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

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	756.927	49.264	54.871	108.235	-	108.235	-	-	-	-	-	-
1555: <i>Lt Armored Vehicle Prog</i>	138.240	1.193	1.256	0.750	-	0.750	-	-	-	-	-	-
1901: <i>MC Grnd Wpnry Prod Improvement</i>	54.354	7.314	9.860	7.685	-	7.685	-	-	-	-	-	-
2086: <i>Soldier/Marine Enhancement</i>	39.182	2.441	1.642	1.939	-	1.939	-	-	-	-	-	-
2112: <i>Lightweight 155mm Howitzer</i>	6.700	0.003	0.000	1.973	-	1.973	-	-	-	-	-	-
2237: <i>Amphibious Vehicle Test</i>	14.887	2.711	2.884	2.907	-	2.907	-	-	-	-	-	-
2315: <i>Training Devices/ Simulators</i>	168.872	12.616	12.880	51.404	-	51.404	-	-	-	-	-	-
2503: <i>Initial Issue</i>	58.288	5.102	4.917	10.251	-	10.251	-	-	-	-	-	-
2513: <i>Body Armor</i>	60.161	4.587	4.693	3.444	-	3.444	-	-	-	-	-	-
2928: <i>Exp Indirect Fire Gen Supt Wpn Sys</i>	47.807	1.203	0.491	0.497	-	0.497	-	-	-	-	-	-
3098: <i>Fire Support System</i>	157.707	7.016	9.697	3.061	-	3.061	-	-	-	-	-	-
3774: <i>Marine Corps Ammo</i>	1.273	1.431	1.305	10.123	-	10.123	-	-	-	-	-	-
3775: <i>Family of Internally Transportable Vehicles (FITV)</i>	0.550	2.096	2.182	0.230	-	0.230	-	-	-	-	-	-
4002: <i>Family of Raid Reconnaissance</i>	8.906	1.551	3.064	13.971	-	13.971	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This PE provides modification to Marine Corps Expeditionary Ground Force Weapon Systems to increase lethality, range, survivability and operational effectiveness. In addition, the PE provides for product improvements to the family of LAVs. The Amphibious Vehicle Test Branch (AVTB) provides facilities and personnel which perform a broad range of testing, repair and technical services to amphibious vehicles. This program is funded under Operational Systems Development Program Element (PE) because it encompasses engineering and manufacturing and manufacturing development for upgrades of existing systems.

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy	Date: May 2021
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Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys
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B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	51.788	61.381	87.020	-	87.020
Current President's Budget	49.264	54.871	108.235	-	108.235
Total Adjustments	-2.524	-6.510	21.215	-	21.215
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-6.510			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.538	0.000			
• SBIR/STTR Transfer	-1.986	0.000			
• Program Adjustments	0.000	0.000	28.795	-	28.795
• Rate/Misc Adjustments	0.000	0.000	-7.580	-	-7.580

Change Summary Explanation

The net increase of \$53.364M from FY 2021 and FY 2022 is primarily due to the following major program adjustment within the PE:

- 1) Training Devices/Simulators increase of \$38.524M primarily supports the integration of constituent programs into the Live, Virtual, Constructive (LVC) Training Environment, creating a common operational environment by which units can interact across LVC domains as though they are physically located in the same operational space.
- 2) Family of Raid Reconnaissance increase of \$10.907M is primarily due to initiation of developmental efforts for a Medium variant of Unmanned Logistics System-Air (ULS-A) and final test and evaluation efforts for Tactical Resupply Unmanned Aircraft System (TRUAS) prior to rapid fielding efforts.
- 3) Marine Corps Ammo increase of \$8.818M supports R&D of the Mk22 Mod 4 (J143) Rocket Motor and support Joint Service information technology prototyping efforts to enhance accountability of all ground conventional ammunition and auditability the Marine Corps automated ammunition information system.

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 1555 / Lt Armored Vehicle Prog
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
1555: Lt Armored Vehicle Prog	138.240	1.193	1.256	0.750	-	0.750	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Family of Light Armored Vehicles (FOLAV) consists of six fielded Light Armored Vehicle (LAV) configurations and one communications/intelligence-configured asset on an LAV chassis. The FOLAV provides a logistically self-contained, highly mobile, and lethal combined arms combat system to the Marine Air Ground Task Force (MAGTF). The LAV Product Improvement Program (PIP) funds modification and sustainment activities and the development and testing of modifications. These programs will ensure that the FOLAV is capable of conducting its assigned missions by enhancing lethality, survivability, reliability, availability, and maintainability in addition to reducing operations and support costs.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: LAV MODIFICATIONS	1.193	1.256	0.750	0.000	0.750
Articles:	-	-	-	-	-
FY 2021 Plans: -Initiating and completing the integration of the Tactical Communication Modernization (TCM) onto the Family of Light Armored Vehicles (FOLAV). This integration applies to the LAV-M, LAV-25, LAV-L, LAV-AT, and LAV-R variants. -Initiating and complete conducting developmental test, logistics development, and validation & verification of the new TCM system for the FOLAV prior to fielding. These actions apply to the LAV-M, LAV-25, LAV-L, LAV-AT, and LAV-R variants.					
FY 2022 Base Plans: -Conduct ongoing LAV MOD product and Integrated Logistics Support (ILS) data development.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Decrease of \$0.506M from FY 2021 to FY 2022 is due to the completion of the TCM integration.					
Accomplishments/Planned Programs Subtotals	1.193	1.256	0.750	0.000	0.750

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 1555 / Lt Armored Vehicle Prog

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

Line Item	FY 2020	FY 2021	FY 2022	FY 2022	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Cost To	
			Base	OCO	Total					Complete	Total Cost
• PMC/2038: LAV PIP	60.734	37.403	23.476	-	23.476	-	-	-	-	-	-
• PMC/7000: LAV Spares	5.883	0.000	0.000	-	0.000	-	-	-	-	-	-

Remarks

PMC/7000 Spares decreased from \$5.883M in FY20 to \$0M in FY21 due to the cancellation of the LAV Reset Program.

D. Acquisition Strategy

The LAV Modification & Sustainment Program funds important vehicle modifications, support equipment and tools, and other projects that increase LAV reliability and readiness while simultaneously reducing operations and support costs. The LAV Modification and Sustainment Team is a multi-disciplinary integrated project team that employs subject matter experts in engineering, logistics, contracting and financial management to manage modification projects.

UNCLASSIFIED

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 1555 / Lt Armored Vehicle Prog
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development (MOD)	MIPR	NIWC : Charleston, SC	0.000	0.750	Aug 2020	0.800	Dec 2020	0.385	Dec 2021	-		0.385	-	-	-
ILS Data Development (MOD)	MIPR	NIWC : Charleston, SC	0.000	0.157	Jan 2020	0.200	Dec 2020	0.100	Dec 2021	-		0.100	-	-	-
Proj 1555: Prior Years Cumulative Funding	Various	Various : Various	101.963	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			101.963	0.907		1.000		0.485		-		0.485	-	-	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Mgmt (MOD)	MIPR	TACOM : Warren, MI	0.000	0.286	Oct 2019	0.256	Oct 2020	0.265	Oct 2021	-		0.265	-	-	-
Proj 1555: Prior Years Cumulative Funding	Various	Various : Various	25.854	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			25.854	0.286		0.256		0.265		-		0.265	-	-	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Dev/Oper T&E (Reset)	MIPR	RTC : AL	3.147	0.000		0.000		0.000		-		0.000	-	-	-
Proj 1555: Prior Years Cumulative Funding	Various	Various : Various	6.105	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			9.252	0.000		0.000		0.000		-		0.000	-	-	N/A

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 1555 / Lt Armored Vehicle Prog
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	FY 2020				FY 2021				FY 2022				
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
Proj 1555													
LAV MOD					TCM Integration								
	Product/ILS Data Development												

2022PB - 0206623M - 1555

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 1555 / Lt Armored Vehicle Prog

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 1555				
LAV MOD: TCM Integration	1	2021	4	2021
LAV MOD: LAV MOD Product/ILS Data Development	1	2020	4	2022

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys				Project (Number/Name) 1901 / MC Grnd Wpnry Prod Improvement			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
1901: MC Grnd Wpnry Prod Improvement	54.354	7.314	9.860	7.685	-	7.685	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project develops joint and Marine Corps unique improvements to infantry weapons technology, non-lethal systems technology, improvements for Night Vision Equipment, Rifle Combat Optics, Family of Individual Optics, and monitors national and international weapons developments.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Company and Battalion Mortars	0.100	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2021 Plans: N/A					
FY 2022 Base Plans: N/A					
FY 2022 OCO Plans: N/A					
Title: Gunners Protection Kit	1.448	0.200	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: Gunners Protection Kit (GPK). Prior to FY 2020, GPK was funded within the Family of Infantry Weapons (FIWS). The TOGPK 2.0 is the planned upgrade and replacement for the Tube-Launched, Optically-Tracked, Wire-Guided Gunner Protection Kit (TGPK), currently in use with TOW High Mobility Multipurpose Wheeled Vehicle variants. TOGPK 2.0 affords the TOW gunner protection from small arms fire and Improvised Explosive Device fragmentation. TOGPK 2.0 addresses user concerns regarding limited workspace and TOW slew as well as improved visibility. The Reducible Height Gunners Protection Kit (RHGPK) enables Joint Light Tactical Vehicles (JLTV), Medium/Heavy Tactical Vehicle Replacement (MTVR) and Logistics Vehicle System Replacement (LVSR) to be transported in the lower vehicle stowage areas of Landing Platform/Dock (LPD 17) and Landing Helicopter Dock class ships.					
FY 2021 Plans:					

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 1901 / MC Grnd Wpnry Prod Improvement

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
- Complete RHGPK Developmental Testing (DT) FY 2022 Base Plans: N/A FY 2022 OCO Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: The decrease of \$0.200K from FY21 to FY22 is due to the completion of developmental testing of the RHGPK.					
Title: Combat Optics Description: Combat Optics is a program that provides for research and development, as well as ammunition to support testing and assessment of optical systems and implementation of modifications for these systems as well as life-cycle management efforts. The research and development of future capabilities include, but are not limited to variable power day optics and fused/multi-spectral (e.g., combined image intensifier, thermal imaging, and short wave infrared) optical and laser systems. The Integrated Clip-on Advanced Targeting System (ICATS) is an Other Transaction Authority (OTA) development effort to which will mature dual band imager technology and integrate a dual band weapon sight prototype capable of sensing in Near Infrared/Short Wave Infrared/Mid Wave Infrared (NIR/SWIR/MWIR) to enable target engagement out to 1,500 meters. The ICATS provides weapon/no weapon identification, battlefield illuminator see-spot capability, through-window targeting, and the ability to identify man-made camouflage materials to increase lethality and survivability of the Marine. FY 2021 Plans: - Completed initial design of the Integrated Clip-On Advanced Targeting System (ICATS) and began building prototypes. - Continued modernization of the Electro Optical Support Facility (EOSF) to support testing and assessment of optical systems and implementation of modifications for these systems, as well as, life cycle management efforts. - Performed system test, surveillance troubleshooting, maintenance and maintenance management, and supply chain management at the EOSF. FY 2022 Base Plans:	3.898	3.750	3.493	0.000	3.493
Articles:	-	-	-	-	-

UNCLASSIFIED

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Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 1901 / MC Grnd Wpnry Prod Improvement

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>- Continue Integrated Clip-on Advanced Targeting System (ICATS) development efforts to receive, demonstrate, and evaluate initial dual band weapon sight prototypes and increase the prototype maturity to withstand weapon shock.</p> <p>- Continue modernization of the Electro Optical Support Facility (EOSF) to support source selection evaluations, characterization of emerging optical technologies, and life cycle management efforts to include specialized equipment to accurately and properly characterize/assess ICATS.</p> <p>- Perform system test, surveillance troubleshooting, maintenance and maintenance management, and supply chain management at the EOSF.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: The decrease of \$0.257M is due to reduced requirement for EOSF Modernization in FY 2022.</p>					
<p>Title: Family of Infantry Weapons Systems (FIWS)</p> <p align="right">Articles:</p> <p>Description: Family of Infantry Weapons Systems (FIWS) is a program that provides for continuous monitoring, research and development, assessment of and implementation of Joint Service and USMC unique system modifications, as well as new acquisition efforts. Efforts such as: sustain weapon capability, enhance Gunner Protection Kits (GPK), and improve the performance, maintainability, supportability, service life, ergonomics, and safety enhancements of Infantry Weapons Systems.</p> <p>FY 2021 Plans:</p> <p>- Initiated the procurement of Next Generation Squad Weapon (NGSW) Fire Control test articles and the completion of Developmental Testing (includes ammunition) to evaluate requirements unique to the Marine Corps' expeditionary and amphibious mission in maritime environments. Provided USMC participation in NGSW Developmental Testing events.</p> <p>- Continue product development for the improvement of Small Arms Weapon Systems, which includes, but is not limited to, Suppressors, Sniper and Special Purpose systems, and their ancillary support equipment in order to meet established or emerging requirements. These efforts included Suppressor Condemnation Testing, Suppressor Cleaner Testing, M460A6 High Angle Fire Testing, and Recon Weapon Kit (RWK) Safety Testing. These product development efforts will be accomplished primarily through the Small Arms Weapon Systems Division of the Naval Surface Warfare Center (NSWC), Crane.</p>	1.868	5.910	4.192	0.000	4.192
	-	-	-	-	-

UNCLASSIFIED

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Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 1901 / MC Grnd Wpnry Prod Improvement

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<ul style="list-style-type: none"> - Conducted Performance evaluation of various types of ammunition currently under development. - Continued smalls arms engineering and testing, including Product Improvement testing. - Procured Ammo for testing ASR. <p>FY 2022 Base Plans:</p> <ul style="list-style-type: none"> - Initiate the procurement of Next Generation Squad Weapon (NGSW) Rifle and ammunition test articles for USMC participation in the Army' Operational Test and Evaluation plan. - Begin NGSW Operational Testing (includes ammunition) to evaluate requirements unique to the Marine Corps' expeditionary and amphibious mission in maritime environments. Fund USMC in the Army's planned OT events. - Continue product development for the improvement of Small Arms Weapon Systems including Suppressors, Sniper and Special Purpose systems, and their ancillary support equipment to meet established or emerging requirements. - Product Improvement Program (PIP) testing and evaluation for multiple requirements as required. - Performance evaluation of various types of ammunition currently under development. - Continue small arms engineering and testing. <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease of \$1.718M from FY 2021 to FY 2022 is based on reduced Marine Corps participation in the Army's test plan.</p>					
Accomplishments/Planned Programs Subtotals	7.314	9.860	7.685	0.000	7.685

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• PMC/2220-01: Family of Infantry Weapons Systems	21.687	8.075	12.738	-	12.738	-	-	-	-	-	-
• PMC/2220-02: Company and Battalion Mortars	3.053	3.474	3.543	-	3.543	-	-	-	-	-	-
• PMC/4620-01: Combat Optics	68.422	50.492	51.412	-	51.412	-	-	-	-	-	-
• PMC/2220-04: Gunners Protection Kit	6.666	11.949	18.187	-	18.187	-	-	-	-	-	-

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 1901 / MC Grnd Wpnry Prod Improvement

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

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

D. Acquisition Strategy

These programs range from off-the-shelf modifications to developmental items for safety, reliability, and technology upgrades to meet Marine Corps requirements.

Family of Infantry Weapons Systems (FIWS):

The FIWS program strategy is to explore, research and recommend efforts to address and identify solutions to performance, reliability and safety design issues through various means, including commercial off-the-shelf (COTS) components. This includes efforts to improve Individual and Crew Served Weapon Systems, evaluation of various types of ammunition under development, and testing of Product Improvement Programs in order to meet various emergent requirements.

Combat Optics:

Combat Optics acquisition, management and contracting strategies support the research, development, modification and improvement of optics, night vision and laser systems such as magnified day optics, thermal imagers, image intensifying (I2) systems, lasers, and illuminators. The Integrated Clip-on Advanced Targeting System (ICATS) is an Other Transaction Authority (OTA) development effort.

Company and Battalion Mortars:

Acquisition, management, and contracting strategies support multiservice and USMC unique system modifications and improvements for the lightweight company and battalion mortars and mortar fire control systems to provide immediate indirect fires in support of mounted and dismounted forces to the company and battalion level.

Gunners Protection Kit (GPK):

Acquisition, management, and contracting strategies to support a USMC unique system requirement for the Reducible Height Gunners Protection Kit (RHGPK) in support of loading and unloading vehicles aboard amphibious carriers. The RHGPK enables Joint Light Tactical Vehicles (JLTV), Medium/Heavy Tactical Vehicle Replacement (MTVR) and Logistics Vehicle System Replacement (LVSR) to be transported in the lower vehicle stowage areas of Landing Platform/Dock (LPD 17) and Landing Helicopter Dock class ships.

UNCLASSIFIED

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 1901 / MC Grnd Wpnry Prod Improvement
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Company and Battalion Mortars: MFCA Development	MIPR	Picatinny Arsenal : Picatinny, NJ	2.203	0.100	May 2020	0.000		0.000		-		0.000	-	-	-
Gunners Protection Kit: RHGPK	MIPR	DLA : Philadelphia, PA	0.000	0.156	Sep 2020	0.000		0.000		-		0.000	-	-	-
Gunners Protection Kit: RHGPK	MIPR	Picatinny Arsenal : Picatinny, NJ	0.000	0.315	Mar 2020	0.000		0.000		-		0.000	-	-	-
Combat Optics: ICATS	C/CPFF	MCSC : Quantico, VA	0.000	2.053	Jul 2020	1.801	Dec 2020	2.625	Nov 2021	-		2.625	-	-	-
FIWS - NGSW	MIPR	ARDEC : Picatinny, NJ	1.827	0.670	Apr 2020	2.961	Mar 2021	0.000	Jan 2022	-		0.000	-	-	-
FIWS	WR	NSWC : Crane, IN	0.502	0.000	Mar 2020	0.959	Jan 2021	0.896	Jan 2022	-		0.896	-	-	-
FIWS	MIPR	DLA : Richmond, VA	0.000	0.108	Jul 2020	0.000		0.000		-		0.000	-	-	-
FIWS	Reqn	MCSC : Quantico, VA	0.000	0.000		0.015	Jul 2021	0.014	May 2022	-		0.014	-	-	-
FIWS	Various	Travel/GCPC : Quantico, VA	0.000	0.000		0.508	Jan 2021	0.474	Jan 2022	-		0.474	-	-	-
Proj 1901: Prior Years Cum Funding (Product Dev)	Various	Various : Various	13.851	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			18.383	3.402		6.244		4.009		-		4.009	-	-	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Combat Optics: Technical Engineering	WR	NSWC, Dahlgren : Dahlgren, VA	0.000	0.265	Jan 2020	0.120	Apr 2021	0.265	Jan 2022	-		0.265	-	-	-
Combat Optics: Technical Engineering	WR	NSWC, Crane : Crane, IN	1.569	0.398	Jan 2020	0.245	Jan 2021	0.553	Jan 2022	-		0.553	-	-	-
Family of Infantry Weapons Systems	Various	Travel/GCPC : Quantico, VA	0.759	0.153	Jan 2020	0.036	Jan 2021	0.034	Jan 2022	-		0.034	-	-	-

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 1901 / MC Grnd Wpnry Prod Improvement
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Proj 1901: Prior Years Cum Funding (Support)	Various	Various : Various	14.137	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			16.465	0.816		0.401		0.852		-		0.852	-	-	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Gunners Protection Kit: RHGPK	MIPR	Aberdeen Testing Center : Aberdeen, MD	0.000	0.785	Jun 2020	0.200	Mar 2021	0.000		-		0.000	-	-	-
Combat Optics	Various	Various : Various	0.699	0.729	Dec 2019	0.796	May 2021	0.000	Mar 2022	-		0.000	-	-	-
Combat Optics: EOSF Modernization	MIPR	DLA : Philadelphia, PA	0.000	0.261	Jun 2020	0.590	Jan 2021	0.050	Jan 2022	-		0.050	-	-	-
Combat Optics	MIPR	NSWC Crane : Crane, IN	0.000	0.000		0.198	Apr 2021	0.000		-		0.000	-	-	-
FIWS - NGSW	MIPR	ARDEC : Picatinny, NJ	0.000	0.000		0.000		1.453	Jan 2022	-		1.453	-	-	-
FIWS	WR	NSWC Crane : Crane, IN	1.871	0.630	Jan 2020	0.734	Dec 2020	0.670	Dec 2021	-		0.670	-	-	-
FIWS	MIPR	DLA : Philadelphia, PA	0.000	0.050	Apr 2020	0.024	Mar 2021	0.022	Mar 2022	-		0.022	-	-	-
FIWS	C/FFP	MCSC : Quantico, VA	0.000	0.025	Dec 2020	0.021	Jan 2021	0.020	Jan 2022	-		0.020	-	-	-
FIWS	C/FFP	DTIC : Ft. Belvoir, VA	0.000	0.049	Sep 2020	0.235	Apr 2021	0.219	Apr 2022	-		0.219	-	-	-
FIWS	WR	NSWC Indian Head : Indian Head, MD	0.000	0.000		0.308	Feb 2021	0.288	Feb 2022	-		0.288	-	-	-
FIWS	MIPR	Aberdeen Testing Center : Aberdeen, MD	0.000	0.015	Dec 2020	0.000		0.000		-		0.000	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy												Date: May 2021				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
1319 / 7				PE 0206623M / MC Ground Cmbt Spt Arms Sys				1901 / MC Grnd Wpnry Prod Improvement Sys								
Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
FIWS	WR	NSWC Corona : Corona, CA	0.000	0.016	Nov 2020	0.000		0.000		-		0.000	-	-	-	
Proj 1901: Prior Years Cum Funding (T&E Eval)	Various	Various : Various	14.281	0.000		0.000		0.000		-		0.000	-	-	-	
Subtotal			16.851	2.560		3.106		2.722		-		2.722	-	-	N/A	
Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Gunners Protection Kit: RHGPK	C/FFP	MCSC : Quantico, VA	0.000	0.192	Feb 2020	0.000		0.000		-		0.000	-	-	-	
Combat Optics: PM Support	C/FFP	MCSC : Quantico, VA	0.192	0.192	Mar 2020	0.000		0.000		-		0.000	-	-	-	
FIWS	C/FFP	MCSC : Quantico, VA	1.231	0.152	Mar 2020	0.109	Mar 2021	0.102	Mar 2022	-		0.102	-	-	-	
Proj 1901: Prior Years Cum Funding (Mgmt Services)	Various	Various : Various	1.232	0.000		0.000		0.000		-		0.000	-	-	-	
Subtotal			2.655	0.536		0.109		0.102		-		0.102	-	-	N/A	
Project Cost Totals			54.354	7.314		9.860		7.685		-		7.685	-	-	N/A	
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 1901 / MC Grnd Wpny Prod Improvement
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Integrated Clip-on Advanced Targeting System (ICATS) - Combat Optics	FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
ICATS Initial Prototype Development												
ICATS Prototype Demonstrations												

2022PB - 0206623M - 1901

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 1901 / MC Grnd Wpnry Prod Improvement

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Integrated Clip-on Advanced Targeting System (ICATS) - Combat Optics</i>				
ICATS Initial Prototype Development: Schedule Detail	4	2020	2	2022
ICATS Prototype Demonstrations: Schedule Detail	1	2022	2	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys				Project (Number/Name) 2086 / Soldier/Marine Enhancement			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
2086: <i>Soldier/Marine Enhancement</i>	39.182	2.441	1.642	1.939	-	1.939	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Marine Expeditionary Rifle Squad (MERS) mission is to manage the infantry squad, "squad as a system", by conducting integration, systems engineering, human factors, and modernization efforts across all the products that are worn, carried, and consumed by the rifle squad. The Marine Corps' Force Design reorganizes personnel and equipment across all infantry battalions injecting new capabilities in order to combat a near peer competitor and includes experimentation with Fleet Marine Force units from 2021 to 2023. Experimentation will require an increased level of effort to influence integration and synergy of capabilities. Physical integration, capability analysis, modeling and simulation, ergonomics, and usability assessments are facilitated by this program in working with the various program managers and project officers in the development of their unique items that contribute to the squads overall capabilities. MERS operates and manages the Gruntworks Squad Integration Facility in order to meet mission requirements to support integration and assessments of equipment. MERS is engaging industry and academia in search of innovative technologies that can meet Force Design infantry capabilities via a Partnership Intermediary Agreement. Weight, volume, and power management are fundamental considerations in the insertion or modernization of any squad equipment. MERS works with Joint and North Atlantic Treaty Organization (NATO) soldier modernization programs to harvest new technologies to increase the capability of the rifle squad. The program also ensures the integration of the rifle squad into the various mobility platforms currently in service and being developed to ensure a Marine and his equipment can operate effectively. The Marine Corps anthropometry survey was delayed in FY 2020 due to COVID and anticipate completion in FY 2022. This program is essential to ensure the combined synergistic equipment effects enhance the war-fighting functions of the Marine rifle squad towards the strategic Marine Corps war fighting vision for the future.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Marine Expeditionary Rifle Squad (MERS)	2.441	1.642	1.939	0.000	1.939
Articles:	-	-	-	-	-
FY 2021 Plans:					
-Continue to support all the Marine Corps Systems Command program offices that provide equipment to the Marine rifle squad or provide mobility platforms that support the squad.					
-Continue to resource improvements and operating costs to support the mission of Gruntworks Squad Integration Facility.					
-Continue to utilize the Gruntworks Squad Integration Facility as an asset to execute innovation and technology searches and projects, R&D integration projects, prototyping, rapid assessment of technologies, and usability trials.					
-Continue investment into Gruntworks Squad Integration Facility enablers and capabilities.					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2086 / Soldier/Marine Enhancement

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>-Continue to conduct human performance trials utilizing MC-LEAP and other data collection methodologies in order to develop mobility metrics.</p> <p>-Continue to conduct usability trials, requirements generation workshops, and limited user evaluations for digital interoperability, handheld devices and applications at the infantry platoon and squad level.</p> <p>-Continue to support integration of body armor and load bearing systems with human factors expertise.</p> <p>-Continue to conduct mobility experiments using the Marine Corps Load Effects Assessment Program and associated Policy Letters and Requirements Documents.</p> <p>-Continue to develop integrated seating solutions for combat equipped Marines for ACV, JLTV and other mobility programs and synchronize seat belt and retention systems among the platforms.</p> <p>-Conduct R&D on squad systems in conjunction with Army, Special Operations Command (SOCOM), and Close Combat Lethality Task Force in order to leverage new technologies and capabilities to the rifle squad to include Integrated Visual Augmentation System and Enhanced Night Vision Goggle Binocular.</p> <p>-Continue to conduct surveys with post deploying infantry battalions on usability and integration of equipment utilized during deployment.</p> <p>-Continue to conduct human performance testing of Marines utilizing current and prototype configurations of infantry rifle squad equipment.</p> <p>-Continue to evaluate and transition technologies from ONR and other S&T activities that enhance capabilities of the squad or provide a desired capability.</p> <p>-Continue to seek weight and volume reduction replacements for current infantry equipment that support integration of components.</p> <p>-Continue to implement capability requirements from MERS Initial Capabilities Document (ICD) and results from Force Design.</p> <p>-Continue to prioritize projects with the Infantry Working Group and utilize the Partnership Intermediary Agreement as a mechanism to pursue innovation and technology.</p> <p>-Coordinate with Marine Corps Warfighting Lab and other stakeholders on execution of Force Design 2030 Infantry Battalion experimentation and support capability injection requirements as feasible.</p> <p>-Initiate an anthropometry survey of the Marine Corps. The data from this study is critical to provide other program offices with the size and fit requirements for all Marines.</p> <p>FY 2022 Base Plans:</p> <p>-Coordinate with Marine Corps Warfighting Lab and other stakeholders on execution of Force Design Infantry Battalion experimentation and support capability injection requirements as feasible.</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2086 / Soldier/Marine Enhancement

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>-Continue to support all the Marine Corps Systems Command program offices that provide equipment to the Marine rifle squad or provide mobility platforms that support the squad.</p> <p>-Conduct operational integration using designated Marines from 2nd Battalion 2nd Marines, 3rd Battalion 6th Marines, and the Jungle Warfare Training Center (JWTC) in order to assess near term and Force Design equipment integration in operational environments.</p> <p>-Continue to utilize the Gruntworks Squad Integration Facility as an asset to execute innovation and technology searches, R&D integration projects, prototyping, human performance trials, rapid assessment of technologies, and usability trials.</p> <p>-Continue investment into Gruntworks Squad Integration Facility enablers and capabilities in order to provide state of the art data collection.</p> <p>-Continue to conduct human performance trials utilizing MC-LEAP and other data collection methodologies in order to develop mobility metrics.</p> <p>-Continue to conduct usability trials, requirements generation workshops, and limited user evaluations for digital interoperability, handheld devices and applications at the infantry platoon and squad level.</p> <p>-Continue to support integration of body armor, load bearing systems, and Integrated Helmet System with human factors and operational expertise.</p> <p>-Continue to develop integrated seating and equipment storage solutions for combat equipped Marines for ACV, JLTV and other mobility programs and synchronize seat belt and retention systems among the platforms.</p> <p>-Conduct R&D on squad systems in conjunction with Army, Special Operations Command (SOCOM), and Close Combat Lethality Task Force in order to leverage new technologies and capabilities to the rifle squad to include Integrated Visual Augmentation System and Enhanced Night Vision Goggle Binocular.</p> <p>-Continue to conduct surveys with post deploying infantry battalions on usability and integration of equipment utilized during deployment.</p> <p>-Continue to conduct human performance testing of Marines utilizing current and prototype configurations of infantry rifle squad equipment.</p> <p>-Continue to evaluate and transition technologies from ONR and other S&T activities that enhance capabilities of the squad or provide a desired capability.</p> <p>-Continue to seek weight and volume reduction replacements for current infantry equipment that support integration of components. Identify and analyze power solutions to support increased power demands of new capabilities within the rifle squad.</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2086 / Soldier/Marine Enhancement

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
-Continue to implement capability requirements from MERS Initial Capabilities Document (ICD) and results from Force Design. -Continue to prioritize projects with the Infantry Working Group and utilize the Partnership Intermediary Agreement as a mechanism to pursue innovation and technology. -Continue the anthropometry survey of the Marine Corps. The data from this study is critical to provide other program offices with the size and fit requirements for all Marines. FY 2022 OCO Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: Increase of \$0.297M from FY21 to FY22 is due to increased level of effort to conduct anthropometry survey of the Marine Corps. The measurement and analysis required is a significant increase over the FY 2021 requirements.					
Accomplishments/Planned Programs Subtotals	2.441	1.642	1.939	0.000	1.939

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

N/A

Remarks

D. Acquisition Strategy

Non Developmental Item/Commercial off the Shelf (NDI/COTS).

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2086 / Soldier/Marine Enhancement
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Prior Years Cumulative Funding	Various	Marine Corps Systems Command : Quantico, VA	12.792	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			12.792	0.000		0.000		0.000		-		0.000	-	-	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MERS Support	Various	Marine Corps Systems Command : Quantico, VA	1.235	0.173	Oct 2019	0.435	May 2021	0.145	Nov 2021	-		0.145	-	-	-
MERS Technical Support	C/IDIQ	Various : Various	0.520	0.412	Dec 2019	0.281	Jan 2021	0.380	Nov 2021	-		0.380	-	-	-
MERS Technical Support - PIA	C/CPFF	MCSC : Quantico, VA	3.732	1.503	Dec 2019	0.751	Jul 2021	1.324	Jun 2022	-		1.324	-	-	-
MERS Technical Support	C/CPFF	MCSC : Quantico, VA	0.773	0.353	Jan 2020	0.000	Feb 2021	0.000		-		0.000	-	-	-
Prior Years Cumulative Funding	Various	Various : Various	7.142	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			13.402	2.441		1.467		1.849		-		1.849	-	-	N/A

Remarks
 Various contracts, MIPRS, Work Requests and Supply Requisitions are awarded through the year for the various initiatives in the MERS programs. Contract method reflects where the majority of the funding is allocated. Contract award date reflects the first of multiple awards.

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MERS Developmental Test & Eval (Articles)	Various	MCSC : Quantico, VA	0.405	0.000		0.175	Jan 2021	0.090	Nov 2021	-		0.090	-	-	-

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2086 / Soldier/Marine Enhancement
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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Prior Years Cumulative Funding	Various	Various : Various	12.583	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			12.988	0.000		0.175		0.090		-		0.090	-	-	N/A

Remarks
 Various contracts, MIPRS, Work Requests and Supply Requisitions are awarded through the year for the various initiatives in the Marine Enhancement Program (MEP) and MERS programs, therefore a specific contract award date cannot be identified. Contract award date reflects the first of multiple awards.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	39.182	2.441	1.642	1.939	-	1.939	-	-	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2086 / Soldier/Marine Enhancement
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Proj 2086	FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
	MERS Research/Int of Infantry Squad											
Marine Enhancement Prog Equipment												
Empty grid for data entry												

2022PB - 0206623M - 2086

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2086 / Soldier/Marine Enhancement

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2086				
MERS research/integration of Infantry Squad - No major milestones	1	2020	4	2022
Marine Enhancement Program Equipment - No major milestones	1	2020	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys				Project (Number/Name) 2112 / Lightweight 155mm Howitzer			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
2112: <i>Lightweight 155mm Howitzer</i>	6.700	0.003	0.000	1.973	-	1.973	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

LW155 (also known as the M777A2 howitzer) provides all weather, day/night direct, reinforcing, and general support fires to maneuver forces as well as direct support artillery. It is a joint program between the Marine Corps and Army, which is additionally supporting various foreign military purchases of the weapon system. The LW155 was first fielded by the Marine Corps in April 2005 and completed fielding in April 2013. The LW155 is used significantly in support of Operation Inherent Resolve. This budget item supports system updates to maintain and increase performance and lethality. M777A2 is the prominent weapon of the Marine indirect fires triad and currently the only cannon in the Service.

In FY 2022, the program will focus on improving the Digital Fire Control System (DFCS) of the M777A2 while allowing for operation in Global Positioning System (GPS) denied/ challenged environment. Continued operation in a GPS denied/ challenged environment is critical to the M777A2 ability to fire Precision Guided Munitions (PGM). The M777A2 will leverage the US Army's Assured Positioning, Navigation, and Timing (APNT) initiatives, such as Mounted APNT System (MAPS), as well as DFCS efforts by other US Army weapon system platforms, to help evaluate future modernization efforts for the M777A2.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Lightweight 155mm Howitzer Product Improvements	0.003	0.000	1.973	0.000	1.973
Articles:	-	-	-	-	-
FY 2021 Plans: N/A					
FY 2022 Base Plans: -Redesign of the Current Communication Location Enclosure (CLE) of the DFCS to integrate latest M-Code technologies for continued operation in GPS contested environments.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Increase of \$1.973M from FY 2021 to FY 2022 supports the redesign efforts of the DFCS to support future modernization efforts.					
Accomplishments/Planned Programs Subtotals	0.003	0.000	1.973	0.000	1.973

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2112 / Lightweight 155mm Howitzer

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• PMC/2185: 155MM Ltwf Towed Howitzer	21.052	0.059	0.032	-	0.032	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

RDTE,N efforts in 2022 will leverage existing technologies to integrate and evaluate to inform future modernization efforts in terms of hardware and software upgrades for M777A2 howitzer. Future upgrades will be evaluated based on cost and impact to operation.

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2112 / Lightweight 155mm Howitzer
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LW155 Product Improvements	MIPR	CCDC-AC : Picatinny Arsenal, NJ	6.700	0.000		0.000		1.973	Oct 2021	-		1.973	-	-	-
Subtotal			6.700	0.000		0.000		1.973		-		1.973	-	-	N/A

Remarks
Increase of \$1.973M from FY 2021 to FY 2022 supports redesign efforts of the DFCS to support future modernization efforts.

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Mobility and Firing Test	MIPR	Yuma Proving Ground : Yuma, AZ	0.000	0.003	Jun 2020	0.000		0.000		-		0.000	-	-	-
Subtotal			0.000	0.003		0.000		0.000		-		0.000	-	-	N/A

Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		6.700	0.003	0.000	1.973	-	-	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2112 / Lightweight 155mm Howitzer

Proj 2112	FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
				Test					Evaluation			

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2112 / Lightweight 155mm Howitzer

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2112				
Hardware Prototype Integration	1	2020	4	2020
Operational Assessment	4	2020	2	2021
LW155 Modernization Research	1	2022	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys				Project (Number/Name) 2237 / Amphibious Vehicle Test			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
2237: Amphibious Vehicle Test	14.887	2.711	2.884	2.907	-	2.907	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Amphibious Vehicle Test Branch (AVTB) is a component of Marine Corps Systems Command (MCSC) and is responsible for the operation and management of an amphibious vehicle test facility, which is the Department of Defense's only certified amphibious vehicle test capability. The AVTB develops test plans; executes test and evaluation; and provides analysis and reporting of developmental and integrated test and evaluation events. They predominately support the development and performance validation of amphibious and expeditionary ground combat vehicle systems and equipment. The AVTB conducts and supports testing for the MCSC; Navy and other service PEOs and Program Management Offices; the Office of Naval Research; and HQMC PP&O and CD&I. The mission of the AVTB is to conduct test and evaluation of expeditionary combat vehicle systems and equipment in order to enable informed acquisition decisions.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Contracts and Test and Evaluation Support Assets	2.711	2.884	2.907	0.000	2.907
Articles:	-	-	-	-	-
FY 2021 Plans:					
Amphibious Combat Vehicle (ACV) Family of Vehicles (FoV):					
- Continuation of ACV-P Qualification and follow on testing as required - System upgrades and platform modification.					
- ACV-30 - Water Mobility, Communication System, Reliability Qualification Testing.					
- ACV-C Testing - Water Mobility, Communication System, Reliability Qualification Testing.					
Assault Amphibious Family of Vehicles:					
- Continuation of AAVP7/C7/R & ECP testing as required - System upgrades and platform modification.					
- Amphibious Surf Capability Vehicle - Water Mobility and Reliability Qualification Testing.					
- Foreign Composite Track upgrade for AAVP7 - Water Mobility, Land Mobility.					
Office of Naval Research (ONR) Projects:					
- Autonomous AAVP7 System Development - Land Navigation, Water Navigation.					
- Amphibious Reconnaissance Vehicle - Water Mobility, Land Mobility.					
- Unmanned Swarming Amphibious Assault Craft - Water Mobility, Land Mobility.					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2237 / Amphibious Vehicle Test

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>Other Projects:</p> <ul style="list-style-type: none"> - Joint Light Tactical Vehicle - System upgrades and platform modification. - Rolling Fuel Transporter - Water mobility, Land Mobility. <p>FY 2022 Base Plans:</p> <p>Amphibious Combat Vehicle (ACV) Family of Vehicles (FoV):</p> <ul style="list-style-type: none"> - Continuation of ACV-P follow on testing as required - System upgrades and platform modification. <p>Assault Amphibious Family of Vehicles:</p> <ul style="list-style-type: none"> - Continuation of AAVP7/C7/R & ECP follow on testing as required - System upgrades and platform modification. <p>Other Projects:</p> <ul style="list-style-type: none"> - Amphibious Reconnaissance Vehicle - follow on Water Mobility and Land Mobility testing as required. <p>FY 2022 OCO Plans:</p> <p>N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p> <p>Increase of \$.023M from FY 2021 to FY 2022 is in support of modernization efforts, capital growth, and increased utilization of AVTB testing resources.</p>					
Accomplishments/Planned Programs Subtotals	2.711	2.884	2.907	0.000	2.907

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

Remarks

D. Acquisition Strategy

The Amphibious Vehicle Test Branch supports the Department of Defense's amphibious and expeditionary combat vehicle systems and equipment testing through all stages of the acquisition life cycle. It is agile enough to conduct testing ranging from science and technology / research and development demonstrations (in order to determine program requirements and technological maturity) through verification and validation of post fielding engineering change proposals. AVTB sustainment and test support is conducted through a mix of military subject matter experts, federal civil service, support contracts, and local and supported service military personnel and equipment support requests.

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2237 / Amphibious Vehicle Test
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Prior Years Cumulative Funding	Various	Various : Various	2.430	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			2.430	0.000		0.000		0.000		-		0.000	-	-	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Facility/Test Infrastructure	C/FFP	NAVFAC, SW : Camp Pendleton, CA	0.817	0.141	Oct 2019	0.246	Oct 2020	0.216	Oct 2021	-		0.216	-	-	-
Test Assets//Operator Spprt	C/FFP	MCTSSA Camp Pend : Camp Pendleton, CA	1.767	1.384	Apr 2020	1.426	Apr 2021	1.410	Apr 2022	-		1.410	-	-	-
Vehicle Support	WR	RCO Camp Pendleton : Camp Pendleton, CA	0.381	0.065	Oct 2019	0.065	Oct 2020	0.060	Oct 2021	-		0.060	-	-	-
Hazmat POL PPE	Various	MCTSSA Camp Pendleton : Camp Pendleton, CA	0.478	0.014	Oct 2019	0.014	Oct 2020	0.015	Oct 2021	-		0.015	-	-	-
Crane Test Support	C/IDIQ	MCTSSA Camp Pendleton : Camp Pendleton, CA	0.260	0.005	Oct 2019	0.005	Oct 2020	0.067	Oct 2021	-		0.067	-	-	-
Test article fuel (J8)	Various	AVTB : Camp Pendleton, CA	0.901	0.066	Oct 2019	0.067	Oct 2020	0.070	Oct 2021	-		0.070	-	-	-
Test support Fuel (Diesel)	Various	AVTB : Camp Pendleton, CA	0.750	0.075	Oct 2019	0.076	Oct 2020	0.080	Oct 2021	-		0.080	-	-	-
Prior Years Cumulative Funding	Various	Various : Various	0.452	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			5.806	1.750		1.899		1.918		-		1.918	-	-	N/A

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2237 / Amphibious Vehicle Test
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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test Article Ops & Main	Various	AVTB : Camp Pendleton, CA	1.699	0.115	Oct 2019	0.115	Oct 2020	0.120	Oct 2021	-		0.120	-	-	-
Test Equipment	WR	AVTB : MCTSSA Camp Pendleton	0.581	0.065	Oct 2019	0.065	Oct 2020	0.075	Oct 2021	-		0.075	-	-	-
Subtotal			2.280	0.180		0.180		0.195		-		0.195	-	-	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Data Management	C/FFP	MCTSSA Camp Pendleton : Camp Pendleton	2.498	0.320	Nov 2019	0.330	Nov 2020	0.330	Nov 2021	-		0.330	-	-	-
Lab and Tech Writer Supt.	C/FFP	MCTSSA Camp Pendleton : Camp Pendleton	1.873	0.461	Nov 2019	0.475	Nov 2020	0.464	Nov 2021	-		0.464	-	-	-
Subtotal			4.371	0.781		0.805		0.794		-		0.794	-	-	N/A

Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			14.887	2.711	2.884	2.907	-	2.907	-	-	N/A	

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2237 / Amphibious Vehicle Test

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2237				
Amphibious Combat Vehicle (ACV) Family of Vehicles (FoV): ACV-P Reliability and follow on testing as required - System upgrades and platform modification.	4	2020	4	2021
Amphibious Combat Vehicle (ACV) Family of Vehicles (FoV): ACV-30 Water Mobility Assessment	1	2021	3	2021
Amphibious Combat Vehicle (ACV) Family of Vehicles (FoV): ACV-C Testing - Water Mobility, Communication System, Reliability Qualification Testing	1	2021	4	2021
Amphibious Combat Vehicle (ACV) Family of Vehicles (FoV): ACV-P follow on testing as required - System upgrades and platform modification	1	2020	4	2022
Amphibious Combat Vehicle (ACV) Family of Vehicles (FoV): ACV-30 Testing - Water Mobility, Land Mobility, Reliability, follow on testing as required	4	2022	4	2022
Assault Amphibious Family of Vehicles (AAVP7/C7/R7): AAVP7/C7/R & ECP testing as required - System upgrades and platform modification.	1	2020	4	2021
Assault Amphibious Family of Vehicles (AAVP7/C7/R7): Amphibious Surf Capability Vehicle - Water Mobility and Reliability Qualification Testing	1	2021	4	2021
Assault Amphibious Family of Vehicles (AAVP7/C7/R7): Foreign Composite Track upgrade for AAVP7 - Water Mobility, Land Mobility	3	2020	3	2021
Assault Amphibious Family of Vehicles (AAVP7/C7/R7): AAVP7/C7/R & ECP follow on testing as required - System upgrades and platform modification.	1	2020	4	2022
Office of Naval Research (ONR) Projects: Autonomous AAVP7 System Development - Land Navigation, Water Navigation	1	2020	4	2020
Office of Naval Research (ONR) Projects: Amphibious Reconnaissance Vehicle - Water Mobility, Communication System, Reliability Qualification Testing.	1	2021	4	2021
Office of Naval Research (ONR) Projects: Unmanned Swarming Amphibious Assault Craft - Water Mobility.	1	2021	4	2021

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2237 / Amphibious Vehicle Test
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Other USMC: Joint Light Tactical Vehicle - System upgrades and platform modification.	1	2020	4	2021
Other USMC: Rolling Fuel Transporter	1	2021	3	2021
OPFOR Support: OPFOR Support	1	2020	1	2020
OPFOR Support: OPFOR Support Testing	1	2020	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys				Project (Number/Name) 2315 / Training Devices/Simulators			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
2315: Training Devices/Simulators	168.872	12.616	12.880	51.404	-	51.404	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

(U) Training simulators supported by this program element include Combined Arms Command & Control Training Upgrade System (CACCTUS), Deployable Virtual Training Environment (DVTE), Force on Force Training Systems (FoFTS), Marine Air-Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) Enhancements, Ranges and Training Area Management (RTAM) [Formerly Range Modernization/Transformation], Supporting Arms Virtual Trainer (SAVT), Immersive Training Range Support (ITRS), Training Support and Training Simulation Support (TSS), and Marine Corps Training Information Management System (MC-TIMS). These training systems provide tactical weapons and decision-making skill training from entry level through MAGTF staff level. Systems will be interoperable and will allow for mission planning, mission rehearsal and concept evaluation in a valid synthetic environment with objective and timely feedback. Through Live, Virtual and Constructive Training Environment simulation (LVC-TE), the Marine Corps will have means to train jointly, educate, develop doctrine and tactics, formulate and assess operational plans, assess warfighting situations, and define operational requirements.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Combined Arms Command and Control Trainer Upgrade System (CACCTUS)	1.229	3.533	4.571	0.000	4.571
Articles:	-	-	-	-	-
Description: CACCTUS is a combined arms staff training system that when fully fielded will enable comprehensive Marine Corps staff, unit, and team training both at home station Combined Arms Staff Training (CAST) facilities and through Distributed training involving CAST facilities across the Marine Corps. CACCTUS is an upgrade to the USMC's CAST that provides fire support training for the Marine Air-Ground Task Force (MAGTF) elements up to and including Marine Expeditionary Brigade (MEB) level. Using the system components and simulation capabilities, two dimensional (2D) and three dimensional (3D) visuals, interfaced Command, Control, Communications, Computers and Intelligence (C4I), synthetic terrain, and an After Action Review (AAR), the concept of operations for the CACCTUS system is to immerse the trainees in a realistic, scenario-driven environment to enable commands and their battle staffs to train or rehearse combined arms tactics, techniques and procedures for decision-making processes. CACCTUS is a threshold requirement constituent system of LVC-TE. CACCTUS will begin the initial steps of merging functional baselines and training capabilities with MTWS to achieve the goals of Battle Staff Training System (BSTS) through MTWS-MRKI participation or other avenues.					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continued integration of 3D viewer software. - Continued additional training system interoperability to include additional C4I devices and Office of Naval Research (ONR) transition projects. - Continued development of After Action Review (AAR) functionality. - Continued development to retain currency of training and readiness tasks and tactics, techniques and procedures with combined arms efforts. - Continued development of new architecture to support maturing hardware platforms. <p>FY 2022 Base Plans:</p> <ul style="list-style-type: none"> - Continue integration of 3D viewer software. - Continue additional training system interoperability to include additional C4I devices and Office of Naval Research (ONR) transition projects. - Continue development to retain currency of training and readiness tasks and tactics, techniques and procedures with combined arms efforts. - Continue development of new architecture to support maturing hardware platforms. - Continue development support for integration activities with LVC-TE - Continue program office support through government labor and travel for developmental activities - Initiate development support for integration activities with MTWS to support Battle Staff Training System (BSTS)Annex and the Ground Training Systems Capabilities Development Document <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: The \$1.038M increase supports emerging requirements for system interoperability development/test and associated support labor.</p>					
<p>Title: Deployable Virtual Training Environment (DVTE)</p> <p align="right">Articles:</p> <p>Description: DVTE is a laptop Personal Computer (PC) based simulation system capable of emulating organic and supporting Infantry Battalion weapons systems and training scenarios to facilitate training and readiness</p>	0.207 -	0.385 -	3.663 -	0.000 -	3.663 -

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>based training. Its portable configuration allows Marines to train in areas where there are few options for training in garrison, aboard ship, at remote reserve locations, and deployed. DVTE training includes language and culture training, platoon and squad level tactics, employment of supporting arms, and various Recognition of Combatants (ROC) packages. DVTE is part of a Commander's "training toolkit" contributing to the building block approach to standards based training focusing on achieving an improved level of combat readiness.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continued incremental DVTE network infrastructure development by focusing on capabilities identified as DVTE application enhancements in the development plan. - Continued the additional efforts specified under the DVTE Software Capability Development Document (CDD) Increment II for Virtual Battlespace (VBS) release that includes improved Call For Fire (CFF) and Close Air Support (CAS) capability and Combined Arms Planning Enhancements (CAPE) to replace/decrease actual live training events. - Continued development of Tactical Air Control Party Green Gear modeling and Digital Fire Control System (DFCS) modeling for the Virtual Battlespace (VBS) release. - Continued to improve Flight Dynamics of Close Air Support (CAS) weapon platforms to more accurately represent live Joint Terminal Attack Controller (JTAC) training for the Virtual Battlespace (VBS) release. - Continued enhancement and integration of Comm Gear and After Action Review (AAR) for the Virtual Battlespace (VBS) release. <p>FY 2022 Base Plans:</p> <ul style="list-style-type: none"> - Continue integration of technology products transitioned from the Office of Naval Research - Continue program office support through government labor and travel for developmental activities - Initiate DVTE network infrastructure for integration with the Live Virtual Constructive Training Environment Increment I capability - Initiate development support for integration activities with DVTE to support Battle Staff Training System (BSTS) Annex and the Ground Training Systems Capabilities Development Document <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: The \$3.278M increase supports emerging requirements for system interoperability development/test and associated support</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
labor.					
Title: Force on Force Training Systems (FoFTS)	3.511	0.721	4.089	0.000	4.089
Articles:	-	-	-	-	-
<p>Description: Force on Force Training Systems (FoFTS) This is a CMC Force Design program that provides realistic, non-live fire capabilities to perform force-on-force training. The program develops, fields and supports a suite of tactical engagement capabilities that enhance MAGTF training around the world and across the range of military operations. It is critical for allowing Marines to train in a realistic Force on Force environment in lieu of live fire training scenarios and allows for training against a peer/near peer threat. The FoFTS-Next program was recently re-branded to break out the Component capabilities that encompass FoFTS-Next. Instrumented-Training Engagement Simulation System III (I-TESS III) has changed to Marine Corps Tactical Instrumentation System-Personnel (MCTIS-P). Combat Vehicle-Tactical Engagement Simulation System (CV-TESS) has changed to Marine Corps Tactical Instrumentation System-Vehicles (MCTIS-V). Surrogate Weapons has changed to Marine Corps Tactical Instrumentation System-Surrogate Weapons (MCTIS-WS). Network and Command and Control has changed to Marine Corps Tactical Instrumentation System (MCTIS). The program includes tactical training systems such as the MCTIS-P, MCTIS-V, and advanced, instrumented, laser-based tactical engagement systems that provide realistic weapons effects, position locating, instrumentation system and enhanced After Action Review (AAR) capability to support Live-Virtual-Constructive (LVC) events in the MAGTF Training Program curriculum. The Special Effects Small Arms Marking System (SESAMS) project provides weapon modification kits to fire low-velocity marking ammunition while precluding the weapon from firing live ammunition.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continued the development for Marine Corps Tactical Instrumentation System-Vehicles(MCTIS-V). - Initiated development of the Mountain Top Base stations. - Travel and reimbursable/contract support personnel costs to support Operational System Development. - Continued development of the Surrogate Weapons. <p>FY 2022 Base Plans:</p> <ul style="list-style-type: none"> - Continue MCTIS-V development for the integration of the LAV-25 and LAV-AT simulators. - Continue development of the Mountain Top Base stations. - Continue development of the Surrogate Weapons. <p>FY 2022 OCO Plans:</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy				Date: May 2021	
Appropriation/Budget Activity 1319 / 7		R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys		Project (Number/Name) 2315 / Training Devices/Simulators	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: The \$3.368M increase is for the development of the Surrogate Weapons Prototyping.					
Title: Marine Air-Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) Enhancements					
Articles:					
Description: The MAGTF Tactical Warfare Simulation (MTWS) is the Marine Corps' only constructive, aggregate-level simulation system used to support the training of Marine commanders and their battle staffs in MAGTF war-fighting principles/concepts and associated command and control procedures. Using complex computer-simulated behavior models, MTWS provides an interactive, decision-based, real-time, war game representing the six war-fighting functional areas of fires, command and control, force protection, logistics, maneuver, and intelligence. It's modeling breadth and flexibility enables users to represent and exercise a wide variety of combat scenarios to prepare leaders to face the military challenges of today's world. MTWS is designed to support the training of commanders and their staffs in exercises involving live and simulated land, air, and naval forces at all operational command levels. The system supports all levels of command throughout the Marine Expeditionary Force (MEF) and Joint Task Force (JTF). MTWS can be used as a multi-sided war game, including red, blue, civilian, and non-aligned sides. The system can also be used to validate specific operational plans against a variety of enemy and environmental situations. Thus command personnel may examine alternative tactical solutions on a "what if" basis. MTWS is an objective requirement constituent system of LVC-TE and is undergoing a re-engineering effort via the MTWS-MRKI program.					
	1.658	3.342	5.205	0.000	5.205
	-	-	-	-	-
FY 2021 Plans:					
- Continued JLVC Federation annual minor release.					
- Continued to develop new software capabilities to meet changing operational environment.					
- Continued to develop Joint Live, Virtual and Constructive (JLVC) Federation capabilities.					
- Continued effort to re-engineer the MTWS software baseline.					
FY 2022 Base Plans:					
- Continue JLVC Federation annual minor release.					
- Continue to develop new software capabilities to meet changing operational environment.					
- Continue to develop Joint Live, Virtual and Constructive (JLVC) Federation capabilities.					
- Continue effort to re-engineer the MTWS software baseline.					
- Continue development efforts for MTWS-MRKI					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
cloud infrastructure prototype, system architecture, user experience, and develop a modern business intelligence solution.					
<p>Title: Ranges and Training Area Management (RTAM)</p> <p align="right">Articles:</p> <p>Description: Ranges and Training Area Management (RTAM) developments are associated with modernizing live training ranges at major USMC bases and stations. This development effort enhances After Action Review (AAR) with ground truth feedback, realistic representation of Opposing Forces (OPFOR), and will upgrade the range and exercise control capabilities. RTAM integrates Live, Virtual, and Constructive training technologies, thereby, enhancing fielded live-fire, force-on-target, and force-on-force training capabilities.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue to perform minimum software upgrades to add capability to the Range Instrumentation Systems Exercise Controller (RISCon-T) through the integration of numerous live/target systems. - Continue enhancements of Targetry Range Automated Control and Recording (TRACR) software for Friend-and-Foe target control and scenario development, to include integration with Range Instrumentation System Controller (RISCon-T). - Continue enhancements of the Tactical Video Capture System (TVCS) Mobile (RISCon). - Continue enhancements of TRACR and RISCon-T software for Friend-and-Foe target control and scenario development integration with Location of Miss and Hit (LOMAH) capabilities (RISCon-T). - Initiate development of Known Distance Automated Scoring system enhancements. - Initiate development of Live Fire Evaluation Tool (LFET) that increases shooters recognition, decision making, and battlefield skill proficiency. <p>FY 2022 Base Plans:</p> <ul style="list-style-type: none"> - Initiate development of Live-fire, shoot back interactive target capabilities (RISCon-T). - Initiate Electronic Warfare Instrumented Ranges development with devices that can be activated to deny, degrade and disrupt electromagnetic spectrum operations as the unit undergoing training operates within the area. - Initiate development of Trackless Mobile Infantry/Armor Targets inclusive of RISCon-T integration, spectrum, radio frequency and autonomous control. - Continue development of Live Fire Evaluation Tool (LFET) that increase shooter recognition, decision making, and battlefield skill proficiency. 	3.369	2.861	4.994	0.000	4.994
	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>- Continue enhancements of Targetry Range Automated Control and Recording (TRACR) software for Friend-and-Foe target control and scenario development, to include integration with Range Instrumentation System Controller (RISCon-T).</p> <p>- Complete Ballistic Concrete testing and development for waste characterization, patch mix and field testing.</p> <p>- Travel to support evaluation and testing.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: The \$2.133M increase supports new Electronic Warfare Instrumented Ranges and Trackless Mobile Armor Targets requirements.</p>					
<p>Title: Supporting Arms Virtual Trainer (SAVT)</p> <p align="right">Articles:</p> <p>Description: Supporting Arms Virtual Trainer (SAVT) will advance the training capability, operational readiness, and tactical proficiency of USMC Joint Terminal Attack Controllers (JTACS), Forward Observers (FOs), and Forward Air Controllers (FACs). The personnel will use training scenarios that require the placement of simulated tactical ordnance on selected targets using Joint Close Air Support (JCAS) procedures and observed fire procedures for Naval Surface Fire Support (NSFS), artillery and mortar fire to perform destruction, neutralization, suppression, illumination/coordinated illumination, interdiction and harassment fire missions.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2022 Base Plans:</p> <ul style="list-style-type: none"> - Initiate development of Worldwide Terrain Data Base - Initiate development of Marine Corps Training Information Management System (MCTIMS) engineering change proposals to enable interoperability and interface requirements with the upcoming MCTIMS Learning Management Module Capability. - Initiate Digital Virtual Training Environment/Aviation (DVTE/ADVTE) Capability Upgrades - Initiate Tactical Handheld Systems Version 2 (THSv2) to develop the hardware/software interface along with integration and testing of the interface design. 	0.226	0.000	2.216	0.000	2.216
	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy				Date: May 2021	
Appropriation/Budget Activity 1319 / 7		R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys		Project (Number/Name) 2315 / Training Devices/Simulators	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
- Initiate development of Speech Recognition Software					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: The \$2.216M from FY 2021 to FY 2022 increase supports emerging SAVT engineering requirements, system development/test and associated support labor.					
Title: Training Simulation Support					
Articles:					
Description: Training Simulation Support (TSS) provides greater combat readiness and enhanced operational execution to support a training continuum that features planning, preparation, exercise, and assessment capabilities for the Marine Air Ground Task Force (MAGTF) commander in both Joint and Service venues. Replicates a Contemporary Operational Environment (COE) and allows units to interact as though they are physically located in the same Operational Environment (OE). Enables interoperability between diverse training programs to meet warfighting requirements and supports standards-based training from small unit crawl/walk events to large unit exercises. TSS supports continued constituent integration efforts into the Live, Virtual, and Constructive Training Environment (LVC-TE). This is a CMC Force Design program providing expeditionary force in readiness, a capability critical for obtaining a way for the Marine Corp to train as they fight. LVC-TE is the tool that provides a persistent/consistent common operational training environment by which units can work together as though they are physically located in the same operational space with legacy and emerging training systems. LVC-TE program is on a timeline to deliver minimum viable product between 1st and 2nd Quarter FY 23. Additional minimum viable capability releases are scheduled for every 6 months thereafter. This software intensive product is using the new Software Acquisition Pathway (DODI 5000.87), a transformational process that champions agile methods and fleet involvement to deliver what is most important to the fleet first.					
FY 2021 Plans: N/A					
FY 2022 Base Plans:					
- Initiate development of Live, Virtual, Constructive functionality among constituents to include front end analysis for constituent and enterprise services.					
- Initiate development of enterprise services to include Cross Domain Solution (CDS), Exercise Design Tool (EDT), and After Action Review (AAR) solution.					
	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
	0.307	0.000	18.568	0.000	18.568
	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy				Date: May 2021	
Appropriation/Budget Activity 1319 / 7		R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys		Project (Number/Name) 2315 / Training Devices/Simulators	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
<p>- Initiate transition of Office of Naval Research (ONR) products into the enterprise services</p> <p>- Initiate development of additional integration gateways and testing</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: The \$18.568M increase in FY22 supports the development of the Live Virtual Constructive - Training Environment (LVC-TE) capability as outlined in the LVC-TE Capabilities Development Document (CDD), MROC Decision Memorandum 06-2020 signed Aug 10, 2020. LVC-TE includes the integration of phase 1 constituent programs: Combined Arms Command and Control Training Upgrade System (CACCTUS), Deployable Virtual Training Environment (DVTE), and Supporting Arms Virtual Trainer (SAVT), and connecting aviation training systems via the Aviation Distributed Virtual Training Environment (ADVTE)/Training Environment Network (TEN), along with use of the tools provided to the Live, Virtual Constructive Integration Architecture (LVC- IA) for Live - Virtual- Constructive (LVC) domain planning. This development will create a common operational environment by which units can interact across LVC domains as though they are physically located in the same operational space. We will be able to execute utilizing the Army's Consolidated Product Line Management Plus contract on Task Order 15, awarded on April 16, 2021. This will include the development/documentation of Architecture (for both Hardware and Software); development/documentation of a Continuous Test Strategy; development of Exercise Design Tool (EDT), Exercise Control Tool (ECT), Combined After Action Review functionality, and Cross Domain Solution; and development of New Company-Level Operations Scenarios, using legacy systems: CACCTUS, DVTE, and SAVT. Planning to use the Software Acquisition Pathway, the LVC-TE program team will begin development and planned fielding of a Minimum Viable Product (MVP) to the first site, Twentynine Palms, CA in FY22. The Marine Corps affirms with a high degree of confidence that the programs in this line item are executable. TSS also supports funding for the Office of Naval Research Transition Program to transition Smart Viz capability with 855K. If full funding is not provided in FY22, the fielding of the Minimum Viable Product in support of the LVC-TE capability planned for Twentynine Palms will be delayed.</p>					
Title: Immersive Training Range Support (ITRS)					
Description: Provide and sustains innovative technologies and programs that enhance the effectiveness of training and education at home stations. Innovative technologies incorporate high-fidelity training environments with enhanced battlefield realism including exposure to operational complexities and mental and physical stressors that challenge tactical, moral and ethical decision making. Develops small unit leader decision making					
	2.109	2.038	2.068	0.000	2.068
	-	-	-	-	-
Articles:					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

and hone small unit collective skills in realistic, replicative, and rapidly repeatable venues. Ensures Marines first encounter their tactical and ethical dilemmas in a simulated battlefield rather than actual combat.

FY 2021 Plans:

- Completed validation and testing of the AK-47 Blank Fire Only (BFO) system solution that will meet the requirements as described within the D-UNS and subsequent Letter of Clarification (LOC).
- Continued validation and testing of the RPK BFO system solution that will meet the requirements as described within the D-UNS and subsequent LOC.
- Continued Mobile Immersive Training Environment development to bring immersive training capabilities to units in support of peer-near-peer training.
- Initiated a Computer-generated Forces (CGF) study for analysis of alternatives (AoA) to determine available enhanced instrumentation for immersive training capabilities that directly support the Infantry T&R.

FY 2022 Base Plans:

- Continue Mobile Immersive Training Environment development to bring immersive training capabilities to units in support of peer-near-peer training.
- Continue Computer-generated Forces (CGF) study for analysis of alternatives (AoA) to determine available enhanced instrumentation for immersive training capabilities that directly support the Infantry T&R.
- Complete validation and testing of the RPK Blank Fire Only (BFO) system solution that will meet the requirements as described within the D-UNS and subsequent Letter of Clarification (LOC).

FY 2022 OCO Plans:

N/A

FY 2021 to FY 2022 Increase/Decrease Statement:

The \$0.030M increase is due to escalation.

FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Accomplishments/Planned Programs Subtotals				
12.616	12.880	51.404	0.000	51.404

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

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• PMC/6532-01: Training Devices, CACCTUS	0.988	0.000	5.327	-	5.327	-	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy	Date: May 2021
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Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• PMC/6532-02: <i>Training Devices, DVTE</i>	0.427	4.479	0.700	-	0.700	-	-	-	-	-	-
• PMC/6532-03: <i>Training Devices, FoFTS</i>	58.155	15.299	0.000	-	0.000	-	-	-	-	-	-
• PMC/6532&4630-04: <i>Training Devices, MTWS</i>	0.000	0.000	0.117	-	0.117	-	-	-	-	-	-
• PMC/6532-06: <i>Training Devices, RTAM</i>	28.586	22.518	6.943	-	6.943	-	-	-	-	-	-
• PMC/6532-07: <i>Training Devices, SAVT</i>	5.331	0.000	0.000	-	0.000	-	-	-	-	-	-
• PMC/6532-08: <i>Training Devices, ITRS</i>	1.329	0.000	0.000	-	0.000	-	-	-	-	-	-
• PMC/6532-09: <i>Training Devices, TSS</i>	0.000	0.000	6.067	-	6.067	-	-	-	-	-	-

Remarks

CACCTUS FY24 PMC includes \$6.259M, FY25 includes \$6.384M and FY26 includes \$6.511M for the Guam Initiative.
 FoFTS FY24 PMC includes \$13.800M, FY25 includes \$14.074M and FY26 includes \$42.230M for the Guam Initiative.
 RTAM FY20 PMC includes \$13.348M, FY21 includes \$8.723M, FY23 includes \$2.037M, FY24 includes \$7.424M, FY25 includes \$7.569M and FY26 includes \$7.720M for Guam Initiative.

D. Acquisition Strategy

(U) CACCTUS - Exercise task orders via existing Riptide IDIQ contract through FY 2020. FY 2021 new Software (SW) development contract will be awarded for SW development and interoperability efforts. Reimbursable work request(s) for Navy Eng labor and contractor support.
 (U) DVTE - Exercise task orders off of IDIQ contract for Virtual Battleship Space (VBS) Software (SW) Development. Reimbursable work request(s) for Navy labor and contractor support.
 (U) FoFTS - FoFTS-Next will pursue a Letter contract to allow the vendor to begin work immediately, then the program will definitize the contract for the MCTIS-P, MCTIS and MCTIS-V base kits. Surrogate Weapons and full MCTIS-V will be pursued on another Prototype OTA. Upon successful completion of those prototype efforts then the prototyped items will be procured separately on either a production OTA or another type of contract vehicle.
 (U) MTWS - Exercise task orders for Software Development and Re-engineering efforts via IDIQ contract and MIPRs to Hill AFB. Reimbursable work request(s) for Navy labor and contractor support.
 (U) MCTIMS - Modernization efforts to utilize reimbursable work request(s) to NAWC-AD planned for Navy labor and contractor support.
 (U) RTAM - MIPR to the Army-PEO STRI planned for award on existing Consolidated Product-line Management Contract.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators
<p>(U) SAVT - Funding for Product Research Analysis and Development will be awarded to a small business to perform Front End Analysis that will create training requirements for use in the design and development of the SAVT Increment II and expeditionary JTAC training systems.</p> <p>(U) Immersive Training Range Support - MIPR to the ACC-Orlando planned for award on existing Consolidated Product-line Management Contract. AK47 and RPK Blank Fire Only (BFO) weapon development by NSWC Crane. AK47 and RPK BFO weapon validation and testing by Corona.</p> <p>(U) Training Simulation Support - MIPR to the Army-PEO STRI planned for award on existing Consolidated Product-line Management Contract to start the development effort for LVC-TE functionality including constituent integration efforts. Follow-on hardware will be provided by FY 2022 PMC utilizing competitive process as directed by current guidance. Reimbursable work request for government labor support and existing CLS contract for contractor labor support. Front End Analysis through a competitive award.</p> <p>(U) Marine Corps Training Information Management System (MC-TIMS) Funds to NAWC-AD as a reimbursable work request(s)for Navy Eng labor and contractor support.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)						
1319 / 7				PE 0206623M / MC Ground Cmbt Spt Arms Sys					2315 / Training Devices/Simulators						
Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CACCTUS - ONR Transition Projects	TBD	TBD : TBD	0.000	0.000		0.000		0.000		-		0.000	-	-	-
CACCTUS - System Interoperability Development	TBD	TBD : TBD	0.000	0.000		0.000		3.641	Mar 2022	-		3.641	-	-	-
CACCTUS - SW Dev	MIPR	CERDEC : Ft. Belvoir	0.100	0.100	Jul 2020	0.000		0.130	Dec 2021	-		0.130	-	-	-
DVTE - System Interoperability Development	TBD	TBD : TBD	0.000	0.000		0.000		3.000	Mar 2022	-		3.000	-	-	-
DVTE - SW Dev - VBS	SS/IDIQ	Bohemia Interactive : Orlando, FL	17.619	0.000		0.000		0.000		-		0.000	-	-	-
FoFTS Software Development	MIPR	ACC-Orlando : Orlando, FL	2.926	0.000		0.000		0.000		-		0.000	-	-	-
FoFTS OTA Capability Demonstration	Various	MCSC : TBD	0.260	0.000		0.000		0.000		-		0.000	-	-	-
FoFTS TREX Surrogate Weapons	PO	MCSC : Quantico, VA	0.000	1.971	Jun 2021	0.127	Jun 2021	0.000		-		0.000	-	-	-
FoFTS - ITRS AK47 BFO	C/BA	NSWC Crane : Crane, IN	0.000	0.000		0.392	Aug 2021	0.000		-		0.000	-	-	-
FoFTS OTA Phase III	Various	MCSC : Quantico, VA	0.000	1.160	Aug 2020	0.000		0.000		-		0.000	-	-	-
FoFTS MCTIS-V Development	Various	MCSC : TBD	0.000	0.000		0.000		4.089	Mar 2022	-		4.089	-	-	-
FoFTS Human Factors Prototype	TBD	MCSC : Quantico, VA	0.000	0.010	May 2021	0.000		0.000		-		0.000	-	-	-
MTWS - Reengineering	MIPR	Hill AFB : Utah	5.221	0.000		3.045	Feb 2021	5.000	Jan 2022	-		5.000	-	-	-
MTWS - SW Dev	TBD	TBD : TBD	0.000	0.000		0.000		0.000		-		0.000	-	-	-
MTWS - SW Dev 1	C/IDIQ	Cole Engineering, Inc. : Orlando, FL	9.590	1.277	Sep 2020	0.000		0.000		-		0.000	-	-	-
MTWS - SW Dev 2	C/IDIQ	Cole Engineering, Inc. : Orlando, FL	1.002	0.000		0.000		0.000		-		0.000	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy												Date: May 2021			
Appropriation/Budget Activity 1319 / 7				R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys				Project (Number/Name) 2315 / Training Devices/Simulators							
Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MCTIMS	WR	NAWC-AD : Patuxent River, MD	0.000	0.000		0.000		6.030	Feb 2022	-		6.030	-	-	-
RTAM RISCon-T Development	MIPR	ACC-Orlando : Orlando, FL	9.491	1.199	Apr 2021	1.003	Mar 2021	1.385	Jun 2022	-		1.385	-	-	-
RTAM LFET	C/FFP	NSWC Dahlgren : Dahlgren, VA	0.000	0.000		0.207	May 2021	0.000		-		0.000	-	-	-
RTAM Electronic Warfare	TBD	NSWC Dahlgren : Dahlgren, VA	0.000	0.000		0.000		1.588	Jun 2022	-		1.588	-	-	-
RTAM KDAS efforts	SS/FFP	NSWC Crane : Crane, IN	0.000	0.651	Apr 2020	0.000		0.000		-		0.000	-	-	-
RTAM TMAT	TBD	TBD : TBD	0.000	0.000		0.000		1.341	Jul 2022	-		1.341	-	-	-
RTAM KDAS Target System	SS/FFP	DLA : Philadelphia, PA	0.000	0.605	Apr 2020	0.000		0.000		-		0.000	-	-	-
RTAM KDAS GCPC	Various	Various : Various	0.000	0.009	Aug 2020	0.000		0.000		-		0.000	-	-	-
SAVT - Tech Insertion	TBD	TBD : TBD	0.000	0.000		0.000		2.216	Feb 2022	-		2.216	-	-	-
SAVT - Tech Insertion	C/FFP	Riptide Software, Inc. : Orlando, FL	5.846	0.000	Sep 2020	0.000		0.000		-		0.000	-	-	-
ITRS Computer Generated Forces	TBD	ACC-Orlando : Orlando, FL	0.000	0.000		1.211	Aug 2021	1.079	Feb 2022	-		1.079	-	-	-
ITRS - CPM	MIPR	ACC-Orlando : Orlando, FL	8.261	0.899	Apr 2021	0.000		0.880	Jan 2022	-		0.880	-	-	-
Training Simulation Support	C/CPFF	TBD : TBD	0.000	0.000		0.000		13.818	Jun 2022	-		13.818	-	-	-
Training Simulation Support	MIPR	PEO STRI : Orlando, FL	0.000	0.157	Mar 2020	0.000		2.000	Mar 2022	-		2.000	-	-	-
Prior Year Cumulative Funding	Various	Various : Various	91.239	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			151.555	8.038		5.985		46.197		-		46.197	-	-	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 7				PE 0206623M / MC Ground Cmbt Spt Arms Sys				2315 / Training Devices/Simulators							
Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
CACCTUS/LVCTE Prototype Integration	MIPR	PEO STRI : Orlando, FL	0.000	0.499	Jun 2020	0.000		0.000		-		0.000	-	-	-
CACCTUS/LVCTE Pre Development	MIPR	PEO STRI : Orlando, FL	0.000	0.000		1.662	Mar 2021	0.000		-		0.000	-	-	-
ITRS Corona Spt	WR	NSWC Corona : Corona, CA	0.000	0.271	Apr 2020	0.400	Oct 2020	0.000		-		0.000	-	-	-
TSS Corona Spt (ATO)	WR	NSWC Corona : NSWC Corona	0.000	0.000		0.000		0.150	Apr 2022	-		0.150	-	-	-
TSS LVC-TE Front End Analysis	TBD	TBD : TBD	0.000	0.000		0.000		1.000	Apr 2022	-		1.000	-	-	-
SAVT Risk Managemnt Framework (RMF)	TBD	NSWC Corona : Corona, CA	0.000	0.098	Mar 2021	0.000		0.000		-		0.000	-	-	-
ITRS ISS Front End Analysis	WR	NSLC : Mechanicsburg, PA	0.000	0.000		0.034	Feb 2021	0.100	Oct 2021	-		0.100	-	-	-
RTAM Corona Spt	WR	NSWC Corona : Corona, CA	0.000	0.351	Mar 2020	0.533	Oct 2020	0.521	Oct 2021	-		0.521	-	-	-
RTAM NSLC Spt	WR	NAVSEALOGCEN : Mechanicsburg, PA	0.000	0.000		0.034	Jan 2021	0.100	Oct 2021	-		0.100	-	-	-
RTAM LFET	WR	NSWC Dahlgren : Dahlgren, VA	0.000	0.000		0.231	Apr 2021	0.000		-		0.000	-	-	-
RTAM KDAS Navy support	WR	NSWC Crane : Crane, IN	0.000	0.224	Mar 2020	0.000		0.000		-		0.000	-	-	-
RTAM NAWC-TSD Support	WR	NAWC-TSD : Orlando, FL	0.000	0.101	Jan 2020	0.000		0.000		-		0.000	-	-	-
RTAM Electronic Warfare	WR	NSWC Dahlgren : Dahlgren, VA	0.000	0.200	Jun 2020	0.200	Apr 2021	0.000		-		0.000	-	-	-
SAVT Corona Spt	WR	NSWC Corona : Corona, CA	0.000	0.000		0.000		0.000		-		0.000	-	-	-
SAVT Contractor Spt	C/BA	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	-	-	-
FoFTS Mountain Top Base Station Dev	PO	NSWC Corona : Corona, CA	0.000	0.000		0.200	May 2021	0.000		-		0.000	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 7				PE 0206623M / MC Ground Cmbt Spt Arms Sys				2315 / Training Devices/Simulators							
Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Cumulative Funding	Various	Various : Various	16.866	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			16.866	1.744		3.294		1.871		-		1.871	-	-	N/A
Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
ITRS - RPK BFO Validation & Testing	PO	NSWC Corona : Corona, CA	0.000	0.925	Jan 2020	0.000		0.000		-		0.000	-	-	-
SAVT S/W Refresh	C/FFP	RipTide : Orlando, FL	0.000	0.041	Mar 2021	0.000		0.000		-		0.000	-	-	-
ITRS AK-47 Blank Fire Adapter Test	WR	NSWC Corona : Corona, CA	0.000	0.000		0.241	Dec 2020	0.000		-		0.000	-	-	-
RTAM SACON Gov Patch mix	MIPR	ATC : Aberdeen, MD	0.000	0.000		0.510	Feb 2021	0.000		-		0.000	-	-	-
FoFTS Crane Labor IAR Testing	PO	NSWC Crane : Crane, IN	0.000	0.080	Feb 2021	0.000		0.000		-		0.000	-	-	-
FoFTS Lazer Hazard Evaluation	WR	NSWC Dahlgreen : Dahlgren, VA	0.000	0.038	Nov 2020	0.000		0.000		-		0.000	-	-	-
FoFTS AMITS	WR	NSWC Dahlgreen : Dahlgren, VA	0.000	0.025	May 2020	0.000		0.000		-		0.000	-	-	-
FoFTS AMITS Study	PO	NSWC Corona : Corona, CA	0.000	0.100	Jun 2020	0.000		0.000		-		0.000	-	-	-
FoFTS ARMY HITS	SS/FFP	ACC Orlando : Orlando, FL	0.000	0.103	Jul 2020	0.000		0.000		-		0.000	-	-	-
FoFTS AMITS CTIA	SS/FFP	ACC Orlando : Orlando, FL	0.000	0.024	May 2021	0.000		0.000		-		0.000	-	-	-
Prior Year Cumulative Funding	Various	Various : Various	0.002	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			0.002	1.336		0.751		0.000		-		0.000	-	-	N/A

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators
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Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CACCTUS - Program Support	Various	Various : Various	0.000	0.630	Jan 2020	1.871	Oct 2020	0.800	Oct 2021	-		0.800	-	-	-
CACCTUS - Travel	Various	DTS : Various	0.000	0.000		0.000		0.000		-		0.000	-	-	-
DVTE - Program Support	Various	Various : Various	0.164	0.207	Jan 2020	0.385	Oct 2020	0.663	Oct 2021	-		0.663	-	-	-
DVTE - Travel	Various	DTS : Various	0.000	0.000		0.000		0.000		-		0.000	-	-	-
FoFTS - Travel	Various	DTS : Various	0.000	0.000		0.002	Sep 2021	0.000	Sep 2022	-		0.000	-	-	-
MTWS - Program Support	Various	Various : Various	0.000	0.381	Jan 2020	0.297	Feb 2021	0.205	Oct 2021	-		0.205	-	-	-
MTWS - Travel	Various	DTS : Various	0.000	0.000		0.000		0.000		-		0.000	-	-	-
RTAM - Travel	Various	DTS : Various	0.000	0.015	Jul 2020	0.040	Sep 2021	0.059	Sep 2022	-		0.059	-	-	-
ITRS - Travel	Various	DTS : Various	0.146	0.014	Sep 2020	0.010	Sep 2021	0.009	Sep 2022	-		0.009	-	-	-
TSS/LVCTE - Program Support	Various	Various : Various	0.000	0.150	Mar 2020	0.000		1.600	Oct 2021	-		1.600	-	-	-
Prior Year Cumulative Funding	Various	Various : Various	0.139	0.000		0.000		0.000		-		0.000	-	-	-
RTAM Program Support	TBD	TBD : TBD	0.000	0.000		0.143	Sep 2021	0.000		-		0.000	-	-	-
RTAM KDAS Travel	Various	DTS : Various	0.000	0.014	Oct 2020	0.000		0.000		-		0.000	-	-	-
SAVT - Program Support	TBD	TBD : TBD	0.000	0.087	May 2021	0.000		0.000		-		0.000	-	-	-
ITRS - Program Support	C/BA	Not Specified : Not Specified	0.000	0.000		0.102	Sep 2021	0.000		-		0.000	-	-	-
Subtotal			0.449	1.498		2.850		3.336		-		3.336	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	168.872	12.616	12.880	51.404	-	51.404	-	-	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date: May 2021**

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators
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Combined Arms Command & Control Training Upgrade System (CACCTUS) NVIG Software Development Integration LVC-TE Pre Development	FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
	◆						◆				◆	
						◆				◆		

2022PB - 0206623M - 2315

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date: May 2021**

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators
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Deployable Virtual Training Environment (DVTE)	FY 2020				FY 2021				FY 2022				
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
Software Development - Contract Award	◆												
Software Development Version Release - VBS						◆							
System Interoperability Development										◆			

2022PB - 0206623M - 2315

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators
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Marine Air/Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) SW Development Contract Award SW Re-Engineering MIPR	FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
				◆								
					◆					◆		

2022PB - 0206623M - 2315

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators
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Supporting Arms Virtual Trainer (SAVT)	FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
SW Development and Integration										◆		

2022PB - 0206623M - 2315

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy

Date: May 2021

Appropriation/Budget Activity
1319 / 7

R-1 Program Element (Number/Name)
PE 0206623M / MC Ground Cmbt Spt Arms
Sys

Project (Number/Name)
2315 / Training Devices/Simulators

Immersive Training Range Support	FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Blank Fire Only (BFO) RPK Weapon Development	████████████████████											
Blank Fire Only (BFO) RPK Weapon Testing				████████████████████	████████████████████	████████████████████						
Blank Fire Only (BFO) AK47 Weapon Development			████████████████████	████████████████████	████████████████████	████████████████████						
Blank Fire Only (BFO) AK47 Weapon Testing				████████████████████	████████████████████	████████████████████	████████████████████					
CPM							◆					
							◆				◆	

2022PB - 0206623M - 2315

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators
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Force on Force Training Systems (FoFTS)	FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
CPM Contract Award (SW PDSS)							◆	◆			◆	
Capabilities Demo	◆			◆								

2022PB - 0206623M - 2315

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date: May 2021**

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators
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Training Simulation Support	FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
LVC-TE System Development Increment 1												
LVC-TE System Development Front End Analysis												
Minimum Viable Capability Release (MVCR):												

2022PB - 0206623M - 2315

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators
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Marine Corps Training Information Management Systems (MCTIMS)	FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Testing Event												◆
Engineering Event										◆		◆
Contracting Event										◆		

2022PB - 0206623M - 2315

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2315 / Training Devices/Simulators

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Combined Arms Command & Control Training Upgrade System (CACCTUS)				
NVIG Software Development Integration: (FY20)	1	2020	1	2020
NVIG Software Development Integration: (FY21)	3	2021	3	2021
NVIG Software Development Integration: (FY22)	3	2022	3	2022
LVC-TE Pre Development: System Integration (FY21)	2	2021	2	2021
LVC-TE Pre Development: System Integration (FY22)	2	2022	2	2022
Deployable Virtual Training Environment (DVTE)				
Software Development - Contract Award: FY20	1	2020	1	2020
Software Development Version Release - VBS: FY21	2	2021	2	2021
System Interoperability Development: FY22	2	2022	2	2022
Marine Air/Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS)				
SW Development Contract Award: FY20	4	2020	4	2020
SW Re-Engineering MIPR: FY21	1	2021	1	2021
SW Re-Engineering MIPR: FY22	1	2022	1	2022
Ranges and Training Area Management				
CPM RISCon-T Development: CPM RISCon-T SW Integration FY20	3	2021	3	2021
CPM RISCon-T Development: CPM RISCon-T SW Integration FY21	3	2021	3	2021
CPM RISCon-T Development: CPM RISCon-T SW Integration FY22	3	2022	3	2022
Supporting Arms Virtual Trainer (SAVT)				
SW Development and Integration: FY22 Task Order Award	2	2022	2	2022
Immersive Training Range Support				

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy			Date: May 2021	
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)		
1319 / 7	PE 0206623M / MC Ground Cmbt Spt Arms Sys	2315 / Training Devices/Simulators		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Blank Fire Only (BFO) RPK Weapon Development: NSWCrane RPK BFO Development	1	2020	3	2020
Blank Fire Only (BFO) RPK Weapon Testing: NSWCrane RPK Testing	4	2020	2	2021
Blank Fire Only (BFO) AK47 Weapon Development: NSWCrane AK47 BFO Development	3	2020	1	2021
Blank Fire Only (BFO) AK47 Weapon Testing: NSWCrane AK47 Testing	2	2021	4	2021
CPM: CPM (2020)	3	2021	3	2021
CPM: CPM (2021)	3	2021	3	2021
CPM: CPM (2022)	3	2022	3	2022
Force on Force Training Systems (FoFTS)				
CPM Contract Award (SW PDSS): FY20 Award	3	2021	3	2021
CPM Contract Award (SW PDSS): FY21 Award	4	2021	4	2021
CPM Contract Award (SW PDSS): FY22 Award	3	2022	3	2022
Capabilities Demo: Phase II Capability Demo	1	2020	1	2020
Capabilities Demo: Phase III Capability Demo	4	2020	4	2020
Training Simulation Support				
LVC-TE System Development Increment 1: Increment 1	1	2022	4	2022
LVC-TE System Development Front End Analysis: Front End Analysis	1	2022	4	2022
Marine Corps Training Information Management Systems (MCTIMS)				
Testing Event: GAT	4	2022	4	2022
Engineering Event: Software Release 1	2	2022	2	2022
Engineering Event: Software Release 2	4	2022	4	2022
Contracting Event: Contract Award	2	2022	2	2022

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

Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys				Project (Number/Name) 2503 / Initial Issue			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
2503: <i>Initial Issue</i>	58.288	5.102	4.917	10.251	-	10.251	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This funding provides research, development, test and evaluation (RDT&E) on low cost items with an emphasis on Non-Developmental Items/Commercial-Off-the-Shelf (NDI/COTS) available items. Much of the RDT&E is conducted in coordination/concert with other services and joint organizations, and in consideration of RDT&E efforts being pursued by the other Services. Items approved for procurement will transition into Operation and Maintenance Marine Corps accounts for Infantry Combat Equipment, Family of Shelters, Combat Field Feeding Systems, and Family of Field Medical Equipment. Family of Field Medical Equipment items approved for procurement will also transition to the Procurement, Marine Corps account. The benefits will be reduced logistics, less weight, improved combat effectiveness, better echelon I and II care for Marines, improved individual and unit protection, expeditionary feeding platforms, tactical mobility, calibration and maintenance, etc. The employment of state of the art equipment will ensure Marines are equipped and supported with the best items that technology can offer.

The Infantry Combat Equipment portfolio of capabilities encompasses Marine Corps Uniforms, Cold Weather and Mountaineering, Load Bearing and Pack Systems, and Individual Warfighting Equipment. Load Bearing and Pack Systems now includes the waterproof bag efforts previously included under Individual Warfighting Equipment. The continual research development and testing of technological advancements leads to performance enhancements, upgrades and modifications to legacy systems and new developments. Funding for this capability area leverages other Services' and governmental partners' efforts to maximize returns on investment and promote coordination and cooperation for same or similar requirements and capabilities. The objective is to equip individual Marines with uniforms and combat equipment to maximize effectiveness in every environment across the full range of military operations.

The Family of Field Medical Equipment (FFME) focus is to provide state of the art medical equipment and emerging medical technology that will improve the clinical outcomes for casualties. The objective is to replace obsolete items with those that fulfill the requirements and needs while increasing performance characteristics in the areas of energy efficiency, durability, reliability, and survivability while reducing weight and size in austere environments of a variety of climes. The focus is also to update and promote new supporting technologies and joint interoperability of operational medical equipment in support of Force Design 2030, Littoral Operation in a Contested Environment and Expeditionary Advanced Base Operations.

The Family of Shelters and Shelters Equipment (FSSE) and The Family of Combat Field Feeding Systems (CFFS) portfolio focus is to provide scalable expeditionary capabilities to the warfighter, with specific emphasis on supporting Expeditionary Advanced Base Operations (EABO) and austere base establishment in the littorals. The FSSE funding will be used to improve legacy material solutions that protect the Fleet Marine Force from observation, detection, adverse climatic conditions, and combat hazards. Furthermore, continuation of camouflage research which is vital to provide both cover and concealment in visual, signature reduction, and infrared and radar spectrums against near peer adversaries in support of the Commandant's Planning Guidance. Continuation of shelter research and development is required to design more reliable systems, lighten current shelters and shelter systems and minimize power requirements for environmental systems in support of EABO. The Family of CFFS funding seeks to maximize fuel efficiency, reduce size and weight, and improve transportability of equipment used to provide nutrition on the go to Marines conducting training and contingency operations in future EABO and forward operating environments.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2503 / Initial Issue

The Calibration and Maintenance Program (CAMP) calibrates the majority of tools and test equipment that ensure the safe and accurate operation of the ground weapon systems required to conduct Expeditionary Advanced Base Operations. The entire ground maintenance effort relies on CAMP activities to maintain combat effectiveness. This funding will be used to identify and assess the latest technology in calibration equipment, which is necessary to replace obsolete equipment, increase performance and reduce the footprint of deployable calibration sets. Funding will also develop new automated test procedures and protocols aimed at making the Marine Corps' deployable ground calibration sets more efficient.

Family of Expeditionary Water Systems (FEWS) is a family of systems line that contains purification, storage, distribution, hygiene, and test systems for water. This capability is necessary to provide safe and potable water to Marines in expeditionary environments. The family contains individual Table of Allowance Material Control Numbers which supports Fleet Marine Force (FMF) Marine Air-Ground Task Force (MAGTF) operations by providing all aspects of land-based water support to include test analysis, purification, reuse, storage, transfer, dispensing, and field hygiene support.

Family of Expeditionary Fuel Systems (FEFS) is a family of systems line that contains highly versatile fuel systems in support of Fleet Marine Force (FMF) operations. The family contains individual Table of Allowance Material Control Numbers which support FMF Marine Air-Ground Task Force (MAGTF) operations by providing all aspects of land-based fuel support to include receiving, test, additization, storage, transfer and dispensing of fuel.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Marine Corps Uniforms (MCU)	0.851	0.208	0.844	0.000	0.844
Articles:	-	-	-	-	-
FY 2021 Plans:					
- Conduct research, development, testing and evaluation to increase effectiveness of Flame Resistant (FR) properties in existing uniforms. Efforts include on lower cost, more durable, and comfortable FR utility uniforms to increase FR protection of individual Marines in training and in combat.					
- Conduct research and development for lighter uniforms, including footwear, and develop affordable alternatives.					
- Conduct clothing and fabric improvement efforts leveraging emerging technologies in uniform durability, design, and footwear development.					
- Conduct research and development for Marine clothing efforts, to include field and dress uniform certification along with associated accoutrements which includes badges, ribbons and devices.					
- Conduct research, development and testing to enhance appearance and service life of seabag issue items, which consists of initial basic training allowance of clothing, footwear, and associated individual uniform items.					
- Conduct research and development of enhanced camouflage protection and mitigation of Short Wave Infrared (SWIR) and thermal signature. Analyze FR and non-FR materials with enhanced signature mitigation.					
FY 2022 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2503 / Initial Issue

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>- Continue testing to impart SWIR signature mitigation and FR properties into the non-FR Marine Corps Combat Utility Uniform (MCCUU) by adding chemistry in the manufacturing process. Conduct user evaluations of NexGen MCCUUs with SWIR mitigation and FR improvements. Continue efforts to increase effectiveness of FR properties in all existing uniforms while lowering cost, increasing durability and comfort. These efforts will produce economical FR/SWIR capabilities in combat uniforms, specifically the NexGen MCCUU for all Marines.</p> <p>- Continue research and development for lighter uniforms, including footwear, and develop affordable alternatives, leveraging emerging technologies in uniform durability, design, and footwear development.</p> <p>- Continue research and development for Marine clothing efforts, to include field and dress uniform certification along with associated accoutrements which includes badges, ribbons and devices.</p> <p>- Continue research, development and testing to enhance appearance and service life of seabag issue items, which consists of initial basic training allowance of clothing, footwear, and associated individual uniform items.</p> <p>- Continue research and development of enhanced camouflage protection and mitigation of SWIR, and thermal signature in other uniform products.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase of \$0.636M from FY 2021 to FY 2022 supports Product Development and Test/Evaluation applying updated technologies to current MCCUU. NexGen MCCUU will incorporate spectral mitigation capabilities and flame/flash fire resistance for all Marines.</p>					
<p>Title: Cold Weather and Mountaineering (CWM)</p> <p align="right">Articles:</p> <p>FY 2021 Plans:</p> <p>- Complete research and development of emerging materials and technology to further enhance existing cold weather clothing & equipment effectiveness while lightening the load of the individual Marine.</p> <p>- Complete research for the cold weather clothing and equipment items to identify product improvements based upon existing requirements, market research, and user input from evaluations and after action reports.</p> <p>- Complete Cold Weather Clothing & Equipment Limited User Evaluation on Level 3 and Level 4 insulation layering systems.</p>	1.435	0.176	0.000	0.000	0.000
	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy				Date: May 2021	
Appropriation/Budget Activity 1319 / 7		R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys		Project (Number/Name) 2503 / Initial Issue	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
<ul style="list-style-type: none"> - Complete prototypes of level I insulation layer, handwear and headwear items for transition to producible specifications for inclusion in future procurements. - Complete modernization of existing suite of equipment to incorporate technology advances which will drive the development of the Marine Assault Climbers Kit (MACK). - Complete evaluation of alternate items for Marine Corps Cold Weather Infantry Kit (MCCWIK) to assess change proposals based on pending requirement update to the kit's SL-3. - Complete evaluation of Extreme Cold Weather boot alternatives, in concert with U.S. Army. - Complete on improvements to existing materials to include mitigation of SWIR and thermal signatures, while increasing the FR properties of cold weather and combat uniforms. <p>FY 2022 Base Plans: - N/A</p> <p>FY 2022 OCO Plans: - N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease in funding from \$0.176M to \$0.000M is due to Cold Weather and Mountaineering completing all FY21 RDT&E efforts.</p>					
<p>Title: Load Bearing and Pack Systems (LBPS)</p> <p align="right">Articles:</p>					
	0.343	0.352	0.215	0.000	0.215
	-	-	-	-	-
<p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Complete the adjustable shoulder harness and hip belt pack evaluation. - Continue to explore potential avenues for product improvements and upgrades for LBPS by leveraging technological advancements of industry, lighten load and increase mobility of effectiveness. Primary focus is to finish developing the adjustable shoulder harness assembly to fit the 2nd percentile female Marine to 98th percentile male Marine torso length and smaller hip belts to fit the 2nd percentile female Marine to 98th percentile male Marine waist circumference for the USMC Pack main bag. - Continue evaluations on loadbearing equipment such as Marine Corps pouch sets to implement product improvements to USMC LBPS systems. <p>FY 2022 Base Plans: - Continue product improvements and upgrades for LBPS by leveraging technological advancements of industry; lighten load and increase mobility of effectiveness.</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy				Date: May 2021						
Appropriation/Budget Activity 1319 / 7		R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys		Project (Number/Name) 2503 / Initial Issue						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										
<ul style="list-style-type: none"> - Continue evaluations on loadbearing equipment such as Marine Corps packs and pouch sets. - Initiate design, development, and evaluation of the waist pouch - Continue to evaluate pack frame system capable of carrying heavy weapon systems such as mortars and anti-armor munitions. - Initiate implementation of power and data management into loadbearing equipment (Main Pack and Assault Pack). <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease of \$0.137M from FY 2021 to FY 2022 is in line with the completion of the evaluation of the adjustable shoulder harness assembly and hip belt in FY 2021.</p>						FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>Title: Individual Warfighting Equipment (IWE)</p> <p align="right">Articles:</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Complete modernization of existing projects, including knee & elbow pads, by leveraging the technological advancements of industry. - Complete research for the IWE items to identify product improvements for the Marine Corps Utility Cutter (MCUC), the handheld flashlights, and the ISO mat based upon existing requirements. <p>FY 2022 Base Plans: - N/A</p> <p>FY 2022 OCO Plans: - N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: The decrease in funding from \$0.139M to \$0.000M due to Individual Warfighting Equipment completing all FY21 RDT&E efforts.</p>						0.129	0.139	0.000	0.000	0.000
<p>Title: *Family of Field Medical Equipment (FFME)</p> <p align="right">Articles:</p> <p>FY 2021 Plans:</p>						0.988	1.014	1.292	0.000	1.292

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2503 / Initial Issue

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>- Initiate research, development, testing and evaluation of new packing configurations of currently fielded forward surgical and trauma resuscitation capabilities to reduce the cubic foot space requirements in order to utilize limited lift capabilities. Conduct further analysis to validate the existing patient condition code requirements, and patient streams against future casualty stream estimates in the corresponding future operational environment(s) to identify material that can be removed from capabilities without impacting effectiveness.</p> <p>- Continue to test COTS/NDI medical equipment items for the En Route Care System (ERCS), Forward Resuscitative Surgery System (FRSS) and Shock Trauma Platoon (STP) to determine future viability in an operational environment.</p> <p>- Continue testing of medical equipment items to evaluate their energy efficiency, functionality and ability to improve the quality of healthcare provided to the warfighter and reduce the logistics footprint of USMC medical equipment.</p> <p>- Continue testing and product development for possible application technology for insertion, such as: portable patient life support systems, expeditionary medical refrigeration, oxygen production, sterilization, whole blood utilization, patient warming, and standardization of currently independent equipment sets to be employed for forward resuscitative, surgical care and casualty evacuation.</p> <p>- Complete collaborative testing efforts with Army for Traumatic Brain Injury (TBI) non-invasive diagnosis and treatment to determine viability in an operational environment in support of reduction of TBI effects.</p> <p>FY 2022 Base Plans:</p> <p>- Initiate product verification test and evaluation for equipment such as expeditionary medical refrigeration, oxygen production, sterilization, whole blood utilization and patient warming.</p> <p>- Initiate research and development for Project Phoenix medical support framework in support of the Marine Littoral Regiment (MLR). Research validates engineering changes to Authorized Medical Allowance Lists (AMAL) product baselines.</p> <p>- Initiate research to develop advanced wound healing bandages for prolonged field care in the MLR under Distributed Maritime Operations (DMO)/Littoral Operations in a Contested Environment (LOCE), validating engineering changes to AMAL product baselines.</p> <p>- Continue research, development, testing and evaluation of new packing configurations of currently fielded forward surgical and trauma resuscitation capabilities to reduce the cubic foot space requirements in order to utilize limited lift capabilities. Conduct further analysis to validate the existing patient condition code requirements, and patient streams against future casualty stream estimates in the corresponding future operational environment(s) to identify material that can be removed from capabilities without impacting effectiveness.</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2503 / Initial Issue

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>- Continue to test COTS/NDI medical equipment items for the ERCS, FRSS and STP to determine future viability in an operational environment.</p> <p>- Continue testing of medical equipment items to evaluate their energy efficiency, functionality and ability to improve the quality of healthcare provided to the warfighter and reduce the logistics footprint of USMC medical equipment.</p> <p>- Continue testing and product development for possible application technology for insertion, such as: portable patient life support systems, expeditionary medical refrigeration, oxygen production, sterilization, whole blood utilization, patient warming, and standardization of currently independent equipment sets to be employed for forward resuscitative, surgical care and casualty evacuation.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: FY 2021 to FY 2022 increase of \$0.278M aligns with the requirement to determine necessary refit of AMAL capabilities to meet emerging requirements under Project Phoenix in support of the MLR.</p>					
<p>Title: *Family of Shelters and Shelter Equipment (FSSE)</p> <p align="right">Articles:</p> <p>FY 2021 Plans: - Continue the evaluation and development of FSSE energy efficient Engineering Change Proposals (ECPs) such as alternative production techniques and designs.</p> <p>FY 2022 Base Plans: - Continue the evaluation and development of FSSE energy efficient ECPs such as alternative production techniques and designs. - Initiate test and evaluation of multi-spectral defense netting and other material solutions used to provide deception or limit detection and observation of personal and equipment.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>	0.001	0.200	0.199	0.000	0.199
	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2503 / Initial Issue

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
The FY21 to FY22 decrease of \$0.001M has minimal impact to planned program requirements.					
Title: *Family of Combat Field Feeding (CFFS) Articles: FY 2021 Plans: - Continue to reduce the overall logistics burden by researching and testing technological improvements for CFFS components such as commercial food service and alternative field sanitation solutions. FY 2022 Base Plans: - Continue to reduce the overall logistics burden by researching and testing technological improvements for CFFS components such as commercial food service and alternative field sanitation solutions. - Initiate research and development of lighter weight and scalable field feeding and field sanitation equipment that use alternate energy sources or provide reduced fuel consumption. FY 2022 OCO Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: FY 2021 to FY 2022 increase of \$0.005M aligns with increasing costs for researching and testing technological improvements for CFFS.	0.057	0.065	0.070	0.000	0.070
	-	-	-	-	-
Title: Calibration and Maintenance Program (CAMP) Articles: FY 2021 Plans: - Continue exploration of emerging technologies to enhance technical capabilities of individual calibration equipment (standards) used within expeditionary calibration facilities by deployed Marine Corps units. New calibration standards are required to replace obsolete items. FY 2022 Base Plans: - Continue exploration of emerging technologies to enhance technical capabilities of individual calibration equipment (standards) used within expeditionary calibration facilities by deployed Marine Corps units. New calibration standards are required to replace obsolete items. FY 2022 OCO Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement:	0.240	0.250	0.248	0.000	0.248
	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2503 / Initial Issue

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
The FY21 to FY22 decrease of \$0.002M has minimal impact to planned program requirements.					
Title: Family of Expeditionary Water Systems (FEWS) Articles: FY 2021 Plans: - Development testing of Squad Water Purification System (SWPS) SBIR Phase II deliverables at NAVFAC, as well as support to procurement of additional SWPS prototypes for incorporation in Fleet Marine Force exercises for conduct of Field User Evaluation, informing a requirements document to transition SWPS to a Program of Record. FY 2022 Base Plans: - Development to support improvements to various expeditionary hygiene equipment water systems, to include an upgrade or replacement shower system as the PICA (Air Force) is divesting of the currently fielded B0055 Shower Unit system in the Marine Corps inventory. - Research and validate the Atmospheric Water Generator capability by exploring the systems possibility to reduce the need for a water source in providing drinkable water for human consumption. Currently industry has made great strides in reducing the size of an AWG making it more flexible for an EABO environment. FY 2022 OCO Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: Decrease of \$0.004M from FY21 to FY22 is due to Inflation Rates for Non-Pay and Non-Fuel Purchases.	0.673	0.700	0.696	0.000	0.696
	-	-	-	-	-
Title: Family of Expeditionary Fuel Systems (FEFS) Articles: FY 2021 Plans: - Initiate test and evaluation to procure up to (5) Petroleum Expeditionary Analysis Kit (PEAK) prototypes with unique flash point testing capabilities under the Marine Corps' participation in the US Army PEAK program. FY 2022 Base Plans: -Initiate research and development of the LPFDS capability under development by the Office of Naval Research, integrating autonomy and supporting testing to improve the systems technology readiness level.	0.385	1.813	6.687	0.000	6.687
	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2503 / Initial Issue

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
-Continue test and evaluation of Phase I PEAK prototypes and develop Phase II request for proposals for delivery of low rate initial production quantities in FY23. FY 2022 OCO Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: FY 2021 to FY 2022 increase of \$4.874M is to fund the transition research and development LPFDS capability, integrating autonomy and supporting testing to improve the systems technology readiness level.					
Accomplishments/Planned Programs Subtotals	5.102	4.917	10.251	0.000	10.251

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• PMC/6522: Family of Field Medical Equipment	2.898	4.187	8.105	-	8.105	-	-	-	-	-	-
• PMC/4181: Calibration & Maintenance Program (CAMP).	55.156	24.405	33.554	-	33.554	-	-	-	-	-	-
• PMC/6670: Family of Expeditionary Water Systems (FEWS)	10.956	9.174	4.402	-	4.402	-	-	-	-	-	-
• PMC/6277: Family of Expeditionary Fuel Systems (FEFS)	0.052	0.501	2.161	-	2.161	-	-	-	-	-	-

Remarks

D. Acquisition Strategy
Cold Weather and Mountaineering, Load Bearing and Pack Systems, Individual Warfighting Equipment, Marine Corps Uniforms: Items utilize various acquisition strategies. These programs leverage heavily on current developments and technology in commercial industry. As a result, the government's R&D phase is relatively short. Contracting is performed by either Marine Corps Systems Command, the Naval Research Laboratory or the U.S. Army Natick Soldier Research, Development and Engineering Center via Indefinite Delivery/Indefinite Quantity (ID/IQ) contracts. ID/IQ contracts are used to decrease the government risk, allow maximum contract flexibility and capitalize on the savings realized by utilizing Economic Order (EO) quantities.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2503 / Initial Issue
<p>Family of Shelters: The Shelter acquisition strategy is to modify non-developmental items (NDI) to further meet the requirements of the Marine Corps, to support development of multi-service items through inter-service agreements and to adopt commercial-off-the-shelf (COTS) items where applicable.</p> <p>Family of Field Medical Equipment: These programs leverage heavily on current development and technology in the commercial medical industry. The field medical acquisition strategy is to modify NDI and adopt COTS items. Due to the nature of medical device development and the USMC reliance on commercial RDT&E practices, it is frequently difficult to accurately predict successful transition due in part to strict Food and Drug Administration oversight and approval processes.</p> <p>Combat Field Feeding Systems: This program utilized various acquisition strategies and leverages heavily on current developments and technology in commercial industry and other Service field feeding systems. As a result, the government's RDT&E phase is relatively short. Contracting is performed by either Marine Corps Systems Command Contracting Directorate or the US Army Combat Capabilities Development Command (DoD Executive Agent for Field Feeding) via ID/IQ contracts.</p> <p>Calibration and Maintenance Program (CAMP): The CAMP acquisition strategy is to evaluate NDI items and ask industry for enhancements and modifications to meet technical and expeditionary requirements. This will be in concert with the Navy's calibration RDT&E efforts.</p> <p>Family of Expeditionary Water Systems (FEWS): The FEWS acquisition strategy is to validate future water purification and hygiene capabilities through test and evaluation under operationally relevant conditions, and to further evaluate NDI items and collaborate with industry for enhancements and modifications to meet technical and expeditionary requirements for a new era of hygiene equipment items to better support operational concepts.</p> <p>Family of Expeditionary Fuel Systems (FEFS): The FEFS acquisition strategy is two-fold, and will continue to substantially participate under the Army's PEAK acquisition strategy for the Marine Corps unique requirements. Additionally, we will continue to collaborate with the Office of Naval Research, MCWL, and CD&I on the fulfillment of a Future Naval Capability Technology Deployment Agreement to transition the LPFDS from S&T.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy											Date: May 2021				
Appropriation/Budget Activity 1319 / 7						R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys					Project (Number/Name) 2503 / Initial Issue				

Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Marine Corps Uniforms	MIPR	USA NSRDEC : Natick, MA	6.428	0.270	Mar 2020	0.104	Mar 2021	0.422	Mar 2022	-		0.422	-	-	-
Cold Weather & Mountaineering	MIPR	USA NSRDEC : Natick, MA	2.029	0.864	May 2020	0.088	Jan 2021	0.000		-		0.000	-	-	-
Load Bearing and Pack Systems	C/FFP	MCSC : Quantico, VA	1.232	0.343	Feb 2020	0.352	Feb 2021	0.215	Feb 2022	-		0.215	-	-	-
Individual Warfighting Equipment	MIPR	USA NSRDEC : Natick, MA	0.869	0.129	Feb 2020	0.139	Jun 2021	0.000		-		0.000	-	-	-
Family of Field Medical	MIPR	USDA-ARS : Beltsville, MD	0.000	0.000		0.000		0.255	Dec 2021	-		0.255	-	-	-
Family of Shelters and Shelter Equipment	MIPR	DEVCOM : Natick, MA	1.264	0.000	Feb 2020	0.190	Feb 2021	0.000		-		0.000	-	-	-
Calibration and Maintenance Program	WR	NSWC : Corona, CA	0.250	0.240	Jan 2020	0.250	Jan 2021	0.248	Jan 2022	-		0.248	-	-	-
Family of Expeditionary Fuel Systems	Various	Various : Various	0.000	0.000		1.500	Aug 2021	6.354	Dec 2021	-		6.354	-	-	-
Prior Year Cumulative Funding	Various	Various : Various	23.939	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			36.011	1.846		2.623		7.494		-		7.494	-	-	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Prior Year Cumulative Funding	Various	Various : Various	1.096	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			1.096	0.000		0.000		0.000		-		0.000	-	-	N/A

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2503 / Initial Issue
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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Marine Corps Uniforms	MIPR	USA NSRDEC : Natick, MA	1.343	0.581	Mar 2020	0.104	Mar 2021	0.422	Mar 2022	-		0.422	-	-	-
Cold Weather and Mountaineering	MIPR	USA NSRDEC : Natick, MA	3.490	0.570	Jan 2020	0.088	Mar 2021	0.000		-		0.000	-	-	-
Family of Field Medical	MIPR	U.S. Army Aeromedical Research Lab : Ft. Rucker, AL	0.101	0.205	Mar 2020	0.137	Mar 2021	0.220	Jan 2022	-		0.220	-	-	-
Family of Field Medical	MIPR	NSWC : Crane, ID	0.115	0.215	Apr 2020	0.000		0.180	Nov 2021	-		0.180	-	-	-
Family of Field Medical	WR	NHRC : Silver Spring MD	0.000	0.000		0.249	Mar 2021	0.180	Nov 2021	-		0.180	-	-	-
Family of Field Medical	C/FFP	MCSC : Quantico, VA	0.127	0.000		0.000		0.000		-		0.000	-	-	-
Family of Field Medical	MIPR	AFMESA : Frederick, MD	0.000	0.000		0.145	Mar 2021	0.000		-		0.000	-	-	-
Family of Field Medical	WR	NAVAIR : Patuxent River, MD	0.000	0.000		0.000		0.000		-		0.000	-	-	-
Family of Field Medical	MIPR	NSWC : Dahlgren, VA	10.595	0.140	Apr 2020	0.396	Apr 2021	0.000		-		0.000	-	-	-
Family of Field Medical	MIPR	NSWC - Carderock : Bethesda, MD	0.000	0.000		0.000		0.320	Dec 2021	-		0.320	-	-	-
Family of Field Medical	MIPR	NSWC Indian Head : Indian Head, MD	0.000	0.376	Apr 2020	0.000		0.000		-		0.000	-	-	-
Family of Shelters and Shelter Equipment	TBD	TBD : TBD	0.000	0.000		0.000		0.190	May 2022	-		0.190	-	-	-
Family of Combat Field Feeding	MIPR	DEVCOM : Natick, MA	0.907	0.058	Jan 2020	0.065	Dec 2020	0.070	Dec 2021	-		0.070	-	-	-
Family of Expeditionary Water Systems	MIPR	TARDEC : Warren, MI	0.400	0.400	Mar 2020	0.000		0.000		-		0.000	-	-	-
Family of Expeditionary Water Systems	C/FFP	MCSC : Quantico, VA	0.000	0.273	Aug 2020	0.000		0.000		-		0.000	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 7				PE 0206623M / MC Ground Cmbt Spt Arms Sys				2503 / Initial Issue							
Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Family of Expeditionary Water Systems	MIPR	MCSC : Quantico VA	0.000	0.000		0.700	Jun 2021	0.350	Mar 2022	-		0.350	-	-	-
Family of Expeditionary Water Systems	MIPR	TBD : TBD	0.000	0.000		0.000		0.346	Apr 2022	-		0.346	-	-	-
Family of Expeditionary Fuel Systems	MIPR	Various : Various	0.400	0.385	Apr 2020	0.313	Dec 2021	0.333	Dec 2021	-		0.333	-	-	-
Prior Year Cumulative Funding	Various	Various : Various	3.167	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			20.645	3.203		2.197		2.611		-		2.611	-	-	N/A
Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Family of Field Medical	Various	MARCORSYSCOM : Quantico, VA	0.137	0.000		0.036	Sep 2021	0.052	Aug 2022	-		0.052	-	-	-
Family of Field Medical	Various	MCSC : Quantico, VA	0.020	0.052	Oct 2019	0.051	Oct 2020	0.085	Oct 2021	-		0.085	-	-	-
Family of Shelters and Shelter Equipment	Various	MCSC : Quantico, VA	0.018	0.001	Oct 2019	0.010	Oct 2020	0.009	Oct 2021	-		0.009	-	-	-
Prior Year Cumulative Funding	Various	Various : Various	0.361	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			0.536	0.053		0.097		0.146		-		0.146	-	-	N/A
Project Cost Totals			58.288	5.102		4.917		10.251		-		10.251	-	-	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date: May 2021**

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2503 / Initial Issue
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	FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Calibration And Maintenance Program (CAMP)												
Develop & test emerging calibration equipment												
Family of Field Medical Equipment												
AMAL Technology/Equipment Research and Product Development												
AMAL Technology/Equipment Testing and Evaluation												
Field Medical Management Services												

2022PB - 0206623M - 2503

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2503 / Initial Issue

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Infantry Combat Equipment (ICE)				
Marine Corps Uniforms (MCU): Navy Natick Testing Effort Support:	2	2020	4	2022
Marine Corps Uniforms (MCU): Lab Testing:	1	2020	4	2022
Marine Corps Uniforms (MCU): Shade Lab Testing:	1	2020	4	2022
Marine Corps Uniforms (MCU): Uniform Testing:	2	2020	4	2022
Marine Corps Uniforms (MCU): Footwear Testing:	2	2020	4	2022
Marine Corps Uniforms (MCU): Flame Resistant Testing:	1	2020	4	2022
Individual Warfighting Equipment (IWE): Natick Lab Testing:	2	2020	3	2021
Cold Weather and Mountaineering (CWM): Natick Testing Effort Support:	2	2021	3	2021
Cold Weather and Mountaineering (CWM): Material Properties Lab Testing:	1	2020	4	2021
Cold Weather and Mountaineering (CWM): Extreme Cold Weather Boot:	2	2020	3	2021
Cold Weather and Mountaineering (CWM): Cold Weather User Evaluation:	2	2020	3	2021
Cold Weather and Mountaineering (CWM): Insulation Layer 3 and 4 upgrade:	2	2021	3	2021
Load Bearing and Pack Systems (LBPS): Load Carrier FUE	2	2021	2	2021
Load Bearing and Pack Systems (LBPS): Pack Generation II: USER EVAL 1 & 2	3	2021	4	2021
Load Bearing and Pack Systems (LBPS): Pack Generation II: USER EVAL 3 & 4	1	2022	3	2022
Load Bearing and Pack Systems (LBPS): Waist Pouch FUE	3	2022	4	2022
Load Bearing and Pack Systems (LBPS): Pack Frame FUE	3	2022	4	2022
Calibration And Maintenance Program (CAMP)				
Develop & test emerging calibration equipment:	2	2020	4	2022
Family of Field Medical Equipment: AMAL Technology/Equipment Research and Product Development:	1	2022	4	2022

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2503 / Initial Issue
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Family of Field Medical Equipment: AMAL Technology/Equipment Testing and Evaluation:	2	2020	4	2022
Family of Field Medical Equipment: Field Medical Management Services:	1	2020	4	2022

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2513 / Body Armor
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
2513: <i>Body Armor</i>	60.161	4.587	4.693	3.444	-	3.444	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Ballistic Protection Systems (BPS) provides the most technologically advanced protection at the lightest weight available in the world today. It provides the critical ballistic protective systems that save lives, reduce the severity of combat injuries, and increase combat effectiveness by keeping more Marines in the fight. Major BPS programs include: Plate Carrier Generation III (PC Gen III); Lightweight Plates (LWP); Enhanced Combat Helmet (ECH); Improved Ballistic Eyewear (IBE); Integrated Helmet System (IHS) and Hearing Enhancement. The major focus areas of all BPS programs are adapting ballistic protective systems to the constantly changing threat environment and leveraging emerging technologies to lighten the load and increase the mobility of each Marine.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Ballistic Protection Systems	4.587	4.693	3.444	0.000	3.444
Articles:	-	-	-	-	-
FY 2021 Plans:					
-Continued development of Integrated Helmet System (IHS) to include evaluation of ballistic and integrated hearing protection. IHS is the future helmet system of the Marine Corps with integrated hearing protection, power, ballistic protection, and better suited to integrate future capabilities than the current stand alone Enhanced Combat Helmet (ECH) and Hearing Enhancement Devices which are currently fielded.					
- Continued testing for the next generation of eyewear, specifically the capability to protect against laser threats and to adjust rapidly in varying light conditions and provide laser protection.					
- Continued research with industry partners towards understanding and developing the future technology associated with next generation personal protective equipment (PPE) (i.e. helmets, body armor, eyewear, and hearing protection) to reduce bulk, weight, stiffness, and improve ballistic protection while increasing the mobility of the individual Marine.					
- Continued to develop solutions that provide improved fit, modularity, and integration of armor systems.					
- Initiated development of systems that integrate power management in helmets.					
FY 2022 Base Plans:					
- Complete development and evaluation of Integrated Helmet System (IHS).					
- Complete next generation of eyewear, specifically the capability to protect against laser threats and to adjust rapidly in varying light conditions and provide laser protection.					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2513 / Body Armor

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>- Continue research with industry partners towards understanding and developing the future technology associated with next generation PPE (i.e. helmets, body armor, and hearing protection) to reduce bulk, weight, stiffness, and improve ballistic protection while increasing the mobility of the individual Marine.</p> <p>- Continue to research and develop solutions that improves fit, modularity, and integration of body armor systems.</p> <p>- Initiate the development of data and power management components within helmets through prototype development and testing.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease of \$1.249M from FY 2021 to FY 2022 is due to reduction of Body Armor testing requirements.</p>					
Accomplishments/Planned Programs Subtotals	4.587	4.693	3.444	0.000	3.444

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

N/A

Remarks

D. Acquisition Strategy

Marine Corps Ballistic Protection Systems (BPS) research, development, testing & evaluation activities include seeking new developments in ballistic technology that feature reductions in weight, improvements in ballistic performance, enhanced operational effectiveness through improved product designs and the application of new material technologies to reduce total ownership costs by improving the expected service life of fielded systems. In order to accomplish these goals, the Marine Corps uses a broad array of government and contractor performers to achieve the desired end state. This includes partnerships with government entities and research and development contracts and partnership intermediaries where applicable. The Marine Corps also leverages advancements in industry capabilities to rapidly field non-developmental and commercially available off the shelf armor solutions. Performance is confirmed by characterizing ballistic performance and data collected during user evaluations.

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2513 / Body Armor
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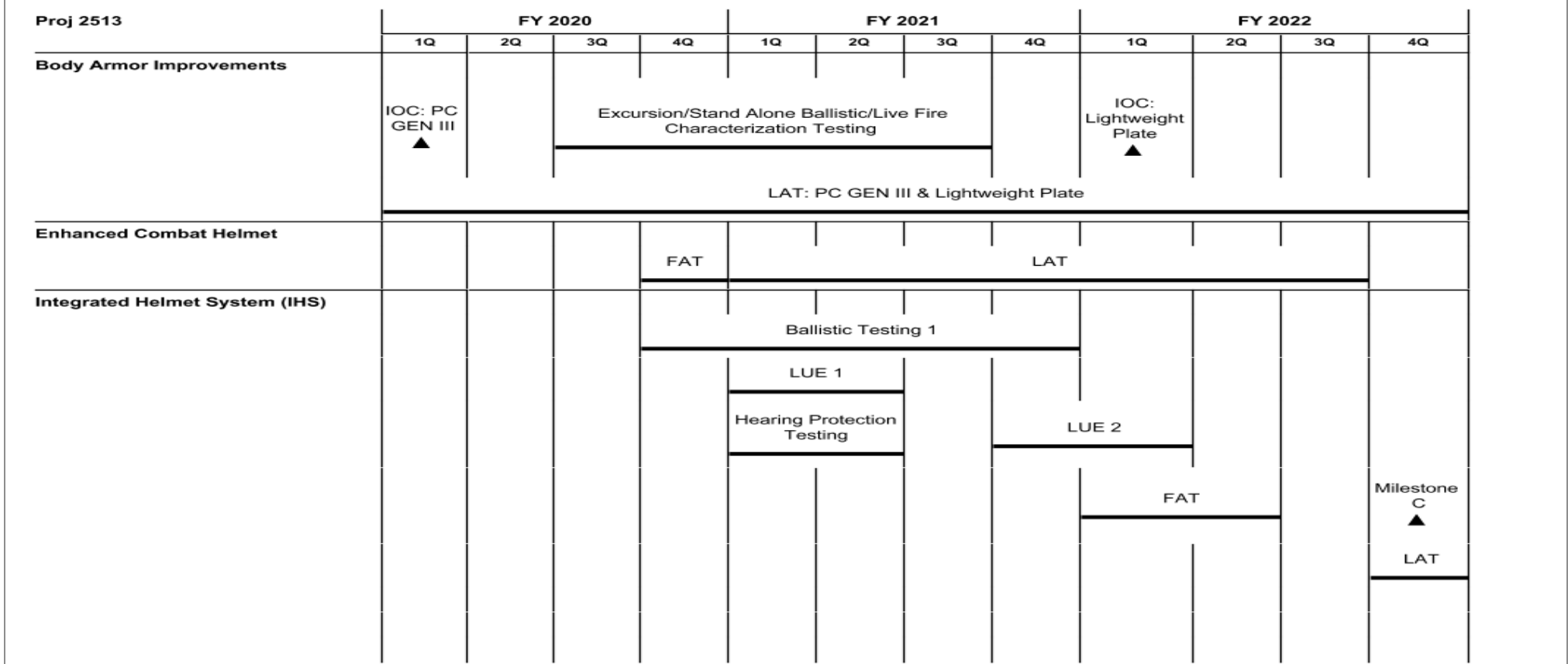
Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Development of Integrated Helmet (IHS)	C/FFP	MCSC : Quantico, VA	0.000	1.750	Sep 2020	0.958	Dec 2020	1.000	Dec 2021	-		1.000	-	-	-
Mosaic/Multi-layer Hard Armor Development	C/FFP	NRL : Washington DC	17.261	0.311	Jan 2020	0.200	Mar 2021	0.000		-		0.000	-	-	-
PC Gen III/Hard Armor Printed Plates	C/FFP	MCSC : Quantico, VA	3.375	0.986	Jan 2020	0.237	Jan 2021	0.000		-		0.000	-	-	-
Prior Year Cumulative Funding	Various	Various : Various	16.391	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			37.027	3.047		1.395		1.000		-		1.000	-	-	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering Support (Army)	MIPR	CCDC SC : Natick, MA	1.571	0.695	Jan 2020	0.945	Dec 2020	0.945	Dec 2021	-		0.945	-	-	-
Engineering Support (Navy)	WR	NCTRF: : Natick, MA	0.000	0.000		0.170	Mar 2021	0.170	Mar 2022	-		0.170	-	-	-
Ballistic Protection Systems	MIPR	NCTRF: : Natick, MA	0.796	0.122	Jun 2020	0.000		0.000		-		0.000	-	-	-
Ballistic Protection Systems Support Services-Eng,Log,PM	C/FFP	MCSC : Quantico, VA	0.552	0.318	Aug 2020	0.798	Mar 2021	0.798	Mar 2022	-		0.798	-	-	-
Prior Year Cumulative Funding	Various	Various : Various	0.054	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			2.973	1.135		1.913		1.913		-		1.913	-	-	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date: May 2021**

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2513 / Body Armor
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2022PB - 0206623M - 2513

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2513 / Body Armor

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2513				
Body Armor Improvements: Initial Operational Capability (IOC): PC GEN III	1	2020	1	2020
Body Armor Improvements: IOC: Lightweight Plate	1	2022	1	2022
Body Armor Improvements: Excursion/Stand Alone Ballistic/Live Fire Characterization Testing	3	2020	3	2021
Body Armor Improvements: Lot Acceptance Testing (LAT): PC GEN III & Lightweight Plate	1	2020	4	2022
Enhanced Combat Helmet: First Article Test (FAT)	4	2020	4	2020
Enhanced Combat Helmet: LAT	1	2021	3	2022
Integrated Helmet System (IHS): Ballistic Testing 1	4	2020	4	2021
Integrated Helmet System (IHS): Limited User Evaluation (LUE) 1	1	2021	2	2021
Integrated Helmet System (IHS): IHS: Hearing Protection Testing	1	2021	2	2021
Integrated Helmet System (IHS): LUE 2	4	2021	1	2022
Integrated Helmet System (IHS): FAT	1	2022	2	2022
Integrated Helmet System (IHS): Milestone C	4	2022	4	2022
Integrated Helmet System (IHS): LAT	4	2022	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys				Project (Number/Name) 2928 / Exp Indirect Fire Gen Supt Wpn Sys			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
2928: Exp Indirect Fire Gen Supt Wpn Sys	47.807	1.203	0.491	0.497	-	0.497	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Expeditionary Indirect Fires provides the Ground Combat Element (GCE) systems needed to engage multiple enemy threats from land and sea. High Mobility Artillery Rocket Systems (HIMARS) which is a C-130 transportable, wheeled, indirect fire, rocket/missile system capable of firing all rockets and missiles in the Multiple Launch Rocket System (MLRS) Family of Munitions (MFOM). The system includes one launcher, two Re-Supply Systems, and the MFOM. HIMARS provides the Marine Air-Ground Task Force (MAGTF) with 24 hour ground-based, responsive General Support/General Support Reinforcing (GS/GSR) indirect fires which accurately engage targets at long range (60+km), with high volumes of lethal fire under all weather conditions throughout all phases of combat operations ashore, to include irregular warfare, distributed operations and sea control. Development provides for the modernization and obsolescence mitigation of the HIMARS in order to provide improved operational capabilities. Development also provides for the qualification/certification of newly developed MFOM for shipboard transportability.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: HIMARS Expeditionary & Naval Integration Capabilities	1.203	0.491	0.497	0.000	0.497
Articles:	-	-	-	-	-
FY 2021 Plans: HIMARS: - Engineering and Integration testing of the launcher, radio and intercom modernization. - Engineering and safety support for Guided Multiple Launch Rocket System (GMLRS) Extended Range (ER) rocket motor qualification and certifications.					
FY 2022 Base Plans: HIMARS: - Continue systems engineer support. - Complete testing of the launcher, radio and intercom modernization.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: FY 2021 to FY 2022 \$0.006M increase due to inflation, no significant changes.					
Accomplishments/Planned Programs Subtotals	1.203	0.491	0.497	0.000	0.497

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2928 / Exp Indirect Fire Gen Supt Wpn Sys

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• PMC/ BLI 2212: <i>High Mobility Artillery Rocket System (HIMARS)</i>	95.686	49.687	71.795	-	71.795	-	-	-	-	-	-
• PMC/ BLI 3025: <i>Guided Multiple Launch Rocket System (GMLRS)</i>	44.765	151.145	98.299	-	98.299	-	-	-	-	-	-

Remarks

BLI 2212 allocated for procurement efforts in support of Ground Based Anti-Ship Missile and High Mobility Artillery Rocket System.

D. Acquisition Strategy

Engineering support will come from multiple Army and Navy labs.

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2928 / Exp Indirect Fire Gen Supt Wpn Sys
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
HIMARS RSS Intercom/ Radio Integration	WR	SPAWAR : Charleston	0.000	0.576	Dec 2019	0.000		0.000		-		0.000	-	-	-
HIMARS Launcher Radio Integration	WR	S3i : Huntsville, AL	0.000	0.326	Mar 2021	0.336	Mar 2021	0.343	Dec 2021	-		0.343	-	-	-
HIMARS Engineering	WR	NSWC : Various	0.000	0.301	Dec 2019	0.155	Dec 2020	0.154	Dec 2021	-		0.154	-	-	-
Prior Years Cumulative Funding	Various	Various : Various	32.890	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			32.890	1.203		0.491		0.497		-		0.497	-	-	N/A

Remarks
FY22 funding is for development of the HIMARS radio integration & engineering efforts for testing of the communication modernization efforts.

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Prior Years Cumulative Funding	Various	Various : Various	9.273	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			9.273	0.000		0.000		0.000		-		0.000	-	-	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Prior Years Cumulative Funding	Various	Various : Various	5.644	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			5.644	0.000		0.000		0.000		-		0.000	-	-	N/A

Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract			
Project Cost Totals			47.807	1.203	0.491	0.497	-	0.497	-	-	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy							Date: May 2021			
Appropriation/Budget Activity 1319 / 7			R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys			Project (Number/Name) 2928 / Exp Indirect Fire Gen Supt Wpn Sys				
	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract	

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2928 / Exp Indirect Fire Gen Supt Wpn Sys

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Proj 2928	
HIMARS Developmental Efforts and Radio Integration	
HIMARS Engineering and Safety Support	

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 2928 / Exp Indirect Fire Gen Supt Wpn Sys

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2928				
HIMARS Developmental Efforts and Radio Integration	1	2020	4	2022
HIMARS Engineering and Safety Support	1	2020	4	2022

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3098 / Fire Support System
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3098: <i>Fire Support System</i>	157.707	7.016	9.697	3.061	-	3.061	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project 3098 Fire Support System funds the development of critical United States Marine Corps (USMC) key efforts: fire support coordination, targeting, and digital interoperability systems required for the employment of air and ground fires. Fire Support Systems develop and integrate a digital networked sensor to shooter kill chain supporting the Marine Air Ground Task Force (MAGTF). Key efforts included are:

The Fire Support Mod Line (FSML) is a set of Marine Corps efforts to address critical operational and logistics deficiencies in existing, fielded fire support/weapons systems and equipment. FSML provides technical refresh and development of target acquisition, artillery survey, meteorological systems, weapon systems, and fire direction control. Provides execution of product improvements/modifications, and upgrades to system hardware and software for the Marine Artillery Survey Set (MASS), Modeled Meteorological Information Manager (MMIM), Global Positioning System Survey (GPS-S), the Improved Position Azimuth Determining System (IPADS) and the replacement system, and the Joint Terminal Attack Controller-Laser Target Designator (JTAC-LTD). Funding is also used for upgrades, engineering change proposals (ECPs), and modifications for guided munitions and fire control systems which fall within Fire Support Systems for the Marine Corps.

The Family of Artillery Munitions (FAM) funding is used to develop and mature artillery munitions for the Marine Corps and includes conducting safety and engineering analysis as well as ship compatibility studies.

The Common Laser Range Finder Integrated Capability (CLRf IC) is an association of targeting systems that provide handheld, lightweight, man portable devices supporting the employment of air and surface fires. They provide foot mobile users the ability to locate, identify, mark and designate targets in both day and night conditions for engagement by fire support and weapons platforms. CLRf IC systems support the collection and dissemination of targeting information to maneuver, fire support, and intelligence personnel via external digital devices such as the Advanced Field Artillery Tactical Data System (AFATDS) and the Target Handoff System (THS) using associated Combat Net Radios. The CLRf IC includes two major components; The CLRf IC Laser Range Finder (LRF) supports the requirement to locate and transmit targeting information, while the Next Generation Hand Held Targeting System (NGHTS) combines the capabilities of the LRF with the ability to designate for specific requirements associated with laser guided munitions.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Fire Support Mods (FSM)	1.788	2.045	2.163	0.000	2.163
Articles:	-	-	-	-	-
Description: Funding is used for upgrades, engineering change proposals (ECPs), and modifications to system hardware and software for the Marine Artillery Survey Set (MASS), Meteorological Information Manager (MMIM),					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3098 / Fire Support System

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>Global Positioning System Survey (GPS-S), the Improved Position Azimuth Determining System (IPADS) and the replacement system, Marine Artillery Survey Set (MASS), and the Joint Terminal Attack Controller-Laser Target Designator (JTAC-LTD) as well as technical refresh for target acquisition, and artillery survey and meteorological systems.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Completed development of advanced components for the IPADS replacement system - Conducted development of MASS Android Sensor Software - Initiated IPADS replacement vehicle motion sensor integration for future use with Joint Light Tactical Vehicle (JLTV) <p>FY 2022 Base Plans:</p> <ul style="list-style-type: none"> - Complete testing of advanced components for the IPADS replacement system - Complete Improved IPADS replacement vehicle motion sensor integration for future use with Joint Light Tactical Vehicle (JLTV) - Continue development of MASS Android Sensor Software <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase of \$0.118M from FY 2021 to FY 2022 supports the testing of the IPADS replacement system.</p>					
<p>Title: Family of Artillery Munitions (FAM)</p> <p align="right">Articles:</p> <p>Description: Family of Artillery Munitions (FAM) funding is used to develop and mature future artillery munitions for the Marine Corps which includes conducting safety and engineering analysis as well as ship compatibility studies.</p> <p>In conjunction with the Army, the Marine Corps is evaluating new munitions that are effective against individual area targets dispersed over a defined area, targets whose precise locations are not known, time-sensitive or moving targets, and massed formations of enemy forces.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Performed USMC specific analysis and testing efforts for Precision Guidance Kit Anti-Jam (PGK-AJ) 	0.698	3.941	0.321	0.000	0.321
	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3098 / Fire Support System

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>- Initiated design concepts and trade studies with the Army for Moving Target Artillery Round (MTAR) munition, a moving surface target that can engage moving armored targets at extended ranges</p> <p>- Evaluated replacement solutions for Dual Purpose Improved Conventional Munitions (DPICM)</p> <p>FY 2022 Base Plans:</p> <p>- Perform classification and safety certification of the 155mm artillery projectiles for the Precision Guidance Kit Anti-Jam (PGK-AJ)</p> <p>FY 2022 OCO Plans:</p> <p>- N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p> <p>Decrease of \$3.620M from FY 2021 to FY 2022 is due to the completion of the Moving Target Artillery Round (MTAR) munition design concepts and DPICM evaluation.</p>					
<p>Title: Common Laser Range Finder (CLRF)</p> <p align="right">Articles:</p> <p>Description: The Common Laser Range Finder (CLRF) is a Family of systems consisting of the Common Laser Range Finder Integrated Capability (CLRF IC) and the Next Generation Handheld Targeting System (NGHTS). The CLRF IC will complete fielding in FY 2021. The NGHTS is currently in development and will consolidate the capabilities of multiple systems into a single targeting capability that will support Joint Forward Observers and Joint Terminal Air Controllers for the next decade. The NGHTS provides day and night enhanced target locating capabilities as well as the ability to employ laser guided munitions with significant size and weight reduction as compared to current fielded systems.</p> <p>FY 2021 Plans:</p> <p>- Completed integration of the north finding & north keeping targeting systems capability</p> <p>- Completed integration of optical and laser designation components to support range and accuracy requirements</p> <p>- Completed component integration of the NGHTS and developmental testing of system</p> <p>- Conducted Operational Assessment of NGHTS prototypes</p> <p>FY 2022 Base Plans:</p> <p>- Complete minor engineering changes and final integration and testing of NGHTS prototypes</p> <p>FY 2022 OCO Plans:</p>	4.530	3.711	0.577	0.000	0.577
	-	-	-	-	-

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3098 / Fire Support System
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: The decrease of \$3.134M from FY 2021 to FY 2022 is due to completion of NGHTS prototype development.					
Accomplishments/Planned Programs Subtotals	7.016	9.697	3.061	0.000	3.061

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• PMC/473302: Fire Support Mods	4.427	4.424	4.534	-	4.534	-	-	-	-	-	-
• PMC/473300: Common Laser Range Finder (CLRF)	12.955	0.954	15.486	-	15.486	-	-	-	-	-	-

Remarks

D. Acquisition Strategy
These programs range from off-the-shelf modifications to developmental items. Development will typically be conducted at government labs.

Fire Support Mods:
Leverage acquisition efforts in conjunction with the Army, Warfare Centers and Labs for existing fielded systems. Continue efforts between the Army's Combat Capabilities Development Command - Armaments Center (CCDC-AC), and NSWC DD for the Future Survey System replacement. Continue liaison with the Army's PM TAS in order to leverage future efforts and economies of scale with a joint procurement. Procure hardware and software refreshes for the GPSS, MASS and MMIM to ensure compliance with cybersecurity policies, address obsolescence and interoperability with other C2 systems.

Family of Artillery Munitions (FAM):
Program includes artillery munitions which are being developed by the Army. The Army is the lead service for these programs but continues to interact with the FAM IPT to ensure USMC requirements and capability needs are met. This allows the USMC to become users of the munition and certify the round for naval transportation. The munitions include but are not limited to Dual Purpose Improved Conventional Munitions (DPICM) replacement, Precision Guidance Kit (PGK), and 155mm rounds. USMC engineering efforts are conducted primarily at Navy Warfare Centers.

Common Laser Range Finder (CLRF):
The Next Generation Handheld Targeting System (NGHTS) will be developed by using competitively awarded Other Transaction Agreements (OTA) for a phased approach that will result in a competitive down select to a single vendor. After the completion of the development phase a procurement contract will be awarded to

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

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
1319 / 7	PE 0206623M / <i>MC Ground Cmbt Spt Arms Sys</i>	3098 / <i>Fire Support System</i>

support Low Rate Initial Production, First Article Testing and Full Rate Production of the NGHTS Approved Acquisition Objective quantity of systems and provide initial training and maintenance support.

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3098 / Fire Support System
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FAM Development	WR	NSWC : Dahlgren, VA	0.000	0.155	Jan 2020	0.155	Dec 2020	0.000		-		0.000	-	-	-
FAM Moving Target	MIPR	NSWC : Dahlgren, VA	0.000	0.000		2.282	Dec 2020	0.000		-		0.000	-	-	-
CLRF/NGHTS	C/FFP	Various : Various	5.465	4.530	Feb 2020	2.970	Nov 2020	0.465	Nov 2021	-		0.465	-	-	-
Fire Support Mods (IPADS-R)	MIPR	CCDC : Picatinny, NJ	3.356	1.226	Dec 2019	1.690	Mar 2021	1.776	Dec 2021	-		1.776	-	-	-
Fires Support Mods (MASS Android Sensor Software)	MIPR	Army Research Lab : Adelphi, MD	1.707	0.022	May 2020	0.000		0.000		-		0.000	-	-	-
Fire Support Mods (IPADS-R)	MIPR	NIWC/LANT : Charleston, SC	0.000	0.200	Jul 2020	0.000		0.000		-		0.000	-	-	-
Fires Support Mods (MASS Android Sensor Software)	MIPR	CCDC : Picatinny, NJ	0.000	0.162	Feb 2020	0.155	Jul 2021	0.150	Dec 2021	-		0.150	-	-	-
Prior Years Cumulative Funding	Various	Various : Various	132.681	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			143.209	6.295		7.252		2.391		-		2.391	-	-	N/A

Remarks
 CLRF - Decrease of \$3.134M from FY 2021 to FY 2022 is due to the completion of the NGHTS prototype development.
 FAM - Decrease of \$3.620M from FY 2021 to FY 2022 is due to the completion of USMC focus on longer range engagement of the MTAR munition.
 FSM - Net increase of \$0.118M at CCDC for IPADS-R from FY 2021 to FY 2022 is due to the cost to complete the development and testing of the IPADS replacement system development. In FY 2021 MMIM effort was replaced with MASS Android Sensor Software development.

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FAM Engineering Support	WR	NSWC : Dahlgren, VA	3.334	0.225	Jul 2020	0.225	Mar 2021	0.000		-		0.000	-	-	-
FAM Program Mgt Support	SS/FFP	MCSC : Various	0.000	0.000		0.200	May 2021	0.156	Dec 2021	-		0.156	-	-	-

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3098 / Fire Support System
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FAM Safety Engineer Support	SS/FFP	NSWC : Indian Head, MD	0.000	0.000		0.180	Mar 2021	0.165	Dec 2021	-		0.165	-	-	-
CLRF/NGHTS	Various	Various : Various	0.000	0.000		0.450	Nov 2020	0.034	Nov 2021	-		0.034	-	-	-
Fire Support Mods Engineering Support	WR	NSWC : Dahlgren, VA	0.000	0.178	Jan 2020	0.200	Mar 2021	0.237	Jan 2022	-		0.237	-	-	-
Prior Years Cumulative Funding	Various	Various : Various	2.615	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			5.949	0.403		1.255		0.592		-		0.592	-	-	N/A

Remarks
 CLRF - Decrease of \$0.416M from FY 2021 to FY 2022 is due to completion of the NGHTS prototype development.
 FSM - Increase of \$0.037M from FY 2021 to FY 2022 is a result of the IPADS-R system testing support costs. Realigned prior year funds from Product Development to properly account for Dahlgren engineering support.
 FAM - Net decrease of \$0.284M from FY 2021 to FY 2022 is due to the completion of USMC focus on longer range engagement of the Moving Target Artillery Round (MTAR) munition.

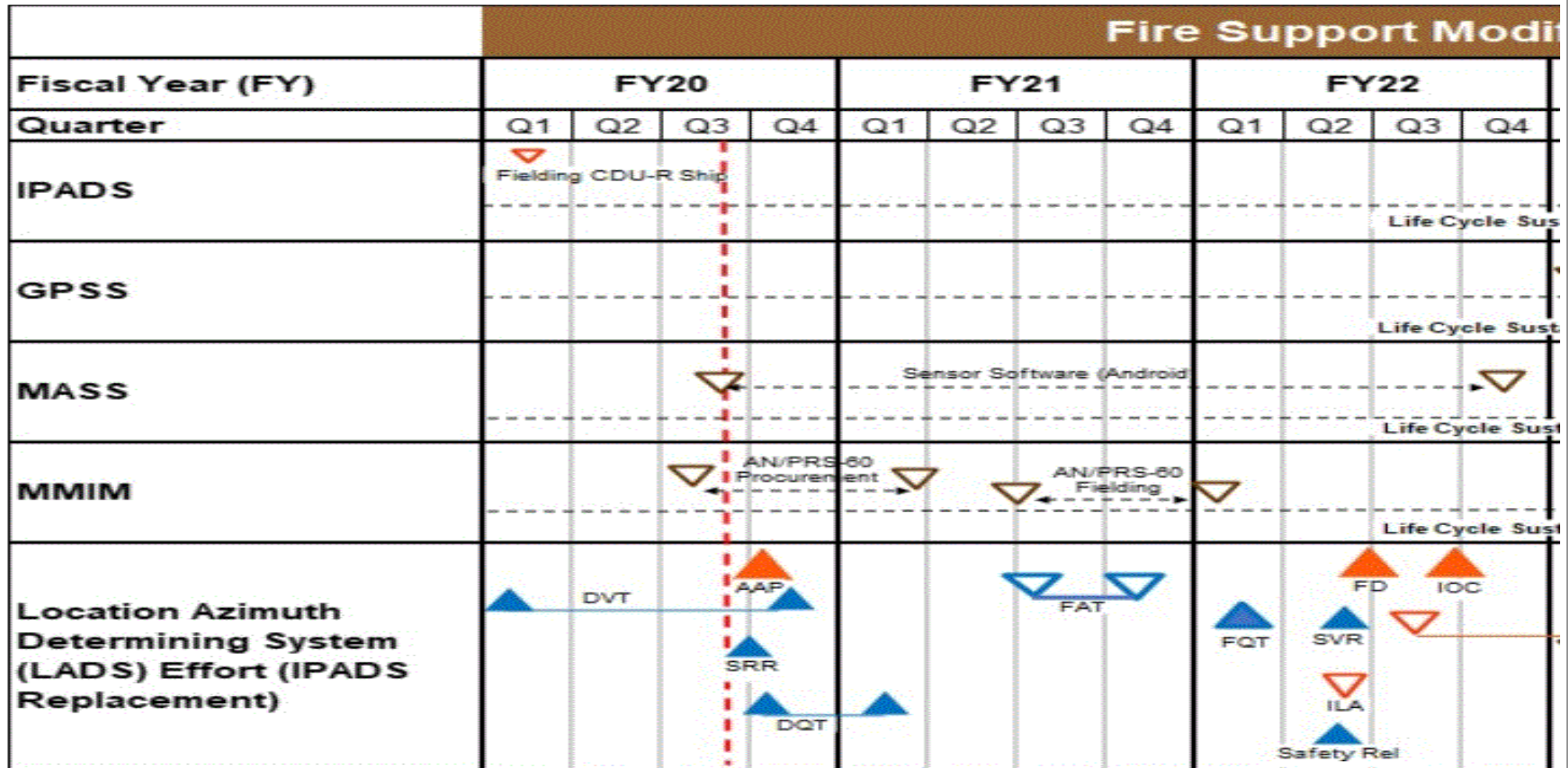
Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FAM DPICM Replacement Evaluations	C/BA	NSWC : Dahlgren, VA	0.000	0.318	Jan 2020	0.899	Mar 2021	0.000		-		0.000	-	-	-
CLRF/NGHTS	Various	Various : Various	0.000	0.000		0.291	Nov 2020	0.078	Nov 2021	-		0.078	-	-	-
Prior Years Cumulative Funding: Fire Support Mods	Various	Various : Various	8.549	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			8.549	0.318		1.190		0.078		-		0.078	-	-	N/A

Remarks
 CLRF - Decrease of \$0.213M from FY 2021 to FY 2022 is due to the completion of NGHTS development.
 FAM - Decrease of \$0.899M from FY 2021 to FY 2022 is due to the completion of DPICM evaluation.

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy Date: May 2021

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3098 / Fire Support System
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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy Date: May 2021

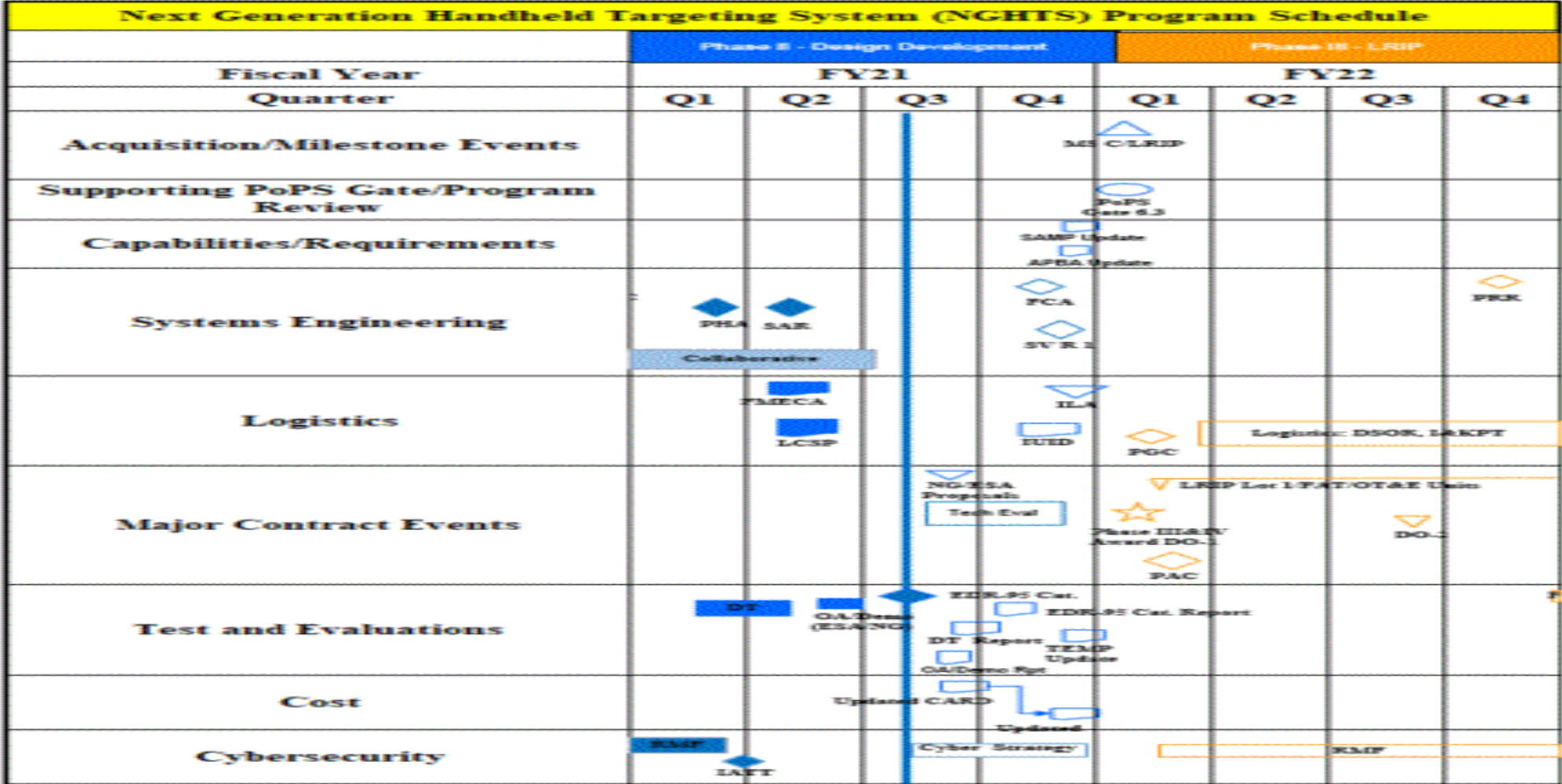
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3098 / Fire Support System
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FAM Schedule													
Fiscal Year	20				21				22				
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q
Acquisition/Milestone Events			◆ PGK-AJ RFP				◆ PGK-Aj EMD Award					XM1128 (DA70) FMR	
			◆ PGK(150m) SW MIL-STD Published				◆ XM1113 UMR					◆ XM1122E/A1 (DA68)	
Capabilities/Requirements	DPICM Requirements Development / Qualification												
Systems Engineering/Safety	■ XM1113 (DZ12) LDP Submitted to JSWSR				■ XM1128 (DA70) LDP Submitted to JSWSR								
Major Contract Events												★ M1128 (DA70)	
Test & Evaluation	PGK-AJ / 150M SW Development / Qualification												
LEGEND	◆ Army Event ■ Documentation												

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy Date: May 2021

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3098 / Fire Support System
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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3098 / Fire Support System

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3098				
FSM: MASS Android Sensor Software Development	3	2020	4	2022
FSM: LADS (IPADS) FAT	2	2021	3	2021
FSM: LADS (IPADS) SVR	2	2022	2	2022
CLRF: NGHTS Operational Assessment/Demonstration & Report	2	2021	3	2021

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3774 / Marine Corps Ammo
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3774: Marine Corps Ammo	1.273	1.431	1.305	10.123	-	10.123	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Ammunition Life Cycle Management Program supports PM Ammo's responsibility for Total Life Cycle Management for ground conventional munitions. Accordingly, PM Ammo is a member of the joint services Ammunition Logistics Research and Development IPT (ALR&D IPT). Each year the IPT solicits R&D projects from all of the services. The IPT looks for innovative ideas to enhance logistical support for munitions. Approximately 20 Ammo Logistics R&D projects are voted on each year by the IPT. They are prioritized by voting actions of the Senior Review Board and funding sources are identified. Since the funding for ammunition procurement is outpaced by annual expenditures, ammunition logistics R&D projects are designed to extend the shelf life of our current inventory, provide enhanced packaging to "lighten the load" of our munitions, and other such projects will go a long way to ensure the Marine Corps can maintain combat readiness with a reliable conventional ammunition inventory into the future. RDT&E funds will also be used to seek a prototype for the Ammunition Inventory Management System consisting of commercially available software solution(s) with minimal customization to fully track, account, audit and manage the supply and distribution of Class V munitions worldwide. Additionally, RDT&E funds will be used modernize some of the applications on the Marine Ammunition Knowledge Enterprise (MAKE).

Conventional Ground Ammunition is a project that identifies and develops Insensitive Munitions (IM) Technologies to address IM shortfalls in new Marine Corps development or improvements to legacy Conventional Ground Ammunition to meet OSD mandated IM compliance requirements. These IM Technology investments directly support the development of the bi-annual Marine Corps Insensitive Munitions Strategic Plan (IMSP) to address the identified IM technology needs of the Marine Corps.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Ammunition Life Cycle Management	0.930	0.776	9.586	0.000	9.586
Articles:	-	-	-	-	-
Description: RDT&E funds are required to seek a prototype for the Ammunition Inventory Management System consisting of commercially available software solution(s) with minimal customization to fully track, account, audit and manage the supply and distribution of Class V munitions worldwide.					
FY 2021 Plans: FY 2021 Baseline Appropriation Request: \$776K					
FY 2021 funding will support:					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3774 / Marine Corps Ammo

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>-Projects voted on by the Ammunition Logistics Research and Development IPT (ALR&D IPT) Senior review board in FY 2020. The projects will be ones that are prioritized and deemed essential to the ammo logistics needs of the Marine Corps.</p> <p>-Continue to support the multi-year effort to develop the Loose Ammo Turn-in Machine. It's a "coin star" type device that can rapidly inspect, segregate and count large volumes of small arms cartridges - saves manpower by eliminating the need to physically inspect each cartridge by hand.</p> <p>-Continue to support the multi-year effort to seek a prototype for the Ammunition Inventory Management System consisting of commercially available software solution(s) with minimal customization to fully track, account, audit and manage the supply and distribution of Class V munitions worldwide.</p> <p>FY 2022 Base Plans: FY 2022 Baseline Appropriation Request: \$9,586K</p> <p>FY 2022 funding will support:</p> <p>-Projects voted on by the Ammunition Logistics Research and Development IPT (ALR&D IPT) Senior review board in FY 2021. The projects will be ones that are prioritized and deemed essential to the ammo logistics needs of the Marine Corps.</p> <p>-Continue to support the multi-year effort to develop the Loose Ammo Turn-in Machine. It's a "coin star" type device that can rapidly inspect, segregate and count large volumes of small arms cartridges - saves manpower by eliminating the need to physically inspect each cartridge by hand.</p> <p>-Support Joint Service information technology prototyping efforts to enhance accountability of all ground conventional ammunition and auditability the Marine Corps automated ammunition information system.</p> <p>-Support R&D of the Mk22 Mod 4 (J143) Rocket Motor to address safety concerns identified during a recent mishap and improved insensitive munitions performance.</p> <p>FY 2022 OCO Plans:</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3774 / Marine Corps Ammo

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A					
<i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> The increase of \$8.810M from FY 2021 to FY 2022 supports research and development of the Mk22 Mod 4 (J143) Rocket Motor to address safety concerns identified during a recent mishap and improved insensitive munitions performance. Additionally, this funding will support Joint Service information technology prototyping efforts to enhance accountability of all ground conventional ammunition and auditability of the Marine Corps automated ammunition information system.					
<i>Title:</i> Conventional Ground Ammunition	0.501	0.529	0.537	0.000	0.537
<i>Articles:</i>	-	-	-	-	-
<i>FY 2021 Plans:</i> FY 2021 Baseline Appropriation Request: \$529K					
FY 2021 Funding will Initiate: (1) Transitioning the J143 Rocket Motor Slow Cook-off Mitigation development design package to a final Technical Data Package to include an Engineering Change Proposal (ECP). (2) Transitioning LAW FFE Particle Impact Mitigation Sleeve development design package to a final Technical Data Package to include an Engineering Change Proposal (ECP). (3) FY 2021 funding will also support projects voted on by the PM Ammunition Research and Development IPT to support efforts to enhance capabilities across the PM Ammunition Portfolio to include improving Insensitive Munitions (IM), lethality, range and cost.					
<i>FY 2022 Base Plans:</i> FY 2022 Baseline Appropriation Request: \$537K					
FY 2022 Funding will Support: (1) Continuing the J143 Rocket Motor Slow Cook-off Mitigation development design package to a final Technical Data Package to include non-flammable container. (2) Continuing LAW FFE Particle Impact Mitigation Sleeve development design package to a final Technical Data Package to include an Engineering Change Proposal (ECP).					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3774 / Marine Corps Ammo

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
(3) Testing for a new tool and technique for Explosive Ordnance Disposal (EOD) of Insensitive Munitions (IM) - Unexploded Ordnance (UXO) applications for artillery and mortars. FY 2022 OCO Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: The increase of \$0.008M from FY 2021 to FY 2022 is for continued IM testing of the J143 Rocket Motor and for continued development of LAW FFE Particle Impact Mitigation Sleeve technology.					
Accomplishments/Planned Programs Subtotals	1.431	1.305	10.123	0.000	10.123

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• PANMC/1085: Mortars	57.473	45.761	50.707	-	50.707	-	-	-	-	-	-
• PANMC/1125: Direct Support Munitions	102.078	79.662	120.037	-	120.037	-	-	-	-	-	-
• PANMC/1350: Infantry Weapons Ammunition	54.247	57.742	94.001	-	94.001	-	-	-	-	-	-
• PANMC/1550: Combat Support Munitions	34.960	25.003	35.247	-	35.247	-	-	-	-	-	-
• PANMC/1630: Ammo Modernization	14.325	15.144	16.267	-	16.267	-	-	-	-	-	-
• PANMC/1650: Artillery Munitions	207.601	64.214	105.669	-	105.669	-	-	-	-	-	-
• PANMC/1660: Items less than \$5 million	4.521	4.142	5.135	-	5.135	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

Non Developmental Item/Commercial off the Shelf (NDI/COTS).

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date: May 2021**

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3774 / Marine Corps Ammo
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Project 3774	FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
J143 Rocket Motor												
Initial Proof of Concept (End with a PDR)												
Baseline testing and preliminary ECP development (End with a CDR)												
Final Qualification Testing and ECP Approval (End with Fielding Decision)												
Ammunition Life Cycle Management - no major milestones												

2022PB - 0206623M - 3774

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3774 / Marine Corps Ammo

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Project 3774				
J143 Rocket Motor: Initial Proof of Concept (End with a PDR): Schedule Detail	1	2022	4	2022
Ammunition Life Cycle Management - no major milestones: Schedule Detail	1	2020	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys				Project (Number/Name) 3775 / Family of Internally Transportable Vehicles (FITV)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3775: Family of Internally Transportable Vehicles (FITV)	0.550	2.096	2.182	0.230	-	0.230	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Family of Ultra-light Tactical Vehicles (FULTV), which consists of the Utility Task Vehicles (UTV) and its eventual replacement the Ultra-light Tactical Vehicle (ULTV), provides operational capabilities for both infantry logistics and long-range surveillance and reconnaissance missions in support of distributed heliborne operations providing units with increased logistics support while reducing the combat load burden on the individual Marine as well providing casualty evacuation for wounded Marines. In addition, the FULTV fills a much needed capability gap in forward arming and refueling point (FARP) operations by enabling the tactical aviation ground refueling system (TAGRS) to rapidly establish refueling sites in austere locations. The vehicles are transportable in the V-22, CH53E and CH53F tilt selected rotary and fixed wing aircraft. The FULTV vehicles mitigate the infantry, reconnaissance battalions and wing support squadrons capability gaps, with the ability to operate in remote, rural regions where currently fielded ground mobility platforms may be unsuitable due to size, weight, and transportability concerns.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Family of Ultra-light Tactical Vehicles (ULTV) Test and Evaluation	2.096	2.182	0.230	0.000	0.230
Articles:	-	-	-	-	-
FY 2021 Plans: In partnership with SOCOM PM FOSOV, complete safety, performance and reliability test requirements for ULTV Non Developmental Item (NDI) vehicle. Initiate and complete a Validation and Verification & System Verification Review (SVR). Funding provided for support to MCOTEA to conduct an Operational Assessment.					
FY 2022 Base Plans: Finalizing test reports from the outcome of testing events that concluded in 4Q FY 2021 and any additional test requirements					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: The decrease of \$1.952M from FY 2021 to FY 2022 is the result of the completion of the ULTV testing events in FY 2021.					
Accomplishments/Planned Programs Subtotals	2.096	2.182	0.230	0.000	0.230

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3775 / Family of Internally Transportable Vehicles (FITV)

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

Line Item	FY 2020	FY 2021	FY 2022	FY 2022	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Cost To	Total Cost
			Base	OCO	Total					Complete	
• PMC/6545: <i>Ultra-light Tactical Vehicles (ULTV)</i>	0.647	0.678	15.439	-	15.439	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The strategy for the ULTV program is a partnership with Program Manager Family of Special Operations Vehicles (PM FOSOV) for testing and procurement. The partnership will capitalize on similar performance and testing specifications and generate efficiencies by conducting a cross-services acquisition. PM FOSOV released a full and open competitive solicitation and awarded an IDIQ contract 29 May 2020. The Marine Corps and PM FOSOV will conduct joint testing including safety, performance, transportability, and durability. The Marine Corps will also complete an Operational Assessment in August 2021. The results of the testing will inform a Full Rate Production decision in 2Q FY 2022.

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3775 / Family of Internally Transportable Vehicles (FITV)
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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test Preparation, Events & Reports	C/CPFF	NATC : Carson City, NV	0.000	0.966	Jun 2020	1.932	Dec 2020	0.230	May 2022	-		0.230	-	-	-
Operational Assessment	TBD	MCOTEA : Corona, CA	0.000	0.000		0.250	May 2021	0.000		-		0.000	-	-	-
ULTV Technology Demonstrator	C/CPFF	NATC : Carson City, NV	0.550	0.000		0.000		0.000		-		0.000	-	-	-
Test Support	C/CPFF	GSA : Albany, GA	0.000	1.000	Jul 2020	0.000		0.000		-		0.000	-	-	-
Internal Air Testing	C/CPFF	NAVAIR : Paxtuxent River, VA	0.000	0.130	Aug 2020	0.000		0.000		-		0.000	-	-	-
Subtotal			0.550	2.096		2.182		0.230		-		0.230	-	-	N/A

Remarks
 Test preparation and event will include the purchase of up to 20 test articles in FY 2021 due to the updated acquisition strategy to partner with SOCOM PM FOSOV. Prior acquisition strategy included bid samples to be provided by multiple offerers. Operational assessment was previously planned for FY 2020 will shift to FY 2021 in order to align with the PM FOSOV acquisition timeline.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.550	2.096	2.182	0.230	-	0.230	-	-	N/A

Remarks

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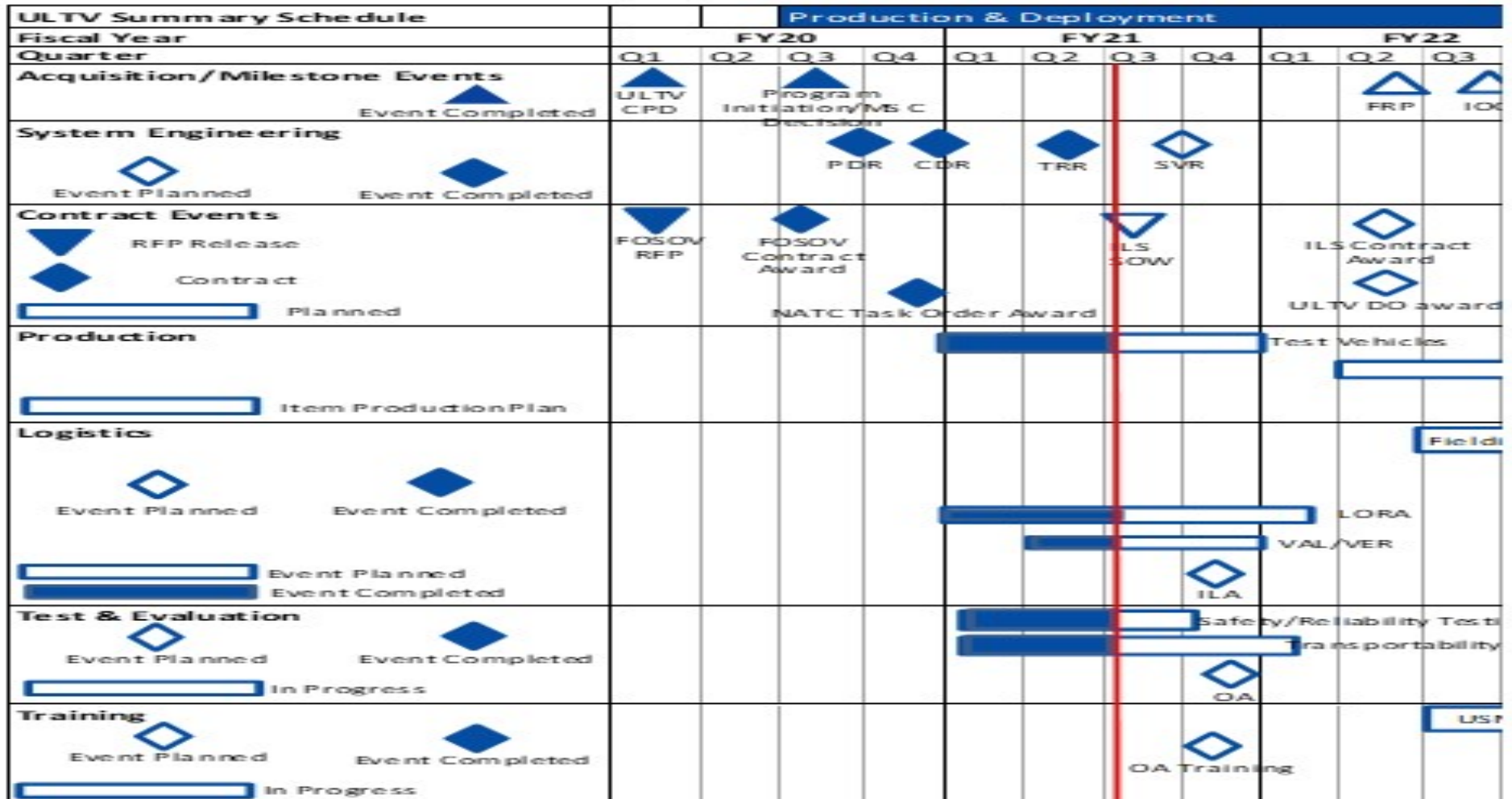
Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy

Date: May 2021

Appropriation/Budget Activity
1319 / 7

R-1 Program Element (Number/Name)
PE 0206623M / MC Ground Cmbt Spt Arms
Sys

Project (Number/Name)
3775 / Family of Internally Transportable
Vehicles (FITV)



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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 3775 / Family of Internally Transportable Vehicles (FITV)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3775				
Proj 3775: ULTV Critical Design Review (CDR)	1	2021	1	2021
Proj 3775: ULTV Safety & Transportability	1	2021	1	2022
Proj 3775: Validation/Verification	2	2021	4	2021
Proj 3775: ULTV Operational Assesment	4	2021	4	2021
Proj 3775: ULTV System Verification Review (SVR)	4	2021	4	2021
Proj 3775: ULTV Independent Logistics Assessment (ILA)	4	2021	4	2021
Proj 3775: ULTV Full Rate Production (FRP)	1	2022	2	2022
Proj 3775: ULTV Vehicle Production award	2	2022	2	2022
Proj 3775: ULTV IOC	3	2022	3	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys				Project (Number/Name) 4002 / Family of Raid Reconnaissance			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
4002: <i>Family of Raid Reconnaissance</i>	8.906	1.551	3.064	13.971	-	13.971	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project supports multiple airborne/parachuting and specialized reconnaissance related programs focusing on immediate capability enhancements for numerous insertion and personnel equipment shortfalls currently within Marine Reconnaissance and Marine Raider units. These enhancements will improve airborne and amphibious capability, equipment and items for direct action missions, and specialized raid equipment. The project supports rapid fielding efforts for Integration and Logistics advocated autonomous small Unmanned Logistics System-Air (ULS-A), known as Tactical Resupply Unmanned Aircraft System (TRUAS), in support of Ground Combat Element (GCE) and Logistics Combat Element (LCE) aerial resupply requirements. Additionally, project supports development of autonomy and other enabling technologies for use across the ULS-A systems and development of a medium ULS-A aircraft.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Airborne Reconnaissance Equipment (ARE)	0.144	0.430	0.437	0.000	0.437
Articles:	-	-	-	-	-
FY 2021 Plans:					
- Continue research and development testing of parachuting capabilities for accessing the battlespace, including High Altitude Low Opening, Low Altitude Personnel Parachutes, and related ancillary items.					
- Continue research and development of new airborne capabilities for accessing a battlespace defended by an integrated air defense system.					
- Initiate test and evaluation of the High-Altitude-Opening Navigation System (HAHONAV), parachutist drop bag, and the Parachutist Oxygen System 2 in an operational environment with current parachute systems.					
- Initiate development of a replacement for the MC-6 low level parachute system.					
FY 2022 Base Plans:					
- Continue to test and evaluate the High-Altitude-High-Opening Navigation System (HAHONAV) and parachutist drop bag in an operational environment with current parachute systems.					
- Continue research and development testing of parachuting capabilities for accessing the battlespace, including High Altitude Low Opening, Low Altitude Personnel Parachutes, and related ancillary items.					
- Continue development of a replacement for the MC-6 low level parachute system in concert with Navy Advanced Low-Level Parachute System.					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 4002 / Family of Raid Reconnaissance

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
- Initiate transition testing and development for Augmented Parachute System-1 with the Navy's increased capability Powered Paraglider. FY 2022 OCO Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: The increase from FY 2021 to FY 2022 of \$.007M reflects inflation.					
Title: Amphibious Reconnaissance Capability Articles:	0.290 -	0.120 -	0.122 -	0.000 -	0.122 -
FY 2021 Plans: - Complete development of the Enhanced Combat Rubber Reconnaissance Craft (E-CRRC), along with First Article Testing (FAT) in support of fielding in late FY2022. - Conduct user evaluations to validate the Enhanced Diver Propulsion Device (E-DPD) performance characteristics. FY 2022 Base Plans: - Initiate developmental testing for the Sub-Surface Hydrographic Amphibious Reconnaissance Capability (SHARC) in order to inform a future requirement. FY 2022 OCO Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: The increase from FY 2021 to FY 2022 of \$.002M reflects inflation.					
Title: Aerial Delivery and Autonomous Distribution Entry Articles:	1.117 -	2.514 -	13.412 -	0.000 -	13.412 -
FY 2021 Plans: - Continue research and development of block upgrades for the Air Delivery Family of Systems for steerable, extended glide systems. Research and development to enhance accuracy of operation in a GPS-denied environment, the interoperability with personnel, the One-Time Use Modular Autonomous Guidance Unit (MAGU), the modularity within aerial delivery systems and various other critical capabilities such as tracking, programming and battery diagnostics.					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 4002 / Family of Raid Reconnaissance

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>- Continue research and development of ULS-A to include integration and development of autonomy aspects and initial phase of rapid prototyping efforts.</p> <p>FY 2022 Base Plans:</p> <ul style="list-style-type: none"> - Conduct Joint Precision Air Delivery System(JPADS) research and development to enhance accuracy and operation of vision navigation in GPS-denied environments and to facilitate interoperability with personnel parachuting. Ensure modularity and integration within aerial delivery systems and critical capabilities such as tracking and programming. - Conduct research and development of Autonomous Aerial Insertion into Rural, Dense, Urban, Complex Terrain (AAIRDUCT) in conjunction with Army CCDC Soldier Center. - Conduct research and development of High Altitude Low Opening Container Delivery System (HALO CDS). - Conduct research and development of ULS-A to include integration and development of autonomy aspects, initial development of Medium variant prototypes of ULS-A, and final developments prior to initial phase of rapid fielding efforts for Tactical Resupply Unmanned Aircraft System (TRUAS), the Small variant of ULS-A. <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: The increase from FY 2021 to FY 2022 of \$10.898M is due to initiation of developmental efforts for a Medium variant prototypes of ULS-A and final test and evaluation efforts for TRUAS prior to rapid fielding efforts.</p>					
Accomplishments/Planned Programs Subtotals	1.551	3.064	13.971	0.000	13.971

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• PMC/6518: Amphibious Support Equipment	7.101	5.752	17.119	-	17.119	-	-	-	-	-	-

Remarks

D. Acquisition Strategy
Family of Raid Reconnaissance partners with government research and development entities and each of the services to ensure duplication of effort is mitigated and shared developmental information benefits the entire DoD representing additional cost savings. Funds development and testing activities to support engineering changes and product upgrades for various reconnaissance special purpose equipment. In addition scalable and flexible transportation (delivery, transfer and retrograde)

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

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
1319 / 7	PE 0206623M / MC Ground Cmbt Spt Arms Sys	4002 / Family of Raid Reconnaissance

of all classes of supply (I-IX) across the range of military operations (ROMO) for standoff/ clandestine operational requirements. A competitive, accelerated acquisition strategy utilizing DoD Middle Tier of Acquisition (DoDI 5000.80) Rapid Prototyping and Rapid Fielding has been selected for Unmanned Logistics Systems-Air platforms. Development of autonomy and other enabling technologies will be conducted in parallel to meet objective requirements.

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 4002 / Family of Raid Reconnaissance
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ARC, E-CRRC	Various	MCSC : Quantico	0.000	0.290	May 2021	0.040	Jul 2021	0.102	May 2022	-		0.102	-	-	-
ADAD, Small ULS-AIR	Various	NAVAIR : Pax River, MD	1.850	0.337	May 2020	1.314	May 2021	0.000		-		0.000	-	-	-
ADAD, Medium ULS-AIR	Various	Various : Various	2.261	0.114	May 2020	0.000		9.585	Apr 2022	-		9.585	-	-	-
ADAD, JPADS Block Upgrades	MIPR	CCDC : Natick, MA	0.000	0.000		0.421	Mar 2021	0.000		-		0.000	-	-	-
ADAD, Auto Aerial Insert Duct	MIPR	Army : CCDC	0.000	0.000		0.000		0.500	Feb 2022	-		0.500	-	-	-
ADAD, HALO	Various	MCSC : Quantico, VA	0.000	0.000		0.000		0.450	Feb 2022	-		0.450	-	-	-
Prior Year Cumulative	Various	Various : Various	0.852	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			4.963	0.741		1.775		10.637		-		10.637	-	-	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ARE, Sys Eng Support	C/FFP	MCSC : Quantico, VA	0.616	0.000		0.181	Jan 2021	0.145	Jan 2022	-		0.145	-	-	-
ARC, E-DPD	Various	MCSC : Quantico, VA	0.026	0.000		0.040	Dec 2020	0.000		-		0.000	-	-	-
ADAD, Sys Eng Support	Various	NAVAIR : Pax River, MD	0.436	0.150	Mar 2020	0.000		0.000		-		0.000	-	-	-
ADAD, ULS-A Support	Various	NAVAIR : Pax River, MD	0.000	0.150	Mar 2020	0.300	Mar 2021	2.000	Mar 2022	-		2.000	-	-	-
Prior Year Cumulative	Various	Various : Various	0.646	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			1.724	0.300		0.521		2.145		-		2.145	-	-	N/A

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

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 4002 / Family of Raid Reconnaissance
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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ARE, Various (travel)	Various	MCSC : Quantico, VA	0.161	0.004	Sep 2020	0.009	Feb 2021	0.018	Dec 2021	-		0.018	-	-	-
ARE, Oxygen Sys Test	MIPR	NAS : Pax River	0.000	0.000		0.085	Dec 2020	0.085	Dec 2021	-		0.085	-	-	-
ARE, Blade Hours	C/FFP	MCSC : Quantico, VA	0.120	0.117	Mar 2020	0.150	Mar 2021	0.169	Jan 2022	-		0.169	-	-	-
ARE, Augmented Parachute	SS/FFP	MCSC : Quantico, VA	0.000	0.023	Aug 2020	0.000		0.020	Feb 2022	-		0.020	-	-	-
ARE, Repair Parts/ Consumables	C/CS	MCSC : Quantico, VA	0.000	0.000		0.005	Jan 2021	0.000		-		0.000	-	-	-
ARC, E-CRRC FAT	MIPR	NSWC : Norfolk, VA	0.000	0.000		0.020	Dec 2021	0.000		-		0.000	-	-	-
ARC, Various (travel)	Various	Various : Quantico, VA	0.118	0.000		0.020	Feb 2021	0.020	Feb 2022	-		0.020	-	-	-
ADAD, TRUAS	MIPR	NAVAIR : Pax River, MD	0.167	0.000		0.479	Aug 2021	0.427	Aug 2022	-		0.427	-	-	-
ADAD, GPS Guided Parachute	MIPR	NRSDEC : Natick	0.000	0.366	May 2020	0.000		0.450	Feb 2022	-		0.450	-	-	-
Prior Year Cumulative	Various	Various : Various	1.653	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			2.219	0.510		0.768		1.189		-		1.189	-	-	N/A

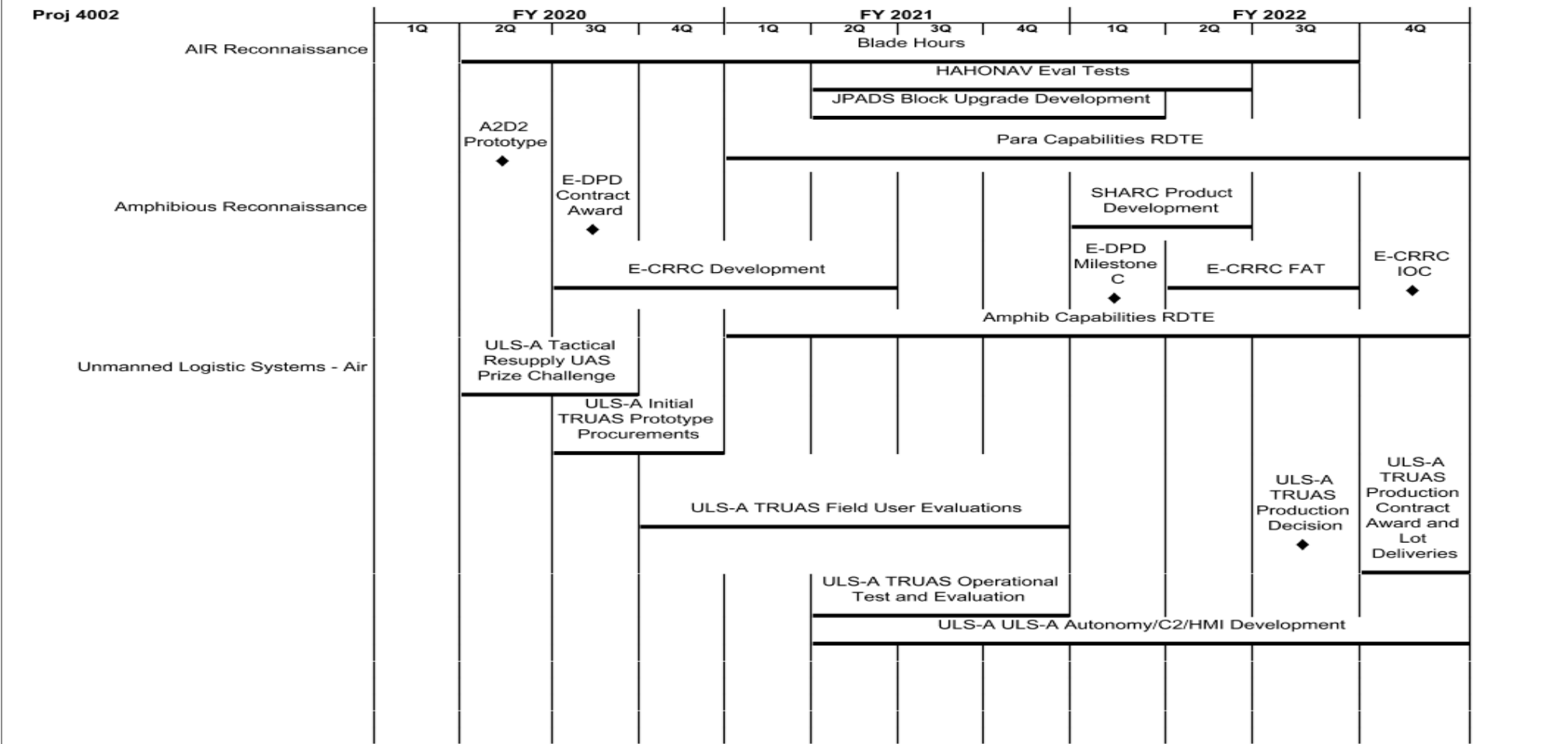
	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	8.906	1.551	3.064	13.971	-	13.971	-	-	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date: May 2021**

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 4002 / Family of Raid Reconnaissance Sys
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2022PB - 0206623M - 4002

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 4002 / Family of Raid Reconnaissance

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0206623M / MC Ground Cmbt Spt Arms Sys	Project (Number/Name) 4002 / Family of Raid Reconnaissance

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 4002				
AIR Reconnaissance: Air Recon: JPADS Blade Hours	2	2020	3	2022
AIR Reconnaissance: Air Recon: HAHONAV	2	2021	2	2022
AIR Reconnaissance: ADAD: JPADS Block Upgrades	2	2021	1	2022
AIR Reconnaissance: Parachute Capabilities R&D	1	2021	4	2022
AIR Reconnaissance: Aerial Delivery and Autonomous Distribution (A2D2) Prototype	2	2020	2	2020
Amphibious Reconnaissance: E-DPD Procurement	3	2020	3	2020
Amphibious Reconnaissance: SHARC	1	2022	2	2022
Amphibious Reconnaissance: E-DPD	1	2022	1	2022
Amphibious Reconnaissance: E-CRRC FAT	2	2022	3	2022
Amphibious Reconnaissance: E-CRRC IOC	4	2022	4	2022
Amphibious Reconnaissance: Enhanced Combat Rubber Reconnaissance Craft Development	3	2020	2	2021
Amphibious Reconnaissance: Amphibious Capabilities R&D	1	2021	4	2022
Unmanned Logistic Systems - Air: Tactical Resupply UAS Prize Challenge	2	2020	3	2020
Unmanned Logistic Systems - Air: Initial TRUAS Prototype Procurements	3	2020	4	2020
Unmanned Logistic Systems - Air: TRUAS Field User Evaluations	4	2020	4	2021
Unmanned Logistic Systems - Air: TRUAS Production Decision	3	2022	3	2022
Unmanned Logistic Systems - Air: TRUAS Production Contract Award and Lot Deliveries	4	2022	4	2022
Unmanned Logistic Systems - Air: TRUAS Operational Test and Evaluation	2	2021	4	2021
Unmanned Logistic Systems - Air: ULS-A Autonomy/C2/HMI Development	2	2021	4	2022