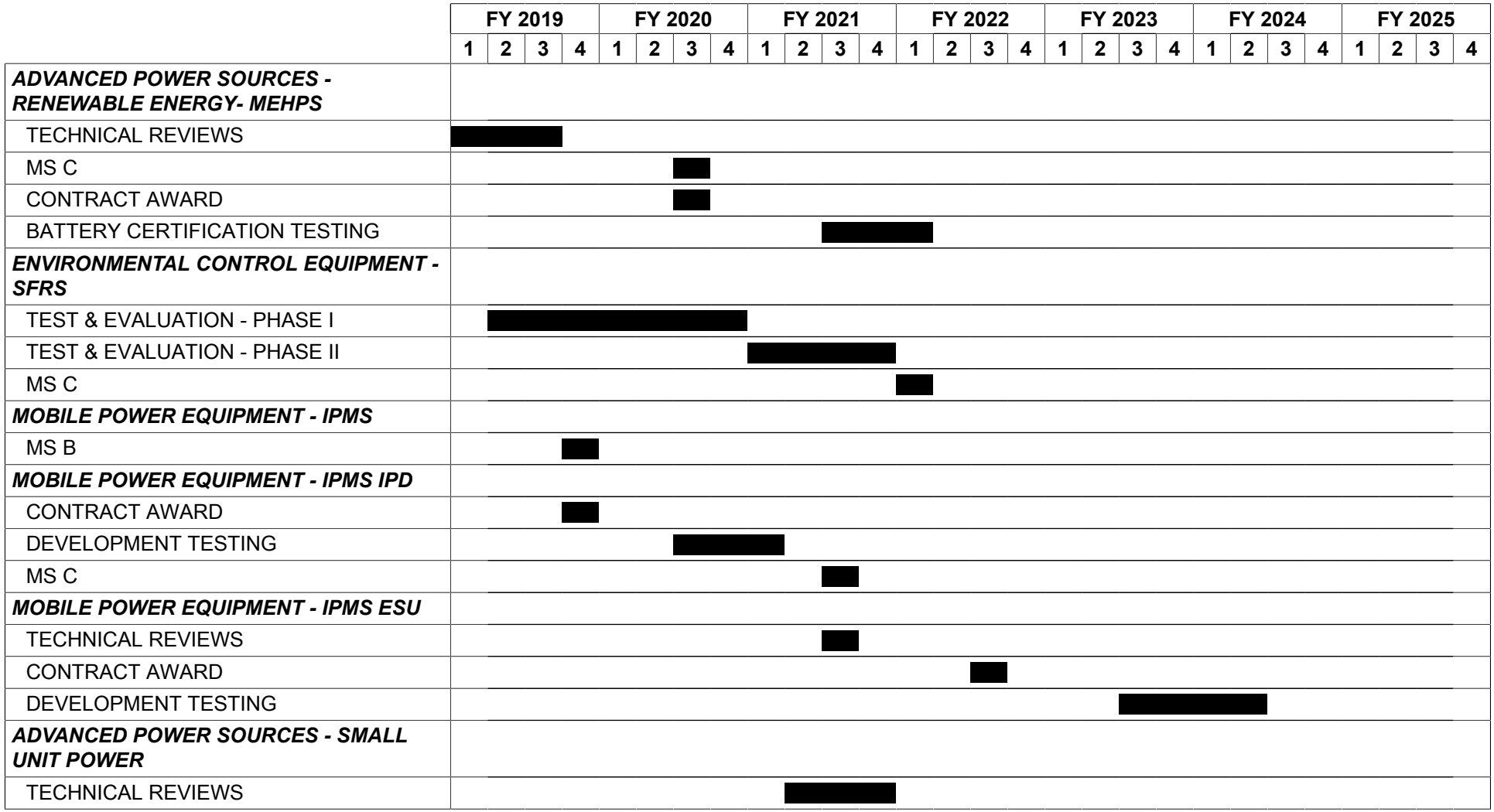

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2510 / *MAGTF CSSE & SE*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
ADVANCED POWER SOURCES -RENEWABLE ENERGY- MEHPS				
TECHNICAL REVIEWS	1	2019	3	2019
MS C	3	2020	3	2020
CONTRACT AWARD	3	2020	3	2020
BATTERY CERTIFICATION TESTING	3	2021	1	2022
ENVIRONMENTAL CONTROL EQUIPMENT - SFRS				
TEST & EVALUATION - PHASE I	2	2019	4	2020
TEST & EVALUATION - PHASE II	1	2021	4	2021
MS C	1	2022	1	2022
MOBILE POWER EQUIPMENT - IPMS				
MS B	4	2019	4	2019
MOBILE POWER EQUIPMENT - IPMS IPD				
CONTRACT AWARD	4	2019	4	2019
DEVELOPMENT TESTING	3	2020	1	2021
MS C	3	2021	3	2021
MOBILE POWER EQUIPMENT - IPMS ESU				
TECHNICAL REVIEWS	3	2021	3	2021
CONTRACT AWARD	3	2022	3	2022
DEVELOPMENT TESTING	3	2023	2	2024
ADVANCED POWER SOURCES - SMALL UNIT POWER				
TECHNICAL REVIEWS	2	2021	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206624M / *Marine Corps Cmbt Services Supt*	Project (Number/Name) 2929 / *Testing Measuring Diag Equip & SE*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
2929: *Testing Measuring Diag Equip & SE*	10.785	1.364	0.572	0.626	-	0.626	0.638	0.652	0.664	0.677	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Marine Corps Family of Automatic Test Systems (ATS), provides automatic test program capability for use by technicians both in garrison and the forward edge of the battlefield; specifically in the areas of interactive electronic technical manuals, condition/predictive based maintenance, and embedded sensors and prognostics.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Automatic Test Systems (ATS)	1.364	0.572	0.626	0.000	0.626
Articles:	-	-	-	-	-
FY 2020 Plans: -Complete development of new and advanced stand-alone Electro-Optical capabilities for automatic testing in order to reduce test solution costs and logistics footprint and keep pace with the next generation of optic and laser equipment.					
FY 2021 Base Plans: -Initiate development of replacement Power Distribution Units for fielded test systems to mitigate obsolescence and reliability issues. Modernized solution will reduce overall power consumption and footprint of fielded Automatic Test Systems.					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: An increase of $0.054M from FY20 to FY21 supports labor to integrate a more capable Power Distribution Unit subsystem into a General Purpose Automatic Test System.					
Accomplishments/Planned Programs Subtotals	1.364	0.572	0.626	0.000	0.626

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2929 / *Testing Measuring Diag Equip & SE*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• PMC/4181: *Automatic Test Systems (ATS)*	9.748	9.046	4.602	-	4.602	4.660	5.208	5.389	5.493	Continuing	Continuing

Remarks

D. Acquisition Strategy

Automatic Test Systems (ATS) acquisition is being done through U.S. Army Armament Research, Development & Engineering Center (ARDEC), Picatinny, NJ both in-house and contracts; In-house at Marine Corps Logistics Command (MCLC), Albany, GA; In-house at Naval Surface Warfare Center, Crane, and through Marine Corps Systems Command contracts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2929 / *Testing Measuring Diag Equip & SE*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ATS Tech Eval & HW Digital Test	WR	MCLC Albany : Albany, GA	1.364	0.814	Feb 2019	0.572	Feb 2020	0.626	Feb 2021	-		0.626	Continuing	Continuing	Continuing
ATS LA-22/U Ocular Interrupter Test ProgramSet	Various	ARDEC Picatinny : Picatinny, NJ	0.000	0.550	Oct 2019	0.000		0.000		-		0.000	0.000	0.550	-
Prior Years Cumulative Funding	Various	Various : Various	5.443	0.000		0.000		0.000		-		0.000	0.000	5.443	-
		Subtotal	6.807	1.364		0.572		0.626		-		0.626	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Years Cumulative Funding	Various	Various : Various	3.978	0.000		0.000		0.000		-		0.000	0.000	3.978	-
		Subtotal	3.978	0.000		0.000		0.000		-		0.000	0.000	3.978	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	10.785	1.364		0.572		0.626		-		0.626	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2929 / *Testing Measuring Diag Equip & SE*

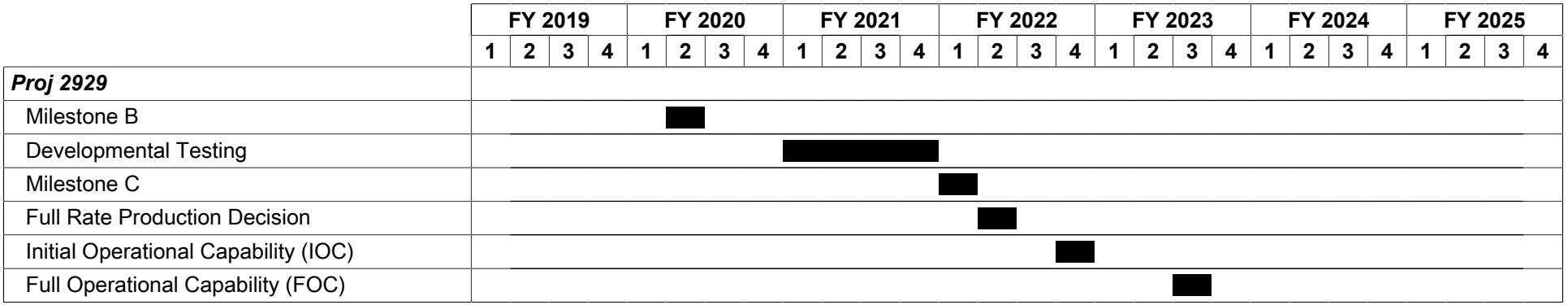

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2929 / *Testing Measuring Diag Equip & SE*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2929				
Milestone B	2	2020	2	2020
Developmental Testing	1	2021	4	2021
Milestone C	1	2022	1	2022
Full Rate Production Decision	2	2022	2	2022
Initial Operational Capability (IOC)	4	2022	4	2022
Full Operational Capability (FOC)	3	2023	3	2023

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206624M / *Marine Corps Cmbt Services Supt*	Project (Number/Name) 3776 / *Combat Track Vehicles Mod*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
3776: *Combat Track Vehicles Mod*	0.000	12.434	25.222	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	37.656
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Funding in this line item has been reprioritized while ensuring the Marine Corps continues to evolve toward a Force that is aligned with the National Defense Strategy.

A. Mission Description and Budget Item Justification

The Combat Track Vehicles Mod effort provides armor-protected mobile firepower to include improvements in all areas of the M1A1 main battle tank, Improved Recovery Vehicle (IRV), and Armored Vehicle Launched Bridge (AVLB). Efforts under the Mod line pertaining to the M1A1 include improvements such as: lethality systems, to increase armament accuracy and provide for off-board targeting improvements; survivability systems (including active and passive); communications and command and control; and mobility, increasing the crew's situational awareness through sensor enhancements and intra-vehicular data sharing; and environmental testing of components. The IRV (also known as the M88A2) provides heavy armor-protected recovery capability to the MAGTF. The Mod line funds research, development, and testing of improvements in all areas of the IRV. This funding addresses obsolescence and Engineering Change Proposals (ECPs) to improve performance and develop safety related ECPs to correct hazards noted during the day to day operation of the M88A2 IRV.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: M1A1 Modifications	12.075	24.855	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2020 Plans: - Initiate and complete evaluation and integration of Survivability Layered Systems for signature management, crew situational awareness, and pre-shot capabilities (i.e., laser warning) along with the incorporation of Battle Management System (BMS) and Modular Active Protection System (MAPS) technology being developed by the U.S. Army. - Initiate and complete operational testing and product improvement of the Active Protective System (APS). - Complete support modifications to include the Firepower Enhancement Program (FEP) and components for the Ammunition Data Link (ADL) II in order to support the ability to utilize next generation munitions to their full capability across the M1A1 fleet. Complete NRE on the APS Technology Demonstrator to complete redesign and development of the system for operational suitability on the Tanks.					
FY 2021 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 3776 / *Combat Track Vehicles Mod*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Initiate the service decision to transition the M1A1 program to full sustainment and stop modernization. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease of $24.855M is a result of service decision to transition the M1A1 program to full sustainment and stop modernization.					
Title: IRV (M88A2) Modifications	0.359	0.367	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2020 Plans: - Purchase arctic mobility test articles to address the needed mobility improvements of the M88A2 in arctic conditions. - Complete the development of modifications for the M88A2 exhaust redesign, in addition to supporting equipment to increase Reliability, Availability, and Maintainability, decrease operating costs, and address obsolescence, crew ergonomics, Command and Control improvements. - Initiate and complete the Automatic Fire Extinguishing System (AFES) fire alarm and sensor improvements. ***FY 2021 Base Plans:*** - Initiate the service decision to transition the IRV program to critical operational and safety related modernizations. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease of $0.367M from FY20 to FY21 is a result of the service decision to transition the IRV program to critical operational and safety related modernizations.					
Accomplishments/Planned Programs Subtotals	12.434	25.222	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• PMC/2061: *M1A1 Modification Kit*	22.904	22.760	3.067	-	3.067	3.292	3.189	3.253	3.318	0.000	798.893

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 3776 / *Combat Track Vehicles Mod*

C. Other Program Funding Summary ($ in Millions)

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

Remarks

D. Acquisition Strategy

The M1A1 modification kits program will initiate the service decision to transition the M1A1 program to full sustainment beginning in FY21.

The IRV program will initiate the service decision to transition the IRV program to critical operational and safety related modernizations only beginning in FY21

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 3776 / *Combat Track Vehicles Mod*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
M1A1 Mod - APS B-Kit	C/FFP	TACOM : Warren, MI	0.000	3.737	Jun 2019	0.457	Mar 2020	0.000		-		0.000	0.000	4.194	-
M1A1 Mod - APS A-Kit	C/CPFF	TACOM : Warren, MI	0.000	5.382	Jun 2019	2.521	Mar 2020	0.000		-		0.000	0.000	7.903	-
M1A1 Mod - APS / IMOD	MIPR	TACOM : Warren, MI	0.000	0.000		1.000	Mar 2020	0.000		-		0.000	0.000	1.000	-
M1A1 Mod - APS Eng Spt	MIPR	APG : Aberdeen, MD	0.000	1.032	Mar 2019	0.000		0.000		-		0.000	0.000	1.032	-
M1A1 Mod - Electro-Optinc Spt	MIPR	NVESD : Ft. Belvoir, VA	0.000	0.281	Nov 2018	0.270	Jan 2020	0.000		-		0.000	0.000	0.551	-
M1A1 Mod - TCM	WR	Benet Labs : Watervaliet, NY	0.000	0.358	May 2019	0.000		0.000		-		0.000	0.000	0.358	-
M1A1 Mod - ADL II	MIPR	ARDEC : Picatinny, NJ	0.000	0.048	Aug 2019	0.627	Mar 2020	0.000		-		0.000	0.000	0.675	-
M1A1 Mod - FEP STS	C/FFP	Raytheon : McKinney, TX	0.000	0.000		0.690	Mar 2020	0.000		-		0.000	0.000	0.690	-
M1A1 Mod - TWMP	C/FFP	MCSC : Quantico, VA	0.000	0.000		1.000	Mar 2020	0.000		-		0.000	0.000	1.000	-
M1A1 Mod - MAPS	MIPR	TACOM : Warren, MI	0.000	0.000		0.925	Mar 2020	0.000		-		0.000	0.000	0.925	-
M88A2 HERCULES	MIPR	TACOM : Warren, MI	0.000	0.359	Mar 2019	0.367	Mar 2020	0.000		-		0.000	0.000	0.726	-
		Subtotal	0.000	11.197		7.857		0.000		-		0.000	0.000	19.054	N/A

Remarks

M1A1 Mod - APS Test Spt consists of test ranges, logistic spt, ammo storage, instrumentation, personnel, reports, threat munition.
M1A1 Mod - APS Eng Spt (GDLS) supports A-Kit refinement for application of the B-Kit to the M1A1.
M1A1 Mod - MAPS (Modular Active Protection System) funds effort to integrate MAPS into the M1A1 tank configuration.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
M1A1 Mod - Survivability Layered Systems	MIPR	TARDEC : Warren, MI	0.000	0.000		9.575	Mar 2020	0.000		-		0.000	0.000	9.575	-
M1A1 Mod - BMS	MIPR	TACOM : Warren, MI	0.000	0.000		5.390	Mar 2020	0.000		-		0.000	0.000	5.390	-
M1A1 Mod - APS Test Spt	MIPR	TACOM : Warren, MI	0.000	1.237	Feb 2019	2.400	Mar 2020	0.000		-		0.000	0.000	3.637	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 3776 / *Combat Track Vehicles Mod*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			0.000	1.237		17.365		0.000		-		0.000	0.000	18.602	N/A

Remarks

M1A1 Mod - Survivability Layered Systems includes integration and test of active and passive sub systems (signature management, crew situational awareness, and pre-shot systems).
M1A1 Mod - BMS (Battle Management System) development of BMS integrates MAPS alerts and enables coordinated distribution to other tank battalion units.

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	12.434		25.222		0.000		-		0.000	0.000	37.656	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 3776 / *Combat Track Vehicles Mod*

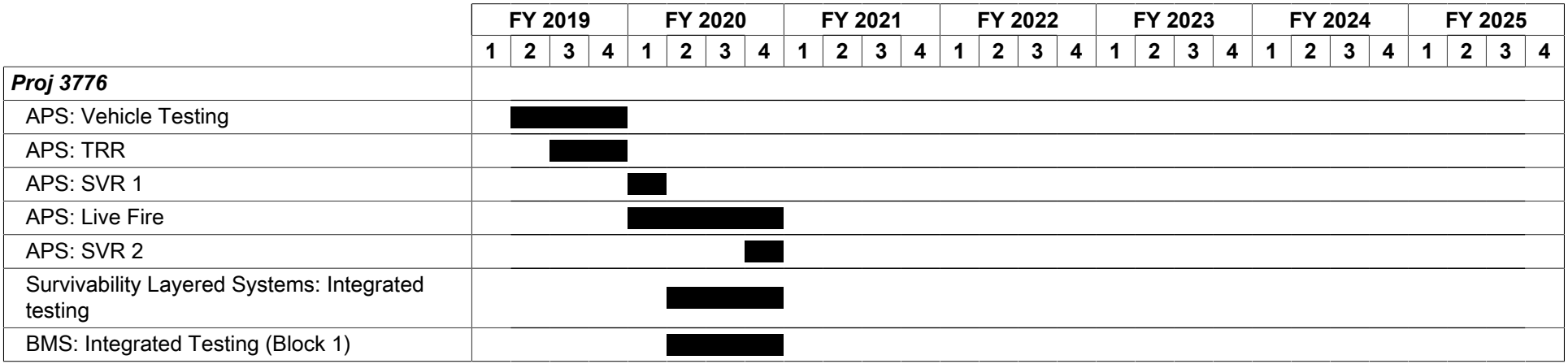

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 3776 / *Combat Track Vehicles Mod*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3776				
APS: Vehicle Testing	2	2019	4	2019
APS: TRR	3	2019	4	2019
APS: SVR 1	1	2020	1	2020
APS: Live Fire	1	2020	4	2020
APS: SVR 2	4	2020	4	2020
Survivability Layered Systems: Integrated testing	2	2020	4	2020
BMS: Integrated Testing (Block 1)	2	2020	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206624M / *Marine Corps Cmbt Services Supt*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
9999: *Congressional Adds*	0.000	0.000	8.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.000
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The UAV alternate power generation technologies and Airborne power generation technology efforts will focus on achieving the Marine Corps goal of lightening the Marine Air-Ground Task Force (MAGTF) through reduced logistical fuel resupply needs. These are Small Business Innovation Research (SBIR) efforts to capture energy at high altitudes utilizing wind energy through unmanned aerial vehicle (UAV) and airborne assets.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020
Congressional Add: UAV alternate power generation technologies ***FY 2019 Accomplishments:*** N/A ***FY 2020 Plans:*** UAV alternate power generation technologies - Continue development of UAV alternate power generation technologies	0.000	3.000
Congressional Add: Airborne power generation technology ***FY 2019 Accomplishments:*** N/A ***FY 2020 Plans:*** Airborne power generation technology - Continue development of Airborne power generation technology	0.000	5.000
Congressional Adds Subtotals	0.000	8.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

UAV alternate power generation technologies and Airborne power generation technology efforts are both Small Business Innovation Research (SBIR) efforts and acquisition strategies do not apply to SBIRs.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 9999 / *Congressional Adds*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
UAV alternate power generation technologies	TBD	TBD : TBD	0.000	0.000		3.000	Sep 2020	0.000		-		0.000	0.000	3.000	-
Airborne power generation technology	TBD	TBD : TBD	0.000	0.000		5.000	Sep 2020	0.000		-		0.000	0.000	5.000	-
		Subtotal	0.000	0.000		8.000		0.000		-		0.000	0.000	8.000	N/A

Remarks

*FY20 Power generation technologies encompasses both UAV alternate power generation technologies $3M and Airborne power generation technology $5M

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		8.000		0.000		-		0.000	0.000	8.000	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 9999 / *Congressional Adds*

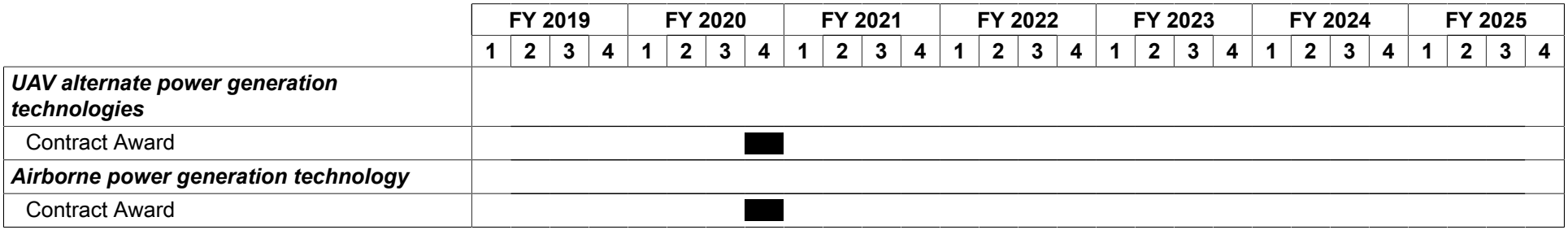

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
UAV alternate power generation technologies				
Contract Award	4	2020	4	2020
Airborne power generation technology				
Contract Award	4	2020	4	2020