Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	262.379	24.915	29.905	37.761	-	37.761	15.573	15.259	14.304	14.590	Continuing	Continuing
0201: *Logistical Veh Sys Replacement (LVSR)*	38.341	0.239	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	38.580
2316: *Combat Service Support Eng Equip*	86.757	18.965	3.375	3.336	-	3.336	3.420	3.499	3.568	3.640	Continuing	Continuing
2509: *Motor Transport Mod*	46.099	0.626	5.267	5.595	-	5.595	1.773	1.816	1.846	1.884	Continuing	Continuing
2510: *MAGTF CSSE & SE*	31.863	3.225	6.015	3.036	-	3.036	4.539	4.445	4.176	4.259	Continuing	Continuing
2929: *Testing Measuring Diag Equip & SE*	10.197	0.588	0.647	0.572	-	0.572	0.626	0.638	0.652	0.664	Continuing	Continuing
3776: *Combat Track Vehicles Mod*	0.000	0.000	14.601	25.222	-	25.222	5.215	4.861	4.062	4.143	Continuing	Continuing
9C90: *MTVR Mod*	49.122	1.272	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	50.394

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 2020 Navy					Date: March 2019
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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
Previous President's Budget	25.258	30.156	40.903	-	40.903
Current President's Budget	24.915	29.905	37.761	-	37.761
Total Adjustments	-0.343	-0.251	-3.142	-	-3.142
• Congressional General Reductions	-	-0.251			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.084	0.000			
• SBIR/STTR Transfer	-0.424	0.000			
• Program Adjustments	0.000	0.000	-3.082	-	-3.082
• Rate/Misc Adjustments	0.001	0.000	-0.060	-	-0.060
• Congressional General Reductions Adjustments	-0.004	-	-	-	-

Change Summary Explanation

The FY2020 funding request was reduced by $3.08M to account for the availability of prior year execution balances.

The net increase from FY19 to FY20 can primarily be attributed to the evaluation and integration of active and passive Survivability Layered Systems (i.e. signature management, crew situational awareness, and pre-shot systems) with the ongoing Active Protection System effort (proj. 3776), and a decrease in Mobile Power Equipment Next Gen Power Distribution System (proj. 2510) due to the procurement of the Micro-grid Advance Digital Control System (MADCS).

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0206624M / *Marine Corps Cmbt Services Supt*				Project (Number/Name) 0201 / *Logistical Veh Sys Replacement (LVSR)*			
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
0201: *Logistical Veh Sys Replacement (LVSR)*	38.341	0.239	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	38.580
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Beginning in FY19, LVSR funding has been realigned from project 0201, Logistics Vehicle System Replacement, to project 2509, Motor Transport Mod. Realignment of efforts to new projects in FY19 and beyond reflects USMC Program Management Office (PMO) reorganization to improve support of USMC OPFOR.

A. Mission Description and Budget Item Justification

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

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Product Development	0.239	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: Details provided in project 2509					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.239	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 0201 / *Logistical Veh Sys Replacement (LVSR)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• PMC/5050: *Logistics Vehicle System Replacement*	12.285	3.814	3.087	-	3.087	3.135	2.186	2.230	2.275	Continuing	Continuing
• RDTE/C2509: *Logistics Vehicle System Replacement*	0.000	0.211	0.213	-	0.213	0.218	0.222	0.226	0.231	0.000	1.321

Remarks

BLI 5050 contains multiple programs. LVSR funding only is reflected above.

D. Acquisition Strategy

The 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. LVSR funding in FY 2019 and out realigned to project unit 2509.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206624M / *Marine Corps Cmbt Services Supt*	Project (Number/Name) 0201 / *Logistical Veh Sys Replacement (LVSR)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LVSR Safety Mod Development	SS/FFP	Various : Various	1.928	0.096	Jun 2018	0.000		0.000		-		0.000	0.000	2.024	-
LVSR ECP Development	SS/FFP	Various : Various	2.054	0.143	Jun 2018	0.000		0.000		-		0.000	0.000	2.197	-
Prior Years Cumulative Funding	C/FFP	Various : Various	17.398	0.000		0.000		0.000		-		0.000	0.000	17.398	-
		Subtotal	21.380	0.239		0.000		0.000		-		0.000	0.000	21.619	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LVSR Engineer Change Support	SS/FFP	Various : Various	1.005	0.000		0.000		0.000		-		0.000	0.000	1.005	-
Prior Years Cumulative Funding	Various	Various : Various	1.648	0.000		0.000		0.000		-		0.000	0.000	1.648	-
		Subtotal	2.653	0.000		0.000		0.000		-		0.000	0.000	2.653	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Years Cumulative Funding	Various	Various : Various	11.296	0.000		0.000		0.000		-		0.000	0.000	11.296	-
LVSR Armour Coupon Testing	Various	Not Specified : Aberdeen Test Centyer	0.065	0.000		0.000		0.000		-		0.000	0.000	0.065	-
		Subtotal	11.361	0.000		0.000		0.000		-		0.000	0.000	11.361	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206624M / *Marine Corps Cmbt Services Supt*	Project (Number/Name) 0201 / *Logistical Veh Sys Replacement (LVSR)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Years Cumulative Funding	Various	Various : Various	2.947	0.000		0.000		0.000		-		0.000	0.000	2.947	-
		Subtotal	2.947	0.000		0.000		0.000		-		0.000	0.000	2.947	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	38.341	0.239		0.000		0.000		-		0.000	0.000	38.580	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 0201 / *Logistical Veh Sys Replacement (LVSR)*

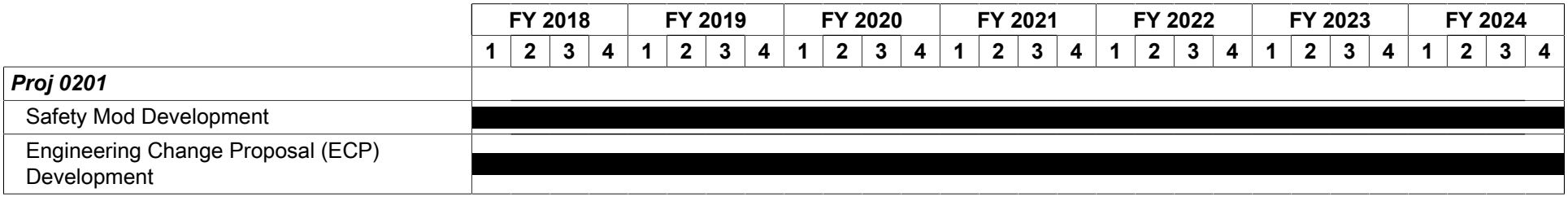


Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 0201 / *Logistical Veh Sys Replacement (LVSR)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0201				
Safety Mod Development	1	2018	4	2024
Engineering Change Proposal (ECP) Development	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
2316: *Combat Service Support Eng Equip*	86.757	18.965	3.375	3.336	-	3.336	3.420	3.499	3.568	3.640	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

M1A1 Mod Kit: The M1A1 Mod Kit effort includes improvements in all areas of the M1A1 main battle tank and the Armored Vehicle Launched Bridge (AVLB). The M1A1 tank provides armor-protected mobile firepower to the Marine Air Ground Task Force (MAGTF). 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 improvement; survivability systems (including passive and active); communications and command and control; mobility; increasing the crew's situational awareness through sensor enhancements and intra-vehicular data sharing; and environmental testing of components. The AVLB provides the Marine Corps only armor-protected assault gap crossing capability. Continued funding is required to address obsolescence and address operational deficiencies to adapt the tank and AVLB to a changing operational environment and support user-defined product improvements. Funding also supports items such as miscellaneous tools and test items for the M1A1 tank and associated supporting platforms, safety and sustainment modifications to the bridge launcher, and Materiel Fielding Support. M1A1 Mod Kit funding in FY 2019 and out realigned to project unit 3776.

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.

Assault Bridging Modernization Program: Replaces the legacy M60 armored vehicle and launching system of the current AVLB with the chassis of an M1A1 main battle tank, configured with a modern launching system, to support the launch and recovery of assault bridging in support of MAGTF maneuver. This program will establish commonality across the DoD fleet, eliminates obsolescence and diminishing manufacturing sources and materiel shortfall issues, while increasing the operational effectiveness and readiness of the MAGTF.

The 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 MRAP

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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*

vehicle categories (CATs) have been procured, fielded, and sustained: MRAP All Terrain Vehicle (M-ATV) - Combat Operations (ops) in rural, mountainous, urban terrain. 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 or other safety issues, new armor technology and ballistic testing. MRAP funding in FY 2019 and out realigned to project unit 2509.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Engineer Mods and Tool Kits	1.089	0.555	0.517	0.000	0.517
Articles:	-	-	-	-	-
FY 2019 Plans: -Continues development, ECPs, and testing in support of Assault Breacher Vehicle (ABV) Modified-Full Width Mine Plow (M-FWMP) prototype, Deep Water Forging Kit (DWFK) and Unmanned Breacher Vehicle (UBV) mine plow drawings and testing. ***FY 2020 Base Plans:*** -Continues M-FWMP, DWFK, and UBV development and testing and ECPs. -Initiates development and testing of ground penetrating capability. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease of $0.038M from FY19 to FY20 results from ECP completion in alignment with program plans.					
Title: M1A1 Modifications	14.846	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: M1A1 Mod Kit funding in FY 2019 and out realigned to project unit 3776. ***FY 2019 Plans:*** N/A ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A					
Title: Mine Resistant Ambush Protected Family of Vehicles	0.516	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Articles:	-	-	-	-	-
Description: MRAP funding in FY 2019 and out realigned to project unit 2509. ***FY 2019 Plans:*** N/A ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A					
Title: Corrosion Prevention and Control (CPAC)	2.514	2.820	2.819	0.000	2.819
Articles:	-	-	-	-	-
FY 2019 Plans: - Continue to support the identification, review and 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 to support field evaluations, product test and environmental monitoring in advance of fielding and equipment staging programs to determine suitability such as: P19s, Light Capability Rough Terrain Forklift, and environmental monitoring of equipment staging programs in support of Marine Corps Prepositioned Program Norway (MCPP-N) and Marine Expeditionary Units Augmentation Program (MAP) Kuwait. - 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 Kuwait.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Initiate review of corrosion prevention products and coatings including metal rich primer, and metal coating eliminating surface preparation. ***FY 2020 Base 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: TSMC, evaluation of the CARC Systems during Re-Paint, Chip Resistant Coatings, Flexible Nonslip Coatings and Corrosion Resistant Insulating Foams. - Continue stewardship of 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 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The program decrease of $0.001M from FY19 to FY20 aligns with the estimated Government Labor rates to allow the program to obtain RDTE activities at Naval Surface Warfare Center-Carderock Division (NSWC-CD).					
Accomplishments/Planned Programs Subtotals	18.965	3.375	3.336	0.000	3.336

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• PMC/2061: *M1A1 Modification Kit*	15.918	20.581	20.139	-	20.139	34.568	41.979	53.457	54.529	0.000	958.503
• PMC/7000: *M1A1 Modification Kit*	0.362	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• RDTE,N/C3776: *M1A1 Modification Kit*	0.000	14.242	25.222	-	25.222	4.840	4.479	3.668	3.741	0.000	56.192
• PMC/5050: *MRAP*	0.000	26.630	0.742	-	0.742	1.267	1.291	1.317	1.343	Continuing	Continuing
• PMC/6520: *EOD Systems - MRAP*	5.389	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6,580.859
• PMC/6670: *Items Less than $5M - CPAC and Eng Mods & Tool Kits*	4.953	6.258	4.672	-	4.672	4.376	4.605	4.717	4.819	Continuing	Continuing

Remarks

M1A1 Modification Kit: APS development efforts in FY16-20 enable the planned procurement of APS systems and supporting counter-measures in FY21-22.

EOD Systems - MRAP: BLI 6520 realigned to 5050 beginning in FY19.
MRAP RDTE realigned to 2509 beginning FY19.

D. Acquisition Strategy

(U) The M1A1 modification kits program will leverage Army initiatives to the maximum extent and incorporate modifications to adapt Army solutions to the USMC environment. The USMC will research, develop, and evaluate programs to improve the survivability and lethality of the USMC tank. These efforts include the Abrams Integrated Display and Targeting System (AIDATS), threat detection and warning, situational awareness, survivability, and ownership cost reduction work. The USMC will refine the Active Protection System (APS) technology demonstrator's design in FY18 and FY19 in preparation for live fire testing and evaluation conducted along with the Army in FY20. Procurement of APS systems and supporting counter-measures is planned in FY21 and FY22. M1A1 Mod Kit funding in FY 2019 and out realigned to project unit 3776.

(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) Assault Bridging Modernization: The program will execute RDT&E in support of transportability testing activities at Aberdeen Test Center for the Assault Bridging Modernization Program.

(U) Corrosion Prevention and Control (CPAC) Program: The Program will execute the RDT&E Program to the Naval Surface Warfare Center - Carderock Division Corrosion Research and Engineering Branch, Naval Research Laboratory and the 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.

(U) Mine Resistant Ambush Protected (MRAP) FoV: The Program will execute RDT&E funds to research, develop and evaluate survivability and mobility upgrades efforts such as the Cougar Egress Upgrades, Ballistic Glass and Other Safety Issues, New Armor Technology and Ballistic Testing. Work will be accomplished through

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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*

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. MRAP funding in FY 2019 and out realigned to project unit 2509.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MRAP Modifications	WR	VARIOUS : VARIOUS	1.131	0.225	Dec 2017	0.000		0.000		-		0.000	0.000	1.356	Continuing
M1A1 Modifications - APS	MIPR	TACOM : Warren, MI	4.438	9.514	May 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
M1A1 Modifications - FEP STS	SS/CPFF	Raytheon : McKinney, TX	0.335	0.400	Aug 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
M1A1 Modifications - FEP Symbology	MIPR	Raytheon : Sacramento, CA	0.563	0.187	Aug 2018	0.000		0.000		-		0.000	0.000	0.750	-
M1A1 Modifications - Laser Upgrade	MIPR	ARDEC : Picatinny, NJ	0.000	0.403	Aug 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
M1A1 Modifications - Communication Mod.	MIPR	SSC LANT : Charleston, NC	0.000	0.200	May 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
M1A1 Modifications - TWMP	MIPR	BENET Labs : Albany, NY	0.000	0.000	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
M1A1 Modifications - APS / IMOD	MIPR	TACOM : Warren, MI	1.850	1.993	Jan 2018	0.000		0.000		-		0.000	0.000	3.843	Continuing
M1A1 Modifications - APS	C/CPFF	Raytheon : McKinney, TX	0.000	0.743	Mar 2018	0.000		0.000		-		0.000	0.000	0.743	-
M1A1 Modifications - GPS LP	MIPR	MCSC : Quantico, VA	2.556	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
MRAP Engineering	WR	ATC : Aberdeen, MD	2.315	0.129	Dec 2017	0.000		0.000		-		0.000	0.000	2.444	Continuing
M1A1 Modifications - AGTS	MIPR	PM TRASYS : Orlando, FL	3.177	0.000	May 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
M1A1 Modifications - AIDATS EMD	MIPR	ABERDEEN PROVING GROUND : Aberdeen, MD	3.465	0.000		0.000		0.000		-		0.000	0.000	3.465	-
M1A1 Modifications - ADL II	MIPR	Picatinny Arsenal : Picatinny, NJ	1.174	1.406	Aug 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Prior Year Cumulative. Funding	Various	VARIOUS : VARIOUS	41.469	0.000		0.000		0.000		-		0.000	0.000	41.469	-
		Subtotal	62.473	15.200		0.000		0.000		-		0.000	Continuing	Continuing	N/A

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

Remarks

M1A1 Modifications - APS / IMOD: FY17/18 Payments pursuant to adding the United States Marine Corps as a principal organization involved in the Trophy Active Protection System Accelerated Characterization (TAAC) Project Agreement (PA) with the Israel Ministry Of Defense (IMOD).

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CPAC	MIPR	TACOM : Warren, MI	0.525	0.788	Apr 2018	0.825	Apr 2019	0.850	Jan 2020	-		0.850	0.000	2.988	-
CPAC	C/FFP	NSWC-CD : Bethseda, MD	2.473	0.400	May 2018	0.500	Mar 2019	0.518	Jan 2020	-		0.518	0.000	3.891	-
		Subtotal	2.998	1.188		1.325		1.368		-		1.368	0.000	6.879	N/A

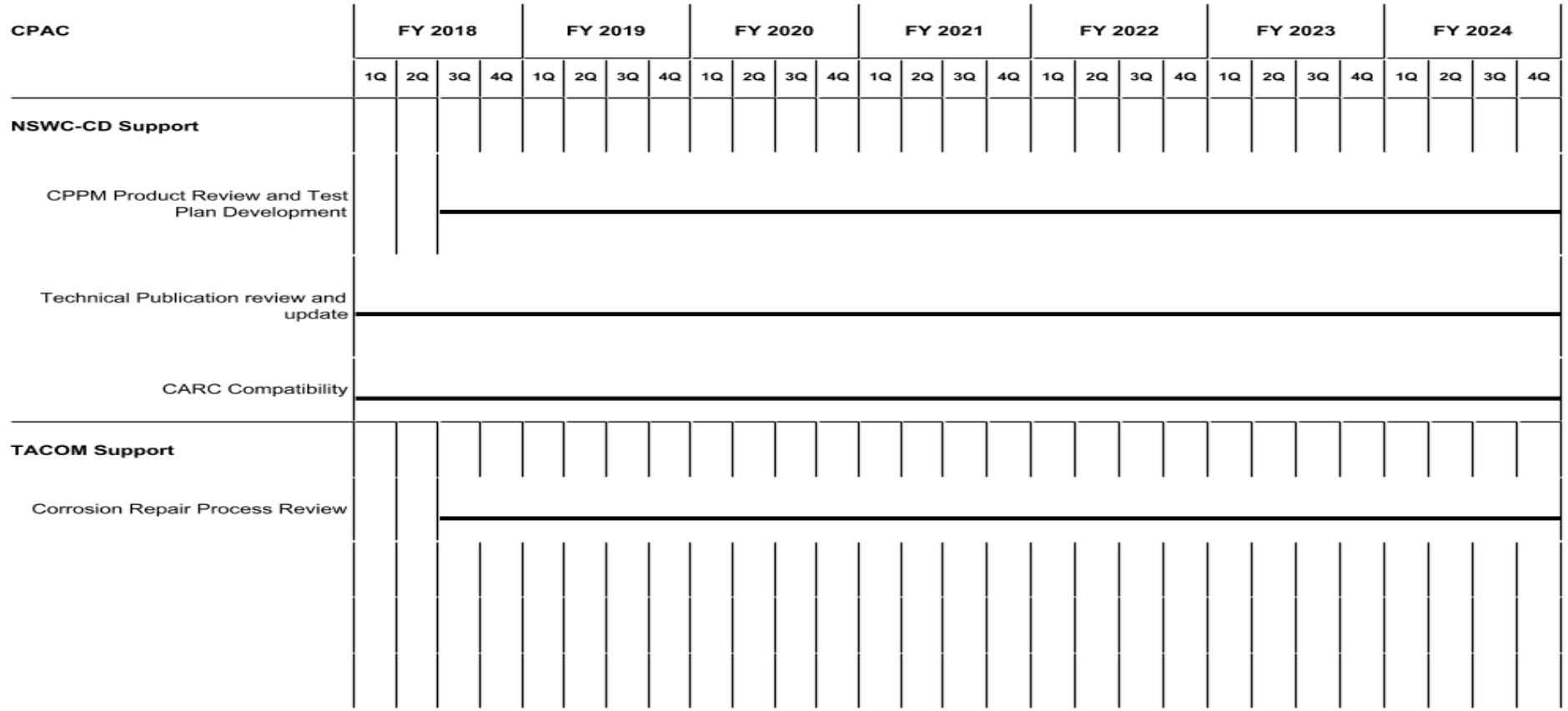
Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MRAP FoV Ballistic Evaluations	MIPR	ATC : Aberdeen, MD	3.246	0.162	Dec 2017	0.000		0.000		-		0.000	0.000	3.408	Continuing
Engineer Modifcation Kits	Various	Various : Various	0.614	1.089	May 2018	0.555	Feb 2019	0.517	May 2020	-		0.517	0.000	2.775	-
CPAC	WR	NSWC-CD : Bethseda, MD	11.810	1.326	Dec 2017	1.495	Nov 2018	1.451	Nov 2019	-		1.451	0.000	16.082	-
Prior Year Cumulative Funding	Various	Various : Various	5.616	0.000		0.000		0.000		-		0.000	0.000	5.616	-
		Subtotal	21.286	2.577		2.050		1.968		-		1.968	0.000	27.881	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	86.757	18.965		3.375		3.336		-		3.336	Continuing	Continuing	N/A

Remarks

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



2020PB - 0206624M - 2316

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
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	3	2018	4	2024
NSWC-CD Support: Technical Publication review and update: Schedule Detail	1	2018	4	2024
NSWC-CD Support: CARC Compatibility: Schedule Detail	1	2018	4	2024
TACOM Support: Corrosion Repair Process Review: Schedule Detail	3	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
2509: *Motor Transport Mod*	46.099	0.626	5.267	5.595	-	5.595	1.773	1.816	1.846	1.884	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) project manages procurement and life cycle sustainment for more than 25,000 light fleet vehicle and tactical trailer principle end items. A sustained effort is maintained in the Marine Corps for development and testing in support of fleet Service Life Extension Program (SLEP) initiatives, vehicle quality deficiency resolutions, safety initiatives, environmental/state transportation mandated vehicle changes, and system component refresh modification efforts to include addressing deficiencies of HMMWV vehicles due to up armoring and age degradation of the fleet as well as engineering change proposals identified for the Utility Task Vehicle. Since transportation asset operational availability declines at a steady rate over time, SLEP, fleet overhauls, and enhanced depot level modifications are essential in maintaining a viable transportation capability in the Marine Corps Operating Forces.

The Improved Recovery Vehicle (M88A2) Modification program funds research, development and testing of improvements in all areas of the M88A2 vehicle, which provides the MAGTF heavy combat recovery capability. Funding addresses obsolescence and Engineering Change Proposals (ECPs) to improve performance and develop safety related ECPs to correct hazards noted during the standard day to day operation of the M88A2 IRV.

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 current and new technological 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, 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 light and medium/heavy trailer fleet to include (but not limited to) the M1076 PLS (Palletized Load System) Trailer, MK1077 Flatrack, MTVR Trailer, M870 40/50 Ton Low Bed, MK970 Tactical Refueler and the Flatrack Refueler Capability (FRC).

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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*

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 Technology Demonstrator 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 Technology Demonstrator provides the opportunity 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 in support of standing up a new HIMARS Battalion by FY22.

The 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 effect 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 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: MRAP All Terrain Vehicle (M-ATV) - Combat Operations (ops) in rural, mountainous, urban terrain. 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, new armor technology and ballistic testing.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: IRV (M88A2) HERCULES	0.209	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: N/A					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
Title: P-19 Replacement	0.200	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 Plans: N/A ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A					
Title: Medium Tactical Vehicle Replacement (MTVR)	0.000	3.672	3.949	0.000	3.949
Articles:	-	-	-	-	-
FY 2019 Plans: - Continuing to support the initiatives aligning with the Commandant of the Marine Corps (CMC) priority for reducing energy costs, logistics footprint, and an improved environment. - Continuing the 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. - Design, build and test an MTVR Technology Demonstrator to inform the Marine Corps of potential ways to modernize the MTVR FoV through a potential Service Life Extension Program (SLEP). The Marine Corps made the decision to extend the service life of the MTVR fleet from 2024 out to 2042. This cannot be done without modernizing the platform. The first step is to inform USMC leadership as to "the art of the possible". The Technology Demonstrator will be a two-year effort, using an armored MTVR, built with 1990s technology, and apply modern technologies. These technologies will include a light weight armored cab, a modern engine, transmission and transfer case, electronic stability control, and an updated secure data bus. This will demonstrate how to "buy back" capability lost through age, after-market armoring and C4I applications, and will address parts obsolescence. The Technology Demonstrator will provide a range of options to USMC leadership to help determine a path forward in ensuring the platform will remain viable for an additional 22 years beyond its initially planned exit date of 2024. - Initiate conduct of a Service Life Extension Program (SLEP) Business Case Analysis (BCA) to explore and develop upgrades that will extend the MTVR from 2024 out to 2042. ***FY 2020 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.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- 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 to design, build and test an MTVR Technology Demonstrator 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. - Continue SLEP BCA. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The FY19 to FY20 increase of $0.277M supports ECP safety mods of the MTVR as required and testing the MTVR Technology Demonstrator to extend the platform's service life from 2024 out to 2042.					
Title: Motor Transport Modification (MTM) ***Articles:*** ***FY 2019 Plans:*** Continue to evaluate, test, and integrate system modifications for the Legacy Light Fleet to support durability and performance testing. ***FY 2020 Base Plans:*** FY20 funds will support the development of engineering change proposals, including HMMWV body mounts and Chassis upgrades in support of the HMMWV/Utility Task Vehicle modifications as identified by feedback from users in operational environments. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The FY19 to FY20 increase ($.022M) is due to additional investment in the continuation of the Light Tactical Vehicle safety and reliability efforts (such as addressing those associated with deficiencies of HMMWV vehicles due to up armoring and degradation).	0.002 -	0.653 -	0.675 -	0.000 -	0.675 -
Title: Combat Service Support Eng Equip MRAP ***Articles:***	0.000 -	0.526 -	0.549 -	0.000 -	0.549 -

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 Plans: Mine Resistant Ambush Protected (MRAP) Vehicles funding profile is realigned in this PE from Project 2316 to Project 2509 for FY19 and future fiscal years. 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 2020 Base Plans:*** 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 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY19 to FY20 increase of $0.23M provides Engineering Change Proposals (ECP) for material improvements to ballistic glass and other safety issues in support of survivability and mobility upgrades.					
Title: Family of Trailers & Ancillary Equipment	0.215	0.205	0.209	0.000	0.209
Articles:	-	-	-	-	-
FY 2019 Plans: - Continue M870 and MK593 Piano Hinge 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 increasing mobility requirements. ***FY 2020 Base Plans:*** - Will Continue MK870 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 increasing mobility requirements. - Will conduct Trailer Transportability recertification with the Ground Clearance mitigation ECP. ***FY 2020 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The FY19 to FY20 increase of $.004M provides for the Trailer Transportability recertification with the Ground Clearance mitigation ECP.					
Title: Logistics Vehicle System Replacement	0.000	0.211	0.213	0.000	0.213
Articles:	-	-	-	-	-
FY 2019 Plans: LVSR funding profile was realigned into this PE from Project 0201 to Project 2509 for FY19 and future fiscal years. - Conduct improved floor and blast mitigation seat modifications. ***FY 2020 Base Plans:*** -Will continue improved floor and blast mitigation seat modifications. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The FY19 to FY20 increase of $.002M provides for efforts to conduct improved floor and blast mitigation seat modifications.					
Accomplishments/Planned Programs Subtotals	0.626	5.267	5.595	0.000	5.595

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• PMC/5097: *Family of Tactical Trailers*	1.668	2.393	2.693	-	2.693	3.146	10.209	3.283	3.349	Continuing	Continuing
• PMC/2061-01: *M88A2 HERCULES Mod*	3.860	2.323	2.621	-	2.621	3.067	3.292	3.189	3.253	Continuing	Continuing
• PMC/5050-01: *Motor T Mod/MTVR*	7.477	7.147	14.501	-	14.501	8.362	8.514	8.699	8.873	Continuing	Continuing
• RDTE,N/C3776: *M88A2 HERCULES Mod*	0.000	0.359	0.367	-	0.367	0.375	0.382	0.394	0.402	0.000	2.279
• PMC/5050-02: *Motor T Mod/LVSR*	12.297	3.814	3.087	-	3.087	3.135	2.186	2.230	2.275	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• RDTEN/0206624M/9C90: *MTVR Mod*	1.272	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	50.394
• PMC/5050-03: *Motor T Mod/MTM*	3.598	0.000	0.542	-	0.542	0.560	3.505	3.575	3.647	Continuing	Continuing
• PMC/5050-04: *Motor T Mod/MRAP*	0.000	0.710	0.742	-	0.742	1.267	1.291	1.317	1.343	Continuing	Continuing
• PMC/5050-05: *Motor T Mod/P19-R*	0.000	0.240	0.362	-	0.362	0.367	0.378	0.386	0.394	Continuing	Continuing
• PMC/5006: *Commercial Cargo Vehicles*	10.771	10.295	10.444	-	10.444	11.434	13.366	13.480	13.750	Continuing	Continuing
• PMC/6520: *EOD Systems*	25.281	45.962	43.360	-	43.360	20.597	30.009	21.090	21.530	Continuing	Continuing

Remarks

Significant changes in the Other APPN/LI is the FY 2019 realignment of the following:
MRAP and P-19R PMC funding was realigned to PMC BLI 5050
LVSR, MTVR and MRAP RDTEN funding was realigned to Project Unit 2509
HERCULES RDTEN funding was realigned to Project Unit 3776

FY19 Overseas Contingency Operations (OCO) funding for MTVR, LVSR and MRAP is reflected in the BLI 5050 funding lines for each program as they have been broken out.

D. Acquisition Strategy

The IRV (M88A2) program leverages Army developmental projects to create a system that more readily meets Marine Corps Heavy Recovery Vehicle requirements. Improvements include modifications addressing safety, reliability, and technology upgrades.

The P-19 Replacement 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-19 Replacement is 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 of 164 has been procured.

Motor Transport Modification (MTM) 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. MTM funding will be used for modifications required to increase MTM fleet readiness, safety and reliability. Successful modifications and tests are intended for follow-on procurement and incorporation into existing system component upgrades, SLEPs, or rapid COTS/NDI fielding for the Fleet Marine Forces (FMF).

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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The Family of Trailers & Ancillary Equipment (FT&AE) management strategy will use RDT&E funding to explore current and new technological 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, MTVR Trailer, M870 40/50 Ton Low Bed, MK970 Tactical Refueler and the Flatrack Refueler Capability (FRC).

The Marine Corps made the decision to extend the service life of the MTVR fleet from 2024 out to 2042. This cannot be done without modernizing the platform. A Business Case Analysis (BCA) will assess the current status of the MTVR fleet and provide recommendations on what should be done to extend the platform's service life. The next step will be to design, build and test an MTVR Technology Demonstrator (MTVR TD), which will begin concurrently, while incorporating lessons learned from the BCA. The MTVR TD will insert applicable modern technologies to address parts obsolescence, safety concerns, and respond to emerging threats. This will be a two-year design, build and test effort, that includes technology insertions such as a light weight armored cab, a modern engine, transmission and transfer case, electronic stability control, and an updated secure data bus. At the conclusion of the MTVR TD Phase, Marine Corps leadership will have the required information needed to make an informed decision on the economical and effective ways to modernize the platform and extend its service life.

The 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 Mine Resistant Ambush Protected (MRAP) FoV: The Program will execute RDT&E funds to research, develop, and evaluate survivability and mobility upgrades 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.

E. Performance Metrics

Program / Technical Reviews
Fuel Efficiency SVR FY 2019 1Q
Fuel Efficiency ECP Approval FY2019 1Q

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
IRV (M88A2) HERCULES	MIPR	TACOM : Warren, MI	2.316	0.209	Apr 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
MRAP Modifications	WR	Various : Various	0.000	0.000		0.188	Dec 2018	0.203	Dec 2019	-		0.203	0.000	0.391	-
MRAP Engineering	WR	ATC : ATC	0.000	0.000		0.129	Dec 2018	0.135	Dec 2019	-		0.135	0.000	0.264	-
LVSR	MIPR	Various : Various	0.000	0.000		0.211	Feb 2019	0.213	Feb 2020	-		0.213	0.000	0.424	-
MTVR SLEP Development	C/FFP	OSHKOSH : Oshkosh, WI	0.000	0.000		0.000		0.588	Dec 2019	-		0.588	Continuing	Continuing	Continuing
MTVR SLEP Research and Development	MIPR	TARDEC : Warren, MI	0.000	0.000		2.446	Dec 2018	2.809	Dec 2019	-		2.809	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	32.816	0.209		2.974		3.948		-		3.948	Continuing	Continuing	N/A

Remarks

MRAP realigned from project code 2316 to 2509 FY19 and out.
LVSR realigned from project code 0201 to 2509 FY19 and out.
MTVR realigned from project code 9C90 to 2509 FY19 and out. Increase from FY19 to FY20 is to support the development of the Technology Demonstrator for the SLEP.
HERCULES realigned from project code 2509 to 3773 FY19 and out.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
P19 Reliability Testing	C/BOA	NATC : Carson City, NV	0.609	0.200	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
FTT Durability Test/ Analysis	WR	NRL : Washington, DC	0.185	0.215	Nov 2017	0.205	Dec 2018	0.209	Dec 2019	-		0.209	Continuing	Continuing	Continuing
MRAP FoV Ballistic Evaluations	MIPR	ATC : ATC	0.000	0.000		0.209	Dec 2018	0.211	Dec 2019	-		0.211	0.000	0.420	-
MTM (Light) ECPs	C/CPFF	NATC : Carson City, NV	0.000	0.000		0.000		0.675	Feb 2020	-		0.675	0.000	0.675	-
MTM (Light)Testing/ Analysis	C/BA	NATC : Carson City, NV	0.413	0.002	Sep 2018	0.653	Feb 2019	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MTVR FE Testing and FUE	MIPR	ATC : Aberdeen,MD	0.000	0.000		0.226	Nov 2018	0.000		-		0.000	0.000	0.226	-
MTVR ECP Test & Evaluation	Various	Various : Various	0.000	0.000		0.600	Dec 2018	0.152	Dec 2019	-		0.152	0.000	0.752	-
MTVR ATC Testing	MIPR	ATC : Aberdeen, MD	0.000	0.000		0.400	Nov 2018	0.400	Nov 2019	-		0.400	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	-
		Subtotal	12.497	0.417		2.293		1.647		-		1.647	Continuing	Continuing	N/A

Remarks

MTM (Light) testing/analysis increase of $0.022 in FY20 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.
MTVR ECP Testing decrease from FY19 to FY20 is to realign funding to higher requirement of Technology Demonstrator development.
The FY19 to FY20 increase of $.004M provides for efforts such as the Trailer Performance Test/Durability Analysis (rust/corrosion) and Ground Clearance mitigation solution.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Years Cumulative Funding	Various	Various : Various	0.786	0.000		0.000		0.000		-		0.000	0.000	0.786	-
		Subtotal	0.786	0.000		0.000		0.000		-		0.000	0.000	0.786	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	46.099	0.626		5.267		5.595		-		5.595	Continuing	Continuing	N/A

Remarks

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

MTVR Program Plan

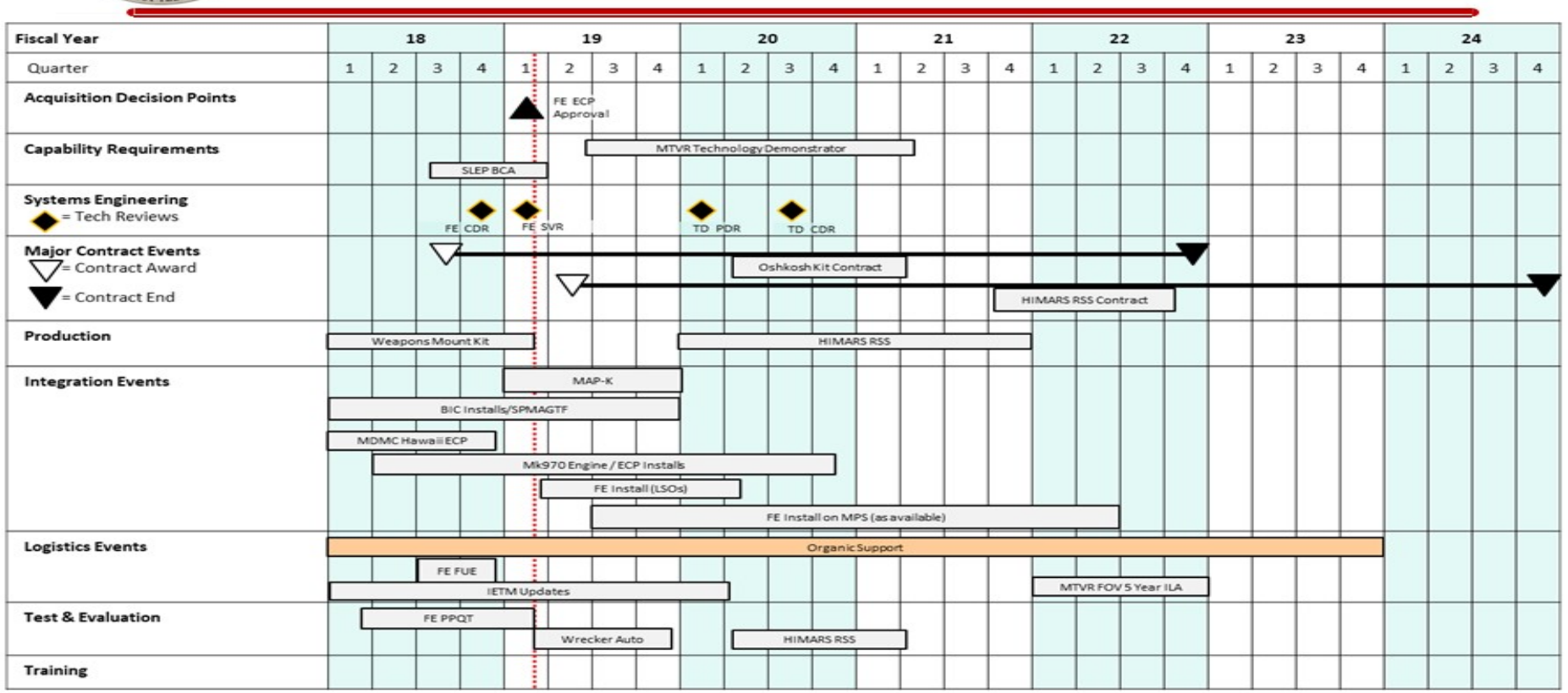

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2509 / *Motor Transport Mod*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MTVR				
Fuel Efficient Modifications (Install S/W)	1	2019	4	2019
ECP/Safety Mod Development	1	2019	4	2024
ECP/HIMARS Development	2	2019	2	2020
SLEP Tech Demonstrator	1	2019	1	2021
FE ECP Approval	1	2019	1	2019

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
2510: *MAGTF CSSE & SE*	31.863	3.225	6.015	3.036	-	3.036	4.539	4.445	4.176	4.259	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 2020 Navy		Date: March 2019
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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 0.5-5kW and 10-15kW 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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Environmental Control Equipment	0.642	0.497	0.504	0.000	0.504
Articles:	-	-	-	-	-
FY 2019 Plans: -Design and develop phase II prototypes for the Small Field Refrigeration System (SFRS) replacement to comply with restricting EPA regulations while increasing efficiency, thus reducing overall power requirements/demands.					
FY 2020 Base 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 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Increase of $0.007M from FY19 to FY20 is due to the SFRS prototypes that are in development during FY18-FY19. Systems will require testing during FY20.					
Title: Mobile Power Equipment Next Gen Power Distribution System	1.624	3.350	0.152	0.000	0.152
Articles:	-	-	-	-	-
FY 2019 Plans: - Request entrance into Milestone B (1st Qtr FY19) for the Intelligent Power Management System, Contract Award (2nd Qtr. FY19) for the Intelligent Power Distribution (IPD) system, Developmental Testing for the IPD will start in the 4th Qtr. FY19					
FY 2020 Base Plans: - Development and Testing of Intelligent Power Distribution system prototypes to be used in support of Intelligent Power Management System (IPMS).					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: Decrease of $3.198M from FY19 to FY20 is due to the procurement of the Intelligent Power Distribution (IPD) system and is not required in FY20, whereas the funding for FY20 is to support development and testing of the Intelligent Power Distribution (IPD) system for the Intelligent Power Management System.					
Title: Advanced Power Sources	0.959	2.168	2.380	0.000	2.380
Articles:	-	-	-	-	-
FY 2019 Plans: MOBILE ELECTRIC HYBRID POWER SOURCES (MEHPS) -Complete MEHPS LUE -Solicit proposal and award for solar panel testing -Initiate Product Verification Testing (PVT) on solar panels -Conclude testing Medium system configuration of MEHPS -Solicit proposal for MEHPS					
FY 2020 Base Plans: FY 20 Base Plans MOBILE ELECTRIC HYBRID POWER SOURCES (MEHPS)					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-Complete solar panel and Light and medium system testing -Complete all user evaluations -Mile Stone C achieved -Award MEHPS contract -LBSM prototype solicitation -Initiate MEHPS low rate initial production ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase from FY19 to FY20 by $0.212M is due to the solar power integration testing to support the MHEPS program.					
Accomplishments/Planned Programs Subtotals	3.225	6.015	3.036	0.000	3.036

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• PMC/6054: *Environmental Control Equipment*	1.405	0.496	0.495	-	0.495	0.496	3.368	3.431	3.500	0.000	99.174
• PMC/6366-1: *Mobile Power Equipment*	5.611	8.122	12.058	-	12.058	8.642	8.828	10.012	10.212	Continuing	Continuing
• PMC/6366-2: *Advanced Power Sources*	4.666	7.438	10.383	-	10.383	15.778	16.092	16.431	16.760	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.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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*

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 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 is purchasing 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 next step is to release a Request for Proposal (RFP) to industry in July 2018, conduct source selection, award 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 3rd Quarter Fiscal Year 2019. Source selection will be conducted for planned award to two vendors. EMD phase will be executed and at the conclusion of testing at ATC the program office will go back out to industry to re-compete for production, First Article Testing will be conducted, and optional delivery orders will be placed against a FFP, IDIQ contract. 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.

E. Performance Metrics

SFRS: Energy efficiency; size; weight; EPA-approved refrigerant; affordability; organically supportable.
ECU: Energy efficiency; size; weight; EPA-approved refrigerant; affordability; organically supportable.
MOBILE POWER: Energy efficiency; size; weight; affordability; organically supportable.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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*

MEHPS: 55% savings in fuel and 80% reduction in generator runtime versus a standard 10 Kilowatt (kW) Tactical Quiet Generator (TQG).
BMASS: Energy efficiency; size; weight; ability to charge specified batteries.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MPE Micro Grid Storage/ IPM	C/FFP	AFLCMC : HANSCOM AFB	1.570	1.624	Mar 2018	1.000	Nov 2018	0.152	Apr 2020	-		0.152	Continuing	Continuing	Continuing
MPE IPD EMD	C/FFP	TBD : TBD	0.000	0.000		1.000	Mar 2019	0.000		-		0.000	Continuing	Continuing	Continuing
MPE IPD Prototype Testing	C/FFP	ATC : Aberdeen, MD	0.000	0.000		1.350	Sep 2019	0.000		-		0.000	Continuing	Continuing	Continuing
ECE SFRS Replacement	MIPR	NSRDEC : NATICK, MA	0.000	0.642	Jul 2018	0.383	Nov 2018	0.000		-		0.000	Continuing	Continuing	Continuing
APS MEHPS Testing	WR	NSWC : CARDEROCK, MD	1.982	0.000		0.100	Jan 2019	0.000		-		0.000	Continuing	Continuing	Continuing
APS MEHPS Solar Power	C/CPFF	UEC : CHARLESTON, SC	0.000	0.000		0.200	Nov 2018	0.100	Apr 2020	-		0.100	Continuing	Continuing	Continuing
Prior Years Cumulative Funding	Various	VAR : VAR	17.246	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	20.798	2.266		4.033		0.252		-		0.252	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Years Cumulative Funding	Various	VAR : VAR	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

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ECE SFRS Replacement Test & Evaluation	MIPR	ABERDEEN TEST CENTER : ABERDEEN MD	0.262	0.000		0.114	Feb 2019	0.504	Nov 2019	-		0.504	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
APS MEHPS Testing (DT)	MIPR	ABERDEEN TEST CENTER : ABERDEEN, MD	0.700	0.549	Jun 2018	1.233	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
APS MEHPS User Evaluation	MIPR	NSWC CARDEROCK : CARDEROCK MD	0.000	0.410	Feb 2018	0.635	Sep 2019	2.280	Jan 2020	-		2.280	Continuing	Continuing	Continuing
APS MEHPS Lithium Battery Testing	WR	NSWC : CARDERROCK, MD	0.000	0.000	Jan 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
APS MEHPS Solar Panel Testing	MIPR	ABERDEEN TEST CENTER : ABERDEEN MD	0.000	0.000	Jul 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Prior Year Cumulative Funding	Various	Various : Various	7.619	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	8.581	0.959		1.982		2.784		-		2.784	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 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 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	31.863	3.225		6.015		3.036		-		3.036	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 2020 Navy		Date: March 2019
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*

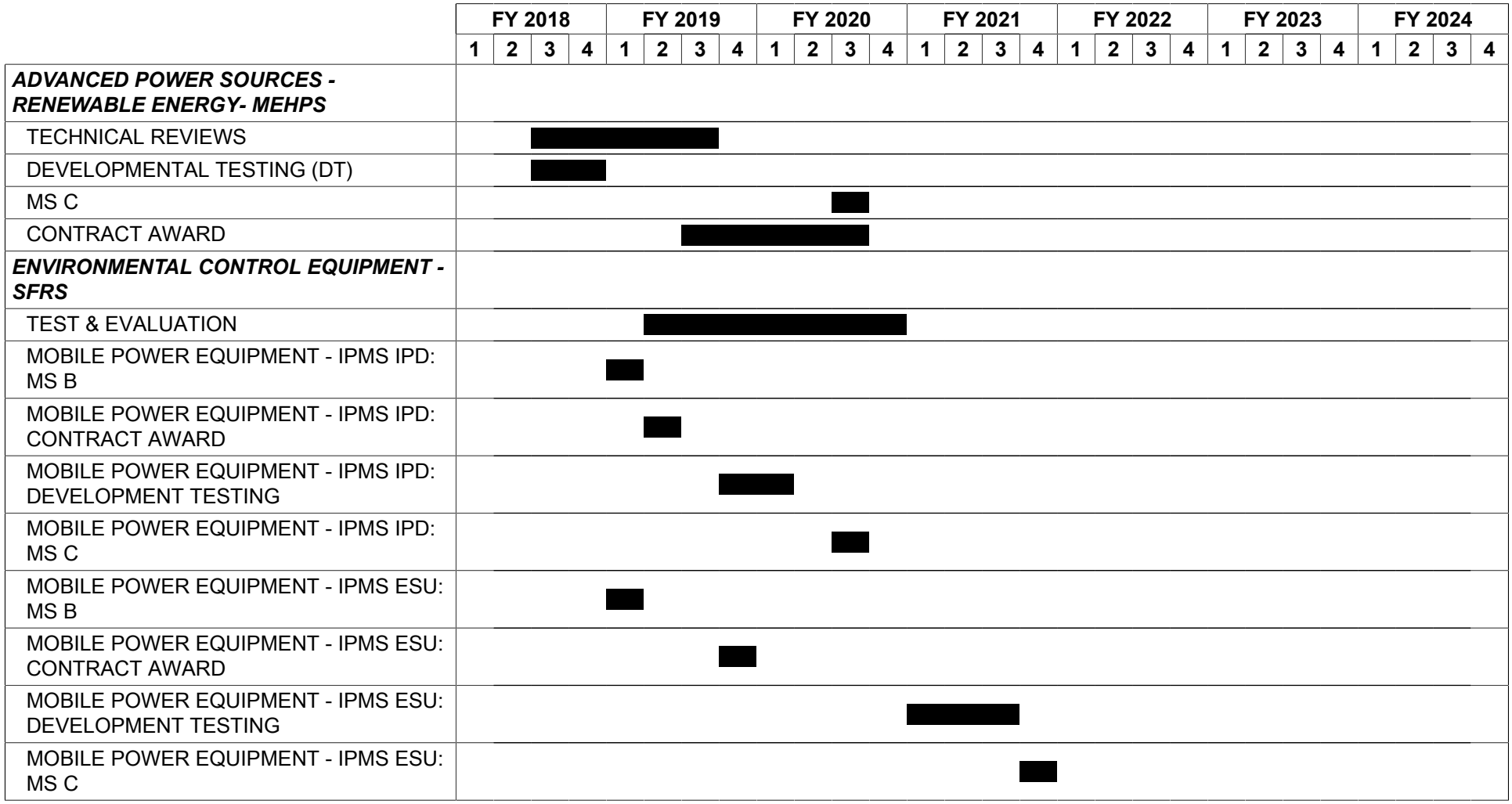

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2510 / *MAGTF CSSE & SE*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
ADVANCED POWER SOURCES -RENEWABLE ENERGY- MEHPS				
TECHNICAL REVIEWS	3	2018	3	2019
DEVELOPMENTAL TESTING (DT)	3	2018	4	2018
MS C	3	2020	3	2020
CONTRACT AWARD	3	2019	3	2020
ENVIRONMENTAL CONTROL EQUIPMENT - SFRS				
TEST & EVALUATION	2	2019	4	2020
MOBILE POWER EQUIPMENT - IPMS IPD: MS B	1	2019	1	2019
MOBILE POWER EQUIPMENT - IPMS IPD: CONTRACT AWARD	2	2019	2	2019
MOBILE POWER EQUIPMENT - IPMS IPD: DEVELOPMENT TESTING	4	2019	1	2020
MOBILE POWER EQUIPMENT - IPMS IPD: MS C	3	2020	3	2020
MOBILE POWER EQUIPMENT - IPMS ESU: MS B	1	2019	1	2019
MOBILE POWER EQUIPMENT - IPMS ESU: CONTRACT AWARD	4	2019	4	2019
MOBILE POWER EQUIPMENT - IPMS ESU: DEVELOPMENT TESTING	1	2021	3	2021
MOBILE POWER EQUIPMENT - IPMS ESU: MS C	4	2021	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
2929: *Testing Measuring Diag Equip & SE*	10.197	0.588	0.647	0.572	-	0.572	0.626	0.638	0.652	0.664	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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Automatic Test Systems (ATS)	0.588	0.647	0.572	0.000	0.572
Articles:	-	-	-	-	-
FY 2019 Plans: -Complete development of new advanced technology concepts for automatic test and integrate the radio frequency subsystems and components into fielded automatic test solutions to support weapon systems.					
FY 2020 Base Plans: -Initiate 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 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: -The $75K decrease from FY19 to FY20 reflects completion of the radio frequency subsystem prototype integration into a General Purpose Automatic Test Systems (GPATS) and its subsequent testing.					
Accomplishments/Planned Programs Subtotals	0.588	0.647	0.572	0.000	0.572

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• PMC/4181: *Automatic Test Systems (ATS)*	25.163	9.958	9.046	-	9.046	4.979	5.075	5.283	5.389	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost

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.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ATS Tech Eval & HW Digital Test	WR	MCLC Albany : Albany, GA	0.776	0.588	Feb 2018	0.647	Feb 2019	0.572	Feb 2020	-		0.572	Continuing	Continuing	Continuing
Prior Years Cumulative Funding	Various	N/A : N/A	5.443	0.000		0.000		0.000		-		0.000	0.000	5.443	-
		Subtotal	6.219	0.588		0.647		0.572		-		0.572	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Years Cumulative Funding	Various	N/A : N/A	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 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	10.197	0.588		0.647		0.572		-		0.572	Continuing	Continuing	N/A

Remarks

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

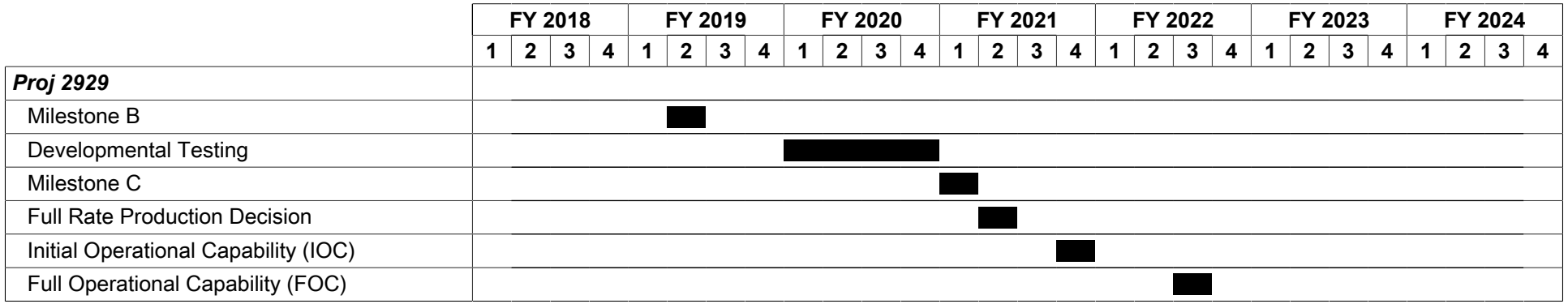

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 2929 / *Testing Measuring Diag Equip & SE*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2929				
Milestone B	2	2019	2	2019
Developmental Testing	1	2020	4	2020
Milestone C	1	2021	1	2021
Full Rate Production Decision	2	2021	2	2021
Initial Operational Capability (IOC)	4	2021	4	2021
Full Operational Capability (FOC)	3	2022	3	2022

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
3776: *Combat Track Vehicles Mod*	0.000	0.000	14.601	25.222	-	25.222	5.215	4.861	4.062	4.143	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Beginning in FY19, funds supporting both M1A1 and IRV (M88A2) Modifications were realigned to project 3776, Combat Track Vehicles Mod. M1A1 previously resided in Project 2316, Combat Service Support Eng Equip. IRV (M88A2) Modifications funding previously resided in Project 2509, Motor Transport Mod. Realignment of efforts to new projects in FY19 and beyond reflects USMC Program Management Office (PMO) reorganization to improve support of USMC OPFOR.

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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: M1A1 Modifications	0.000	14.242	24.855	0.000	24.855
Articles:	-	-	-	-	-
FY 2019 Plans: - Continue supporting modifications to include the Firepower Enhancement Program (FEP)improvements, integration solutions and test items for Tactical Comm Modernization, components for the Ammunition Data Link (ADL) Increment II in order to support the ability to utilize next generation munitions to their full capability across the M1A1 fleet, and Non-Recurring Engineering (NRE) on the Active Protective System (APS) Technology Demonstrator to complete redesign and development of the system for operational suitability on the Tanks.					
FY 2020 Base Plans: - Initiate 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) technology being developed by the U.S. Army.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Initiate operational testing and product improvement of the APS. - Continue to support modifications to include FEP, integration solutions and test items for Tactical Comm Modernization, components for the ADL II in order to support the ability to utilize next generation munitions to their full capability across the M1A1 fleet. Continue non-recurring engineering of the Active Protective System (APS) Technology Demonstrator to complete redesign and development of the system for operational suitability on the Tanks. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The $10.613 increase in FY20 supports the evaluation and integration of active and passive Survivability Layered Systems (i.e. signature management, crew situational awareness, and pre-shot systems) with the ongoing Active Protection System effort started in FY17.					
Title: IRV (M88A2) Modifications	0.000	0.359	0.367	0.000	0.367
Articles:	-	-	-	-	-
FY 2019 Plans: - Continue the development of modifications for the M88A2, such as Arctic Mobility and 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. ***FY 2020 Base Plans:*** - Purchase arctic mobility test articles to address the needed mobility improvements of the M88A2 in arctic conditions. - Continue 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 the Automatic Fire Extinguishing System (AFES) fire alarm and sensor improvements ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
No significant increase from FY19 to FY20.					
Accomplishments/Planned Programs Subtotals	0.000	14.601	25.222	0.000	25.222

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• PMC/2061: *M1A1 Modification Kit*	19.778	22.904	22.760	-	22.760	37.635	45.271	56.646	57.782	0.000	980.108
• PMC/7000: *M1A1 Modification Kit*	0.362	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	30.079
• RDTE/0206624M/2316: *M1A1 Modification Kit*	14.228	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	16.562
• RDTEN/0206624M/2509: *M88A2 HERCULES Mod*	0.352	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.673

Remarks

D. Acquisition Strategy

(U) The M1A1 modification kits program will leverage Army initiatives to the maximum extent possible in order to incorporate modifications to adapt Army solutions to the USMC environment. The USMC will research, develop, and evaluate programs to improve the survivability, lethality, command and control, and mobility of the USMC tank. These efforts include ADL II, Advance Gunnery Target System (AGTS), Track Width Mine Plow (TWMP), Active Protection System (APS), and Tactical Comm Modernization. The USMC will refine the Active Protection System (APS) technology demonstrator's design in FY18 and FY19 in preparation for live fire testing and evaluation conducted along with the Army in FY20. Procurement of APS systems and supporting counter-measures is planned in FY21 to FY23. Survivability layered systems (active and passive) will focus on the integration and testing of new sub-systems as well as the incorporation of BMS technology being developed by the Army to be used with the APS system starting in FY20. Testing and integration of the Tactical Comm Modernization will occur FY18-19, with procurement commencing late FY19.

The IRV program leverages Army developmental projects to create a system that more readily meets Marine Corps Heavy Recovery Vehicle requirements. Improvements include modifications addressing safety that include artic mobility and exhaust redesign, reliability, and technology upgrades.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
M1A1 Mod - APS B-Kit	C/FFP	TACOM : Warren, MI	0.000	0.000		3.191	Jan 2019	0.457	Jan 2020	-		0.457	0.000	3.648	-
M1A1 Mod - APS A-Kit	C/CPFF	TACOM : Warren, MI	0.000	0.000		3.500	Jan 2019	2.521	Jan 2020	-		2.521	Continuing	Continuing	Continuing
M1A1 Mod - APS / IMOD	MIPR	TACOM : Warren, MI	0.000	0.000		3.100	Feb 2019	1.000	Mar 2020	-		1.000	Continuing	Continuing	Continuing
M1A1 Mod - APS Eng Spt	C/CPFF	TACOM : Warren, MI	0.000	0.000		1.100	Mar 2019	0.000		-		0.000	Continuing	Continuing	Continuing
M1A1 Mod - Electro-Optinc Spt	MIPR	NVESD : Ft. Belvoir, VA	0.000	0.000		0.265	Nov 2018	0.270	Nov 2019	-		0.270	Continuing	Continuing	Continuing
M1A1 Mod - TCM	WR	SSC-LANT : Charleston, NC	0.000	0.000		0.125	Jul 2019	0.000		-		0.000	0.000	0.125	-
M1A1 Mod - AGTS	MIPR	PM TRASYS : Orlando, FL	0.000	0.000		0.361	Jul 2019	0.000		-		0.000	0.000	0.361	-
M1A1 Mod - ADL II	MIPR	ARDEC : Picatinny, NJ	0.000	0.000		0.250	Jul 2019	0.627	Dec 2019	-		0.627	0.000	0.877	-
M1A1 Mod - FEP STS	C/FFP	Raytheon : McKinney, TX	0.000	0.000		0.100	Jul 2019	0.690	Dec 2019	-		0.690	0.000	0.790	-
M1A1 Mod - TWMP	C/FFP	MCSC : Quantico, VA	0.000	0.000		0.050	Jul 2019	1.000	Feb 2020	-		1.000	0.000	1.050	-
M1A1 Mod - MAPS	MIPR	TACOM : Warren, MI	0.000	0.000		0.000		0.925	Mar 2020	-		0.925	0.000	0.925	-
M88A2 HERCULES	MIPR	TACOM : Warren, MI	0.000	0.000		0.359	Mar 2019	0.367	Mar 2020	-		0.367	0.000	0.726	-
		Subtotal	0.000	0.000		12.401		7.857		-		7.857	Continuing	Continuing	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.
M1A1 Mod - BMS (Battle Management System) development of BMS integrates MAPS alerts and enables coordinated distribution to other tank battalion units
M1A1 Mod - Survivability Layered Systems includes integration and test of active and passive sub systems (signature management, crew situational awareness, and pre-shot systems).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
M1A1 Mod - Survivability Layered Systems	MIPR	TARDEC : Warren, MI	0.000	0.000		0.000		9.575	Mar 2020	-		9.575	0.000	9.575	-
M1A1 Mod - BMS	MIPR	TACOM : Warren, MI	0.000	0.000		0.000		5.390	Feb 2020	-		5.390	0.000	5.390	-
M1A1 Mod - APS Test Spt	MIPR	TACOM : Warren, MI	0.000	0.000		2.200	Jan 2019	2.400	Jan 2020	-		2.400	0.000	4.600	-
		Subtotal	0.000	0.000		2.200		17.365		-		17.365	0.000	19.565	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		14.601		25.222		-		25.222	Continuing	Continuing	N/A

Remarks

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

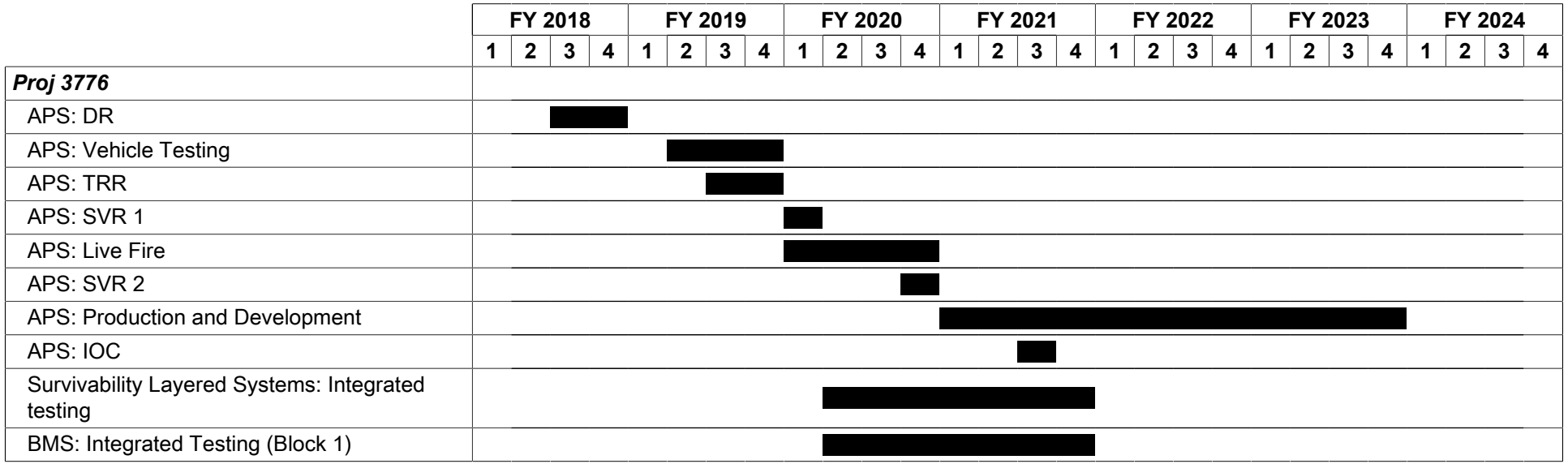

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 3776 / *Combat Track Vehicles Mod*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3776				
APS: DR	3	2018	4	2018
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
APS: Production and Development	1	2021	4	2023
APS: IOC	3	2021	3	2021
Survivability Layered Systems: Integrated testing	2	2020	4	2021
BMS: Integrated Testing (Block 1)	2	2020	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206624M / *Marine Corps Cmbt Services Supt*	Project (Number/Name) 9C90 / *MTVR Mod*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
9C90: *MTVR Mod*	49.122	1.272	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	50.394
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

In FY19, MTVR funding has been realigned from project 9C90, MTVR Mod to project 2509, Motor Transport Mod. Realignment of efforts to new projects in FY 19 and beyond reflects USMC Program Management Office (PMO) reorganization to improve support of USMC OPFOR.

A. Mission Description and Budget Item Justification

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 it allows the program office to develop and implement improvements as required to respond to the evolving needs of the Marine Corps. For example, the Technology Demonstrator effort will continue to explore and develop strategies and products to extend the life of the MTVR to 2042 from its original date of 2024. The MTVR Technology Demonstrator provides the opportunity to integrate critical upgrades which could potentially 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.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Product Development	0.105	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: FY19 decrease is due to the realignment from project 9C90, MTVR Mod to project 2509, Motor Transport Mod.					
FY 2020 Base Plans: N/A					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: N/A					
Title: Support	0.197	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 9C90 / *MTVR Mod*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 Plans: FY19 decrease is due to the realignment from project 9C90, MTVR Mod to project 2509, Motor Transport Mod. ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A					
Title: Test and Evaluation	0.970	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: FY19 decrease is due to the realignment from project 9C90, MTVR Mod to project 2509, Motor Transport Mod. ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A					
Accomplishments/Planned Programs Subtotals	1.272	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• PMC/5050: *MTVR Motor Transport Mods*	7.477	25.148	14.501	-	14.501	8.362	8.514	8.699	8.873	Continuing	Continuing
• RDTE/0206624M/2509: *MTVR*	0.000	3.672	3.949	-	3.949	0.106	0.105	0.117	0.120	Continuing	Continuing

Remarks

PMC BLI 5050 Motor Transport Modifications funds multiple programs/projects; only the funding associated with MTVR has been provided as Other APPN/LI 5050.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 9C90 / *MTVR Mod*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
RDTE 0206624M MTVR funding profile is realigned in this Program Element from Proj 9C90 to Proj 2509 for FY19 and future fiscal years.											

D. Acquisition Strategy

The strategy for the MTVR Technology Demonstrator initiative is to aid in the prevention of parts obsolescence, address safety concerns, and respond to emergent threats. A proactive and focused approach ensures proper vehicle sustainment and life-cycle management and allows the program office the flexibility to develop and implement improvements as required to respond to evolving needs.

The strategy for the MTVR Fuel Efficiency (FE) initiative is to complete installation on the 4,300 armored MTVRs.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206624M / *Marine Corps Cmbt Services Supt*	Project (Number/Name) 9C90 / *MTVR Mod*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ECP Development	WR	NRL : Washington DC	0.148	0.105	Feb 2018	0.000		0.000		-		0.000	0.000	0.253	-
Prior Years Cumulative Funding	Various	Various : Various	23.205	0.000		0.000		0.000		-		0.000	0.000	23.205	-
		Subtotal	23.353	0.105		0.000		0.000		-		0.000	0.000	23.458	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Energy Initiative	WR	NSWC : Panama City, FL	1.008	0.197	Dec 2017	0.000		0.000		-		0.000	0.000	1.205	-
Prior Years Cumulative Funding	Various	Various : Various	11.157	0.000		0.000		0.000		-		0.000	0.000	11.157	-
		Subtotal	12.165	0.197		0.000		0.000		-		0.000	0.000	12.362	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Energy Initiative Testing	WR	Aberdeen Proving Ground : Aberdeen, MD	0.438	0.760	Jan 2018	0.000		0.000		-		0.000	0.000	1.198	-
Prior Years Cumulative Funding	Various	Various : Various	13.016	0.000		0.000		0.000		-		0.000	0.000	13.016	-
Energy Efficiency Initiative Development	C/FFP	Penn State University State College, PA : State College, PA	0.150	0.210	Jan 2018	0.000		0.000		-		0.000	0.000	0.360	-
		Subtotal	13.604	0.970		0.000		0.000		-		0.000	0.000	14.574	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206624M / *Marine Corps Cmbt Services Supt*	Project (Number/Name) 9C90 / *MTVR Mod*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	49.122	1.272		0.000		0.000		-		0.000	0.000	50.394	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 9C90 / *MTVR Mod*

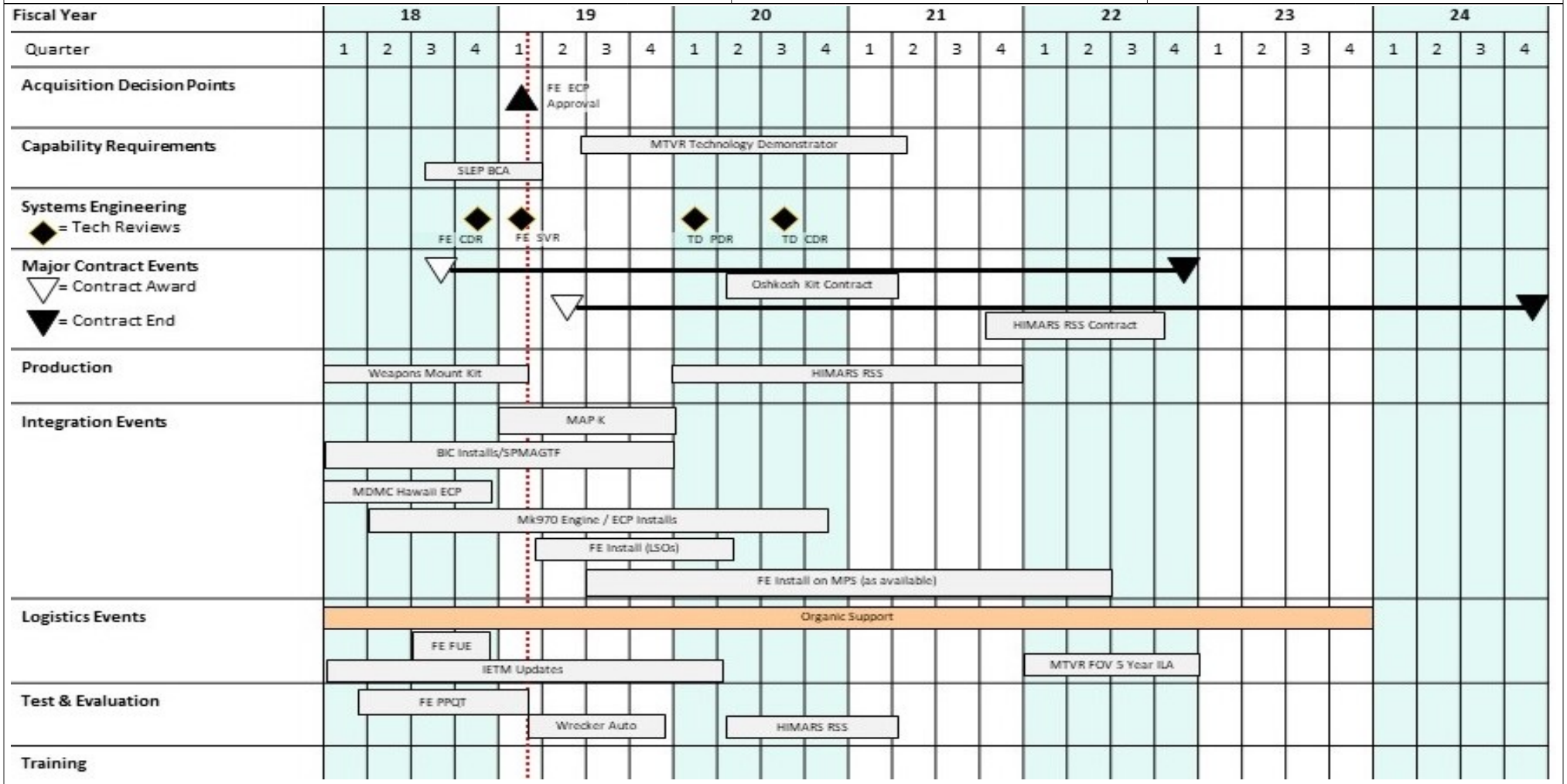

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0206624M / *Marine Corps Cmbt Services Supt*	**Project (Number/Name)** 9C90 / *MTVR Mod*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9C90				
Fuel Efficient Modifications	3	2018	4	2019
Safety Mod Development	1	2018	4	2019
ECP Development	1	2018	4	2019
FE FUE	3	2018	4	2018