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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2024 Navy **Date:** March 2023

<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 3: Advanced Technology Development (ATD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / <i>MC Advanced Technology Demo</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	0.000	283.332	412.747	308.217	-	308.217	272.084	273.012	270.551	272.671	Continuing	Continuing
2223: <i>Marine Corps ATD</i>	0.000	106.408	118.183	126.171	-	126.171	127.120	131.202	133.826	136.503	Continuing	Continuing
2297: <i>Futures Directorate</i>	0.000	101.747	157.064	177.046	-	177.046	139.865	136.609	131.420	130.757	Continuing	Continuing
2958: <i>Cyberspace Activities</i>	0.000	4.609	4.800	5.000	-	5.000	5.099	5.201	5.305	5.411	Continuing	Continuing
9999: <i>Congressional Adds</i>	0.000	70.568	132.700	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	203.268

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

The United States Navy/Marine Corps team is the most potent naval fighting force in the world. Fundamental to their success are the technologies necessary for effective Distributed Maritime Operations (DMO), Expeditionary Advanced Base Operations (EABO), Littoral Operations in Contested Environments (LOCE), Joint Warfighting Concepts, Stand-In Forces, and Reconnaissance / Counter-Reconnaissance. The Office of Naval Research (ONR) combines knowledge of the naval mission with researchers to select and explore solutions critical to expeditionary warfighting needs. It has become clear the joint force needs a capability that operates persistently and with maximum organic mobility and dispersion to compete and deter in the contact and blunt layers. This Program Element (PE) supports investments in critically needed capabilities as outlined in Force Design 2030, to operate below the threshold of armed conflict by winning the reconnaissance and counter-reconnaissance competition in facilitating deterrence by detection.

These future challenges and portents demand robust technologies for the Marine Corps, but the technology options are constrained. They must have a lightweight deployable character, and the ability to operate in austere conditions with little fixed infrastructure or support while retaining the agility and lethality of an integrated maneuver force. Technology must provide full spectrum capability against robust and complex peer and near-peer adversaries while meeting Size, Weight, Power, Cost limitations, and information availability within Distributed, Intermittent and Limited environments.

The approach within this Program Element (PE) encompasses ideas that support both revolutionary and evolutionary capabilities, and in this way considers and balances both "push" and "pull" aspects of technology projects. This PE matures technologies emerging from PE 0602131M-Marine Corps Landing Force Technology to develop concept prototypes and initial experimentation to confirm feasibility in an environment relevant to operations.

This PE funds Advanced Technology Development (ATD) that includes development of subsystems and components and efforts to integrate subsystems and components into system prototypes for field experiments and/or tests in a simulated environment. Efforts in this PE generally have Technology Readiness Levels (TRLs) of 4 (component and/or breadboard validation in laboratory environment), 5 (component and/or breadboard validation in relevant environment), or 6 (system/subsystem model or prototype demonstration in a relevant environment).

Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
Previous President's Budget	291.183	280.285	254.337	-	254.337
Current President's Budget	283.332	412.747	308.217	-	308.217
Total Adjustments	-7.851	132.462	53.880	-	53.880
• Congressional General Reductions	-	-0.238			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	132.700			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.800	0.000			
• SBIR/STTR Transfer	-8.651	0.000			
• Program Adjustments	0.000	0.000	53.880	-	53.880
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000

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

**Project:** 9999: *Congressional Adds*

- Congressional Add: *Adaptive threat force*
- Congressional Add: *Expeditionary Process, Exploitation, and Dissemination*
- Congressional Add: *Advanced mission planning system SBIR technology insertion*
- Congressional Add: *Data analysis and sharing augmentation*
- Congressional Add: *Low-cost atrittable aircraft technology*
- Congressional Add: *Adaptive future force*
- Congressional Add: *AI-powered tactical ISR*
- Congressional Add: *Expeditionary mission support*
- Congressional Add: *Platform agnostic weapons system*
- Congressional Add: *Stand-off security inspection and surveillance system*
- Congressional Add: *Mutli-function array for C-UAS*
- Congressional Add: *C5ISR and EW modular open suite of standards*
- Congressional Add: *ACV EW/comms/ISR technology*
- Congressional Add: *AI-powered tactical ISR for battlespace awareness*
- Congressional Add: *K-MAX next generation autonomouse logistics UAS*

	<b>FY 2022</b>	<b>FY 2023</b>
	0.000	7.000
	3.861	4.000
	4.827	5.000
	1.931	0.000
	24.134	25.000
	7.723	0.000
	4.923	0.000
	9.654	8.000
	4.827	0.000
	8.688	10.000
	0.000	18.000
	0.000	10.000
	0.000	10.000
	0.000	7.200
	0.000	7.000

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<b>Congressional Add Details (\$ in Millions, and Includes General Reductions)</b>	<b>FY 2022</b>	<b>FY 2023</b>
Congressional Add: <i>Wireless technologies for sensing and surveillance at the tactical edge</i>	0.000	6.500
Congressional Add: <i>Hydrofoil wing in ground effect vehicle</i>	0.000	5.000
Congressional Add: <i>ENDOR spectrum superiority technology</i>	0.000	10.000
Congressional Add Subtotals for Project: 9999	70.568	132.700
Congressional Add Totals for all Projects	70.568	132.700

**Change Summary Explanation**

Funding: All funding increases support Marine Corps Warfighting Laboratory (MCWL) / Futures Directorate (FD) experimentation efforts:

- Increase of \$30M to provide a third hull for use in Stern Landing Vessel (SLV) program; improving resilience, dispersion, and the ability to operate in complex archipelagoes and contested littorals.
- Increase of \$21M to investigate the use of Ancillary Surface Connectors (ASC) to improve the sustainment of the future naval expeditionary force.
- Increase of \$2.88M to establish the MCWL Information Fusion Center (IFC); providing a consolidated and collaborative environment, at all classification levels, to augment overall Marine Corps effectiveness as well as MCWL's experimentation objectives.

Technical: No significant change.

Schedule: No significant change.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2024 Navy **Date:** March 2023

<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2223 / Marine Corps ATD
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
2223: Marine Corps ATD	0.000	106.408	118.183	126.171	-	126.171	127.120	131.202	133.826	136.503	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

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

This project funds technology demonstration, experimentation, and prototyping; and more technologically mature projects within the Future Naval Capability (FNC) process as means to inform, enhance, enable, and invent future concepts and capabilities with new Science and Technology (S&T). This project is organized into ten activities, the core of which is represented by the eight Expeditionary Warfighting Capability Areas.

Emphasized within this project are increased efforts to actively demonstrate advanced technologies and system concepts. These demonstrations and experiments focus on the specific technologies, not necessarily their operational application, and vary based on the technical maturity of the project. This early technology exposure gives Marines a view into the future and enables them to use their imagination and innovation to envision novel employment of the technology and inform the acquisition process.

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<b>Title:</b> Command, Control, Communications, Computers (C4)	23.494	26.519	14.000	0.000	14.000
<b>Articles:</b>	-	-	-	-	-
<b>Description:</b> This activity investigates robust, resilient, and secure networked communications pathways and capability that support an expeditionary force's distributed and disaggregated operations. Research supports both networked and local computation for communications that exploits the expeditionary forces close physical proximity to threats while mitigating shortfalls commensurate within Distributed, Intermittent, and Limited environments. Expeditionary forces must operate in the cyber domain and in addition to defending communications networks, vehicles, and weapons systems, are reliant on electronic controllers for basic operations and as such are susceptible to cyberattacks.					
Technologies addressed within this activity include secure, robust, self-forming, mobile communications networks; distributed computing to support information dissemination to all echelons; improved capabilities in over-the-horizon, beyond line-of-sight, and restricted environment communications and sensors; and software and data processing to support formation of an appropriate common picture. Other efforts include power management, low detectability, conforming to Size, Weight, Power, Cost constraints, and interoperability within the joint environment.					

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>Further, this activity integrates and demonstrates enhanced communications and situational awareness capabilities in experimental and warfighting environments reflecting USMC operations. Advanced technology resources will be developed and applied to complement commercial, other service, and defense agency investments to produce a technology base addressing identified Marine Corps technology gaps. Focus will be on developing component level prototypes and experimentation in relevant environments.</p> <p><b>FY 2023 Plans:</b> Complete: The following efforts are in collaboration with the Cognitive Radio Frequency Inference Technology (CRIT) and Multi Domain Radar for the Contested Environment (MuDRaCE) FNC activities in this PE/project and leverage experimental discoveries under the MAGTF C4 project to accelerate development of high priority capabilities.</p> <ul style="list-style-type: none"> <li>- Complete the development and demonstrate technologies that include advanced signature management, machine learning, interoperability, spectrum maneuver, damage assessment monitoring, and information dominance for tactical edge systems.</li> <li>- Complete the development and demonstrate portable distributed multi-domain sensor and surveillance technologies in portable expeditionary warfare form factor to protect forces in denied and contested EM environments.</li> </ul> <p>Continue: The following efforts are in collaboration with the Cognitive Radio Frequency Inference Technology (CRIT) and Multi Domain Radar for the Contested Environment (MuDRaCE) FNC activities in this PE/project and leverage experimental discoveries under the MAGTF C4 project to accelerate development of high priority capabilities.</p> <ul style="list-style-type: none"> <li>- Continue the development of and demonstrate technologies that include advanced signature management, machine learning, interoperability, spectrum maneuver, damage assessment monitoring, and information dominance for tactical edge systems.</li> <li>- Continue the development of and demonstrate distributed multi-domain sensor and surveillance technologies in portable expeditionary warfare form factor to protect forces in denied and contested EM environments.</li> </ul> <p>Initiate: -Initiate research effort to extend demonstrated analysis capability to classified signal sets and reduce machine learning training time.</p> <p><b>FY 2024 Base Plans:</b></p>					

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Continue the development of and demonstrate distributed multi-domain sensor and surveillance technologies in portable expeditionary warfare form factor to protect forces in denied and contested EM environments.</p> <p>- Continue research effort to extend demonstrated analysis capability to classified signal sets and reduce machine learning training time.</p> <p>- Complete the development of and demonstrate technologies that include advanced signature management, machine learning, interoperability, spectrum maneuver, damage assessment monitoring, and information dominance for tactical edge systems.</p> <p>- Initiate research to develop deep learning based natural language processing algorithms to extract operational defined events from unstructured, not grammatically correct Secure Internet Protocol Router Network (SIPRNet) Marine Corps chat rooms.</p> <p>- Initiate development of a prototype to deploy rulesets on US Marine Corps' Tactical Service Oriented Architecture program of record to fuse chat data into meaningful relationships displayed on the watch standers' common operating picture.</p> <p>- Initiate the integration of advanced prototype technologies that can enable electromagnetic signature control through the use of advanced material systems and test those on specific expeditionary platforms.</p> <p><b>FY 2024 OCO Plans:</b> N/A</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The decrease in funding from FY 2023 to FY 2024 is due to the maturation of the Future Naval Capabilities (FNC) Cognitive of Radio Frequency Inference Technology (CRIT) the maturation and transition of the program out of S&amp;T.</p>					
<p><b>Title:</b> Firepower</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> The activity investigates a large variety of weapons technologies to enhance fires capabilities of Fleet Marine Forces as part of joint maritime campaigns to counter emerging threats and create new opportunities for the joint force to secure operational advantage. Research efforts increase range, lethality, and capacity, while maintaining mobility and tempo to operate inside actively contested maritime domains, to achieve overmatch fires capabilities when operating within the landward portions of the littorals, and to provide weapons system capabilities able to persist when operating within the adversary's intelligence, surveillance, collection, and weapons ranges. Focus on low size, weight, power, and cost of weapons components and weapon systems, having low manpower and cognitive burdens to operate, with low logistics burdens, stresses</p>	6.616	7.485	8.500	0.000	8.500
	-	-	-	-	-

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>technical solutions. This activity furthers the maturity of researched technology solutions by also developing the integration required to effectively demonstrate and test emergent capabilities. Weapons system technologies being developed include fire control, launch and propulsion, precision guidance, navigation, and control, seekers, fuzing, and lethality.</p> <p><b>FY 2023 Plans:</b> Continue: - Development of integrated technologies for low-cost, extended range, precision guided munitions, having improved lethality and special effects payloads for use against various types of stationary and moving targets on land and water, and in satellite and network denied environments.</p> <p><b>FY 2024 Base Plans:</b> - Continue development of integrated technologies for low-cost, extended range, precision guided munitions, having improved lethality and special effects payloads for use against various types of stationary and moving targets on land and water, and in satellite and network denied environments.</p> <p><b>FY 2024 OCO Plans:</b> N/A</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The increase in funding from FY 2023 to FY 2024 is due to increased investments in research efforts to increase range, lethality, and capacity, while maintaining mobility and tempo to operate inside actively contested maritime domains, to achieve overmatch fires capabilities when operating within the landward portions of the littorals, and to provide weapons system capabilities able to persist when operating within the adversary's intelligence, surveillance, collection, and weapons ranges.</p>					
<p><b>Title:</b> Force Protection</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> This activity investigates new ways and means to protect forces and materiel across all operational settings from contested sea-land surface interfaces to complex urban environments. The portfolio protects against adversaries' challenges such as guided-rockets and missiles, mobile coastal artillery, threat Electronic Warfare and Counter Intelligence, and Surveillance and Reconnaissance. Mines and obstacles both in the water and ashore also complicate amphibious landings. The activity invests in vehicle survivability aspects that are exacerbated due to Size, Weight, and Power Cost constraints inherent to Marine Corps operation and the harsh nature of the amphibious environment.</p>	11.226	13.872	18.300	0.000	18.300
	-	-	-	-	-

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>Technologies addressed include lightweight armor for ballistic and underbody blast protection, advanced sensors for counter tactical surveillance, active protection, and signature management. This activity also considers technology for payloads, packages and sensors that are needed by amphibious vehicles (both manned and unmanned) including mine counter measures; explosive hazard defeat systems; and obstacle and threat detection systems as well as technologies for improved protection for individuals against blast, ballistic and blunt impact threats.</p> <p>Technologies in this activity enable Marine Corps forces to maintain operational tempo through a range of environments by avoiding or detecting surveillance and targeting capabilities before engagement; counter detection and targeting (e.g. long range sniper, urban shooter, rocket propelled grenades) and delay vehicle detection and identification through signature management/control.</p> <p><b>FY 2023 Plans:</b>            Continue:            - Continue efforts looking at counters to autonomy and sensors/perception.            - Continue to examine technologies for the utility of High Energy Laser (HEL) in Expeditionary operations, including robust, compact, lightweight lasers, with tracking, and optical components to enable Low Altitude Air Defense (LAAD) with non-kinetic weapon hard kill.            - Continue development of low-cost robotic autonomy systems in support of amphibious operations (e.g., ISR, mine-counter-measure, breaching, fire support, and logistics).            - Continue development and demonstrate human-machine teaming techniques and procedures appropriate to military tactics. The end state will demonstrate swarming multi-domain platforms capable of delivering military capabilities over land and sea.            - Continue efforts that emphasize sensors and systems to enable autonomous amphibious assault under mined and obstacle environments will continue. The efforts will focus on multi-domain operations and extending the range at which these unmanned systems are able to perform and execute the assault mission.            - Develop disposable heterogeneous "least-capable" multi-domain unmanned vehicles (UxVs), that can be rapidly manufactured at scale. The UxVs will operate as swarms, utilizing the organizational principles found in social insects/birds/fishes to overwhelm an adversary's kill chain.</p> <p>Initiate:</p>					

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Initiate force-on-force experimentation for countering heterogeneous multi-domain autonomous swarm attacks in Expeditionary Advanced Basing Operations (EABO) scenarios.</p> <p>- Initiate a follow-on and focused research effort to develop compact rapid analysis and sensing systems to assess expeditionary operational site by detecting battle damages, surface and sub-surface explosive hazards detection and classification.</p> <p><b>FY 2024 Base Plans:</b></p> <p>- Continue efforts looking at counters to autonomy and sensors/perception.</p> <p>- Continue to examine technologies for the utility of High Energy Laser (HEL) in Expeditionary operations, including robust, compact, lightweight lasers, with tracking, and optical components to enable Low Altitude Air Defense (LAAD) with non-kinetic weapon hard kill.</p> <p>- Continue development of low-cost robotic autonomy systems in support of amphibious operations (e.g., ISR, mine-counter-measure, breaching, fire support, and logistics).</p> <p>- Continue development and demonstrate human-machine teaming techniques and procedures appropriate to military tactics. The end state will demonstrate swarming multi-domain platforms capable of delivering military capabilities over land and sea.</p> <p>- Continue efforts that integrate and demonstrate sensors and systems that enable autonomous amphibious assault in mined and obstacle environments. The efforts will focus on multi-domain operations and extending the range at which these unmanned systems are able to perform and execute the assault mission.</p> <p>- Continue development of disposable heterogeneous "least-capable" multi-domain unmanned vehicles (UxVs), that can be rapidly manufactured at scale. The UxVs will operate as swarms, utilizing the organizational principles found in social insects/birds/fishes to overwhelm an adversary's kill chain.</p> <p>- Continue force-on-force experimentation for countering heterogeneous multi-domain autonomous swarm attacks in Expeditionary Advanced Basing Operations (EABO) scenarios.</p> <p>- Continue a follow-on and focused research effort to develop compact rapid analysis and sensing systems to assess expeditionary operational site by detecting battle damages, surface and sub-surface explosive hazards detection and classification.</p> <p>-Initiate research to provide a solid-state High-Power Microwave prototype in a form factor that upon transition will enable the USMC to conduct advanced expeditionary base operations (EABO) while being capable of defeating sUAS swarms and other unmanned systems in littoral regions.</p> <p>-Initiate efforts to integrate and field test systems for the precision neutralization of threat explosive hazards, mines, and kill chain components with lethal or non-lethal force from standoff distances to enable in-stride littoral</p>					

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>movement and maneuver, designated ground corridors, at forward aviation points, littoral transition points, and in designated areas of interest.</p> <p>-Initiate efforts to rapidly assess and report the condition of expeditionary sites using the same or similar sensors suites used in the detection of explosive hazards. The efforts will also include development of a common messaging protocol to a control center for assessment sites for both explosive and other related damage.</p> <p><b>FY 2024 OCO Plans:</b> N/A</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The increase in funding from FY 2023 to FY 2024 is due to the initiation of efforts to 1) provide a solid-state High-Power Microwave prototype in a form factor that upon transition will enable the USMC to conduct advanced expeditionary base operations (EABO) while being capable of defeating sUAS swarms and other unmanned systems in littoral regions, 2) integrate and field test systems for the precision neutralization of threat explosive hazards, mines, and kill chain components with lethal or non-lethal force from standoff distances to enable in-stride littoral movement and maneuver, designated ground corridors, at forward aviation points, littoral transition points, and in designated areas of interest and 3) rapidly assess and report the condition of expeditionary sites using the same or similar sensors suites used in the detection of explosive hazards. The efforts will also include development of a common messaging protocol to a control center for assessment sites for both explosive and other related damage.</p>					
<p><b>Title:</b> Human Performance, Training and Education</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> This activity investigates several technology investment areas; warrior resilience, and decision-making and expertise development. Warrior resilience is focused on advanced training technologies and methodologies that enhance neural, cognitive, and physical readiness. Decision making and expertise development accelerates development and improves the retention of skills in decision making, situation awareness, and individual and team adaptability and coordination on decentralized, dynamic and dispersed battlefields. Focus will be on developing component level prototypes for Marine for evaluation and experimentation.</p> <p><b>FY 2023 Plans:</b> Continue:</p>	5.322	6.316	7.600	0.000	7.600
	-	-	-	-	-

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Assess marksmanship lethality via automated capture of shot timing, accuracy, and physical performance; develop and assess new marksmanship training approaches, analysis, and visualizations to improve marksmanship and increase lethality.</p> <p>- Improve small unit decision-making capabilities through the use of human-machine teaming and multi-modal interactions</p> <p>- Demonstrate ability to increase physical readiness and reduce potential injuries by using wearable physiological monitoring devices, predictive algorithms, health tracking capability, and related technologies that support Marine Corps' Human Performance and Training programs.</p> <p>- Develop augmented reality technologies focused on fires applications that improve target identification, classification, and situational awareness.</p> <p>- Develop assessment tools and experiential training solutions to train and educate Marines for the right military occupation, and expand research to include adaptive training technologies.</p> <p>Complete:</p> <p>- Complete and transition 3-D terrain visualization, battlefield control measures and effects to Marine Corps and other DoD service related activities.</p> <p><b>FY 2024 Base Plans:</b></p> <p>- Continue to assess marksmanship lethality via automated capture of shot timing, accuracy, and physical performance; develop and assess new marksmanship training approaches, analysis, and visualizations to improve marksmanship and increase lethality; extend the lethality measurement approach to include other fires activities</p> <p>- Continue to improve small unit decision-making capabilities through the use of human-machine teaming and multi-modal interactions</p> <p>- Continue to demonstrate ability to increase physical readiness and reduce potential injuries by building infrastructure to incorporate wearable physiological monitoring devices, predictive algorithms, health tracking capability, and related technologies that can be operated by and support Marine Corps' Human Performance and Training programs.</p> <p>- Continue to develop mixed reality technologies focused on fires applications that improve target identification, classification, and situational awareness.</p> <p>- Continue to develop assessment tools and experiential training solutions to train and educate Marines for the right military occupation, and expand research to include adaptive training technologies.</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Initiate to develop a tool that automatically imports shot timer data into a software application portal that provides analysis and actionable feedback based on USMC established parameters and doctrine.</p> <p><b>FY 2024 OCO Plans:</b> N/A</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The increase in funding from FY 2023 to FY 2024 is due to the initiation of efforts to develop a tool that automatically imports shot timer data into a software application portal that provides analysis and actionable feedback based on USMC established parameters and doctrine.</p>					
<p><b>Title:</b> Intelligence, Surveillance, and Reconnaissance (ISR)</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> This activity investigates enhanced situational awareness, persistent surveillance, and tactical decision making through automated analysis of data and rapid integration of information and acquired knowledge. Specific technologies in this activity effectively present actionable information to decision-makers, especially those at the lower command levels. This includes biometric monitoring for expeditionary operations, operational Course of Action development, and autonomous surveillance in support of distributed operations. Conduct advanced development research on the impact of machine learning on mission outcomes. Will investigate the operational relevance of enhanced situational understanding and machine-aided tactical decision-making. This includes presenting actionable information (e.g. support to planning, mission monitoring, and re-planning) to decision makers.</p> <p>Further, this activity supports the demonstration of technologies to enhance situational awareness and tactical decision making through automated analysis, fusion of data, rapid integration of information, and acquired knowledge resulting in actionable intelligence at the lower command levels. The activity includes the demonstration of ISR efforts involving enhanced reconnaissance and persistent surveillance, and sensors for unmanned ground and aerial vehicles. Advanced technology demonstrations also include the collection of information (monitoring, sensing, and locating) in the 3-Dimensional urban battlespace as well as exploiting information (identifying and classifying data) as part of the intelligence preparation of the battlespace in order to facilitate operational maneuver and distributed operations.</p> <p><b>FY 2023 Plans:</b> Continue:</p>	8.823	9.532	11.433	0.000	11.433
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2223 / Marine Corps ATD

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Develop and demonstrate new artificial intelligence (AI) systems to automate monitoring and alerting. Research will integrate video analytics with edge processing to create high-throughput detection, classification, and tracking across multiple operational domains.</p> <p>- Develop a prototype using recommendation engines to adapt strategies based on adversary actions.</p> <p>- Advanced technology development on the operational utility of Artificial Intelligence and Machine Learning algorithms; develop, demonstrate, and experiment with these techniques during Marine Corps operations exercises and events.</p> <p>- Development to generate synthetic data useful for machine learning while learning how to combine real data from training or operations.</p> <p>- Demonstrations and experimentation with training and operational forces to understand the utility and impact of decision aids on improving and accelerating understanding and information-based decision-making, as well as reductions in operator workload.</p> <p>Initiate:</p> <p>- Develop fused common tactical picture, and tools to support planning, execution, and assessment that will allow commanders the all-domain situation awareness required to make informed and timely decisions.</p> <p><b>FY 2024 Base Plans:</b></p> <p>- Continue to develop and demonstrate new artificial intelligence (AI) systems to automate monitoring and alerting. Research will integrate video analytics with edge processing to create high-throughput detection, classification, and tracking across multiple operational domains.</p> <p>- Continue to develop a recommendation engine prototype to adapt strategies based on adversary actions.</p> <p>- Continue advanced technology development to evaluate operational utility of Artificial Intelligence and Machine Learning algorithms to improve decision making; and develop, demonstrate, and experiment with these techniques during Marine Corps operations exercises and events.</p> <p>- Continue development to generate synthetic data useful for machine learning while learning how to combine real data from training or operations.</p> <p>- Continue demonstrations and experimentation with training and operational forces to understand the utility and impact of planning and decision aids on improving and accelerating understanding and information-based decision-making, as well as reductions in operator workload.</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2223 / Marine Corps ATD

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Continue development of fused common tactical picture, and tools to support planning, execution, and assessment that will allow commanders the all-domain situation awareness required to make informed and timely decisions.</p> <p><b>FY 2024 OCO Plans:</b> N/A</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The increase in funding from FY 2023 to FY 2024 is due to increased investments in enhanced situational awareness, persistent surveillance, and tactical decision making through automated analysis of data and rapid integration of information and acquired knowledge.</p>					
<p><b>Title:</b> USMC Future Naval Capabilities</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> This R-2 Activity addresses the advanced technology development associated with the Marine Corps' participation in the Department of the Navy's (DoN) Future Naval Capabilities (FNC) Program. The objective of the work in this Program Element (PE) is to develop promising technologies emerging from the FNC technology candidates funded in PE 0602131M that have been matured to higher Technology Readiness Levels (TRLs). Investments in this activity are coordinated with similar and non-duplicative efforts in PE 0603673N. The FNC Program is structured to accelerate the transition of new technologies to the Fleet and Force. Each effort is assessed for its technology maturity and transition commitment. Funding for FNCs, which have Technology Readiness Levels (TRLs) of 4/5 to 6 and also have transition funding commitments from acquisition Programs of Record, are resourced in this PE 0603640M MC Advanced Technology Demo. Funding for FNC technology candidates at lower TRLs (3 to 4) is resourced in PE 0602131M Marine Corps Landing Force Tech. ONR is working closely with the Resource Sponsors and acquisition stakeholders to develop high priority technological capabilities needed by the operational forces.</p> <p>FNC budget activity (BA) 2 investments develop candidate FNC technologies in an agile fashion by exploiting technology advances that respond rapidly to naval needs. This approach facilitates an optimum response when developing and maturing the technology options that can be developed further in this PE 0603640M MC Advanced Technology Demo.</p> <p>The FNC Program favors a high level of collaboration. Collaboration with the acquisition stakeholders and their resource sponsors is required. A complete accounting of the technology candidates being developed and a full</p>	26.165	27.813	28.426	0.000	28.426
	-	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2223 / Marine Corps ATD

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>disposition of each technology development effort funded in this PE is provided annually to the Congressional oversight committees.</p> <p><b>FY 2023 Plans:</b> Continue: Maintenance Tools for Operations and Training (MTOT) - Continue to develop software applications (e.g. augmented reality) and content to improve training availability and accessibility, as well as analytics and algorithms to support student assessment and tailor training to address training gaps within the Marine Corps Deliberate Universal Needs Statement (D-UNS) on Enterprise Level Maintenance Simulation Training Solution.</p> <p>Streamlined Marine After-Action Review Tool- Visualization (SMART-Viz): - Complete development, exit criteria testing, and transition of Streamlined Marine After-Action Review (AAR) Tools for Visualization to Marine Corps Program Manager for Training Systems to support force-on-force and simulation-based training to improve lethality.</p> <p>All Signal Tactical Real-Time Analyzer (ASTRAL): - Continue development of the sensor receiver module to provide full spectral awareness in a contiguous RF range, unifying recent advances in spectral and correlative analysis, signal processing, and monolithic photonics-electronics integration.</p> <p>Cognitive Radio Frequency Inference Technology (CRIT): - Complete development of small form factor technologies that provide organic, easy to understand and use signature management of the Marine Air-Ground Task Force (MAGTF) in electromagnetic and information environments.</p> <p>Multi Domain Radar for the Contested Environment (MuDRaCE): - Complete development of portable, distributed multi-domain sensor and surveillance technologies in portable expeditionary warfare form factor to improve effectiveness and survivability in denied and contested electromagnetic environments.</p> <p>Poison Apple (PA)</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2223 / Marine Corps ATD

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>- Initiate the Poison Apple FNC with two awards to commercial and government performers and begin S&amp;T development by initiating research into establishing a prototype solution that builds upon prior investments that matured earlier versions of the technological capability.</p> <p>- Initiate technology develop planning and documentation leading to a preliminary design review of the proposed prototype solution, and commence development of an initial operational prototype for first year demonstration in a field like setting to receive warfighter feedback of the maturing capability.</p> <p>Ubiquitous Edge (UbE)</p> <p>- Initiate the UbE FNC with five performer awards to begin development by conducting research into a cloud capability orchestration of networked devices to include command and control of networked components.</p> <p>- Initiate technology develop planning to establish a preliminary design for an initial operational prototype, conduct a stakeholder review of the system approach, and commence development of the initial prototype, to include an initial demonstration of the system that obtains warfighter feedback of the maturing capability.</p> <p><b>FY 2024 Base Plans:</b> All Signal Tactical Real-Time Analyzer (ASTRAL):</p> <p>- Complete development of the sensor receiver module to provide full spectral awareness in a contiguous RF range, unifying recent advances in spectral and correlative analysis, signal processing, and monolithic photonics-electronics integration.</p> <p>Poison Apple (PA)</p> <p>- Continue the Poison Apple FNC S&amp;T development by establishing a functional prototype solution that can be evaluated in simulated relevant environment designed to provide insight into software architectural and transition hardware solutions targeted at achieving Technology Readiness Level 6 by FY26.</p> <p>- Finish technology development planning and establish a model based systems engineering approach to documentation and requirements verification based on the preliminary design review outcomes. Finalize design solution supporting prototype development that was evaluated in the first year demonstration.</p> <p>Ubiquitous Edge (UbE)</p> <p>- Continue the Ubiquitous Edge FNC development through prototyping a software baseline targeted on networked devices that can provide an initial demonstration of transition program capability needs.</p> <p>- Continue technology definition through preliminary design review supporting an initial operational prototype based on the results of the first year demonstration feedback from warfighter feedback. Capture design</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2223 / Marine Corps ATD

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>documentation into a model based systems engineering process to provide architecture analysis, requirements verification and measurement of prototype operational performance.</p> <p>Maintenance Tools for Operations and Training (MTOT)</p> <ul style="list-style-type: none"> <li>- Complete the MTOT FNC by providing immersive technologies to support just-in-time, just-in-place training in the field and the schoolhouse, and analytics to track student progress and provide intelligent paths to improve maintenance performance. The final year will continue development of the MTOT FNC via iterative testing of automated processes to generate real-world models of maintenance system for use in immersive technologies (e.g., augmented reality) and tailored training to support the identified Marine Corps use cases and programs of instruction. Collect metrics on student performance to provide objective feedback to students and instructors in realistic classroom settings. Conduct system demonstrations in support of verifying compliance with exit criteria.</li> </ul> <p>Training Environment for Advanced Marine Skills (TEAMS)</p> <ul style="list-style-type: none"> <li>- Initiate advanced prototype development to better integrate operational systems with training systems to support more realistic training with the Marine Corps Project Tripoli / Live Virtual Constructive-Training Environment.</li> <li>- Conduct stakeholder engagements with Training and Education Command and Program Manager of Training System on plans and development and begin development of operational prototypes.</li> </ul> <p>Stand-off Radar Imaging Detection System (SoRIDS)</p> <ul style="list-style-type: none"> <li>- Initiate development of a system for on-the-move standoff detection, virtual marking, and reporting of buried and surface laid explosive hazards using multi-static Ground Penetrating Synthetic Aperture Radar (GP-SAR) systems for Unmanned Aerial Vehicles (UAVs) and Unmanned Ground Vehicles (UGVs).</li> <li>- Initiate high sampling rate transceiver performance analysis and integration to improve the overall operational speed and fidelity.</li> <li>- Initiate software development and integration of a low-cost universally adaptable robotic UGV operator for operations of the unmanned ground vehicle.</li> </ul> <p>Dreamcatcher</p> <ul style="list-style-type: none"> <li>- Initiate the combining of an asset-target assignment mixed integer programming model with contested logistics models.</li> <li>- Initiate the development of an adversarial reinforcement learning to modify Navy and Marine Corps shooters behavior based on Red's behavior.</li> </ul>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2223 / Marine Corps ATD

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
- Initiate the development of modifying software to be compatible within a multi-level security environment. <b>FY 2024 OCO Plans:</b> N/A <b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> There is no significant change from FY 2023 to FY 2024.					
<b>Title:</b> Logistics  <b>Description:</b> This activity investigates the practical discipline and real world application of the deployment, sustainment, reconstitution, and re-deployment of forces engaged in expeditionary operations. Logistics replaces mass with assured knowledge and speed, is equally capable ashore or afloat in austere environments, and is fully scalable to meet uncertain requirements. This includes efficient and responsive force sustainment, planning and directing logistics operations, logistics demand reduction, fleet maintenance, and expeditionary energy. Expeditionary Energy enhances combat capability of expeditionary warfighters by increasing the efficiency and effectiveness of energy production, storage, distribution and use. Beyond traditional energy efforts, this portfolio also looks at other issues, including energy-efficient behaviors and hybridization of energy sources. These pillars are thoroughly integrated and perpetually related in execution.  <b>FY 2023 Plans:</b> Continue: - Advance the broad range of technologies to demonstrate the military utility of enhancing combat capability by increasing energy production, storage, distribution, and curbing energy consumption of the individual Marine and other tactical assets with a particular emphasis on supporting distributed operations. - Progress efforts towards energy-aware aerial logistics, modular and reconfigurable tactical microgrids, aluminum-powered expeditionary energy sources and energy-intensive distributed operations.  Complete: - Complete advanced system research into the scaled use of high specific power solar cell for Marine Corps applications ranging from the individual warfighter to augmenting the power and combat endurance unmanned robotic vehicles.  Initiate:	9.804	10.778	18.200	0.000	18.200
<b>Articles:</b>	-	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2223 / Marine Corps ATD

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Initiate a follow-on and focused research effort developing mission risk-based predictive maintenance technology. Demonstrate in laboratory and progress to field implementation of mission risk-based predictive maintenance technology to allow pre-planning of maintenance and repair requirements sufficiently far in advance to minimize mission interruption and facilitate longer horizon, more energy efficient distribution of Class IX materiel.</p> <p><b>FY 2024 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue to advance the broad range of technologies to demonstrate the military utility of enhancing combat capability by increasing energy production, storage, distribution, and curbing energy consumption of the individual Marine and other tactical assets with a particular emphasis on supporting distributed operations.</li> <li>- Continue progress efforts towards energy-aware aerial logistics, modular and reconfigurable tactical microgrids, aluminum-powered expeditionary energy sources and energy-intensive distributed operations.</li> <li>- Continue a focused research effort developing mission risk-based predictive maintenance technology. Demonstrate in laboratory and progress to field implementation of mission risk-based predictive maintenance technology to allow pre-planning of maintenance and repair requirements sufficiently far in advance to minimize mission interruption and facilitate longer horizon, more energy efficient distribution of Class IX materiel.</li> <li>- Initiate a research effort to research and develop solutions for safe and effective integration of Lithium-ion 6T batteries into soon-to-field energy storage platforms.</li> <li>- Initiate an effort to develop and ultimately demonstrate a modular hydrogen fuel cell Auxiliary Power Unit (APU) that can be mounted to light tactical vehicles to increase silent watch endurance without the addition of large amounts of batteries.</li> <li>- Initiate the development and demonstration of a long shelf-life, non-rechargeable electrical energy source that is affordable, safe, and transportable, that is a plug-and-play replacement for present Li-ion batteries about Loitering Munitions.</li> <li>- Initiate research effort to develop and deliver a power conversion efficiency solar cell mini-module that is based on next-generation perovskite photovoltaics.</li> <li>- Initiate research effort that will establish the development of transfer learning from sensor-informed additive manufacturing for F357 cast aluminum alloys to address critical casting and logistics shortages.</li> <li>- Initiate development and testing of computational tools for understanding flux-metal interaction during additive manufacturing.</li> <li>- Initiate development of specialized torches to adapt existing additive manufacturing system to reduce/eliminate shielding gas consumption in expeditionary manufacturing.</li> </ul>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2223 / Marine Corps ATD

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Initiate the integration of full-scale USV tug with inflatable vessel and close-coupling system. Demonstrate integrated system at-sea in required sea-state conditions.</p> <p>- Initiate creation and live fire testing of tiered (layered) body armor prototype to enhance warfighter protection from ballistic injury.</p> <p><b>FY 2024 OCO Plans:</b> N/A</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The increase in funding from FY 2023 to FY 2024 is due to the initiation of efforts to 1) provide a roadmap and executed plan to yield a standardized Li6T that can fulfil the requirements for the four most pressing USMC programs using Li6T, 2) develop a small expeditionary Auxiliary Power Unit (APU) that can be mounted to light tactical vehicles to increase silent watch endurance without the addition of large amounts of batteries, 3) develop a long shelf-life, non-rechargeable electrical energy source which is affordable, safe to store, and readily transportable, that is a beyond-lithium-ion alternative the requirement of without supply chain logistics hurdles, 4)to develop and deliver a power conversion efficiency solar cell mini-module that is based on next-generation perovskite photovoltaics and 5) establish transfer learning algorithms and a material based equivalency approach to broaden material data sets leveraging Quality Made Additive Manufacturing (AM) capabilities to allow for AM replacement of hard-to-source conventional castings.</p>					
<p><b>Title:</b> Maneuver</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> This activity investigates new ways and means to land forces and material through contested sea-land surface interfaces and then conduct maneuver warfare. In order to enable future Amphibious Operations, research efforts will support autonomous operations across the sea-surf-ground environment, improved fuel efficiency and speed of amphibious vehicles, amphibious vehicle technologies, water performance, and amphibious payloads to change the dynamics of a surface amphibious assault. This includes the emergence of manned-unmanned teaming and autonomous vehicle collaboration.</p> <p>The technologies included in this work address areas of mobility, materials, propulsion, signature reduction, modularity, and unmanned systems. This also encompasses navigating the surf zone by a small autonomous vehicle, navigating negative obstacles on land at speed, overcoming adversarial intent, and developing low-cost robotic autonomy kits to support of expeditionary amphibious operations (e.g., ISR, mine-counter-measures, breaching, fire support, and logistics).</p>	14.958	15.868	19.712	0.000	19.712
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2223 / Marine Corps ATD

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
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**FY 2023 Plans:**  
 Continue:  
 - Researching advanced intelligent mobility technologies for ground and amphibious platforms to improve mobility and maneuverability across littoral and inland terrain. Demonstration platforms will continue to be utilized to assess potential future capabilities.  
 - Expand efforts related to the low-cost, unmanned swarming amphibious assault capable platforms to include addition of enhanced autonomy capabilities and utilization and demonstration of advanced payloads for future operations. Conduct experimentation to understand feasibility and utility for military applications.

Initiate:  
 - Research advanced drivetrain technologies, system designs, and platforms to assess capability of future military tactical truck systems to improve fuel efficiency, extend range, reduce greenhouse gases, and provide on-board auxiliary power and energy.

**FY 2024 Base Plans:**  
 - Continue research to advance intelligent mobility technologies for ground and amphibious platforms to improve mobility and maneuverability across littoral and inland terrain. Demonstration platforms will continue to be utilized to assess potential future capabilities.  
 - Continue to expand on efforts related to the low-cost, unmanned swarming amphibious assault capable platforms to include addition of enhanced autonomy capabilities and utilization and demonstration of advanced payloads for future operations. Conduct experimentation to understand feasibility and utility for military applications.  
 - Continue research to advance drivetrain technologies, system designs, and platforms to assess capability of future military tactical truck systems to improve fuel efficiency, extend range, reduce greenhouse gases, and provide on-board auxiliary power and energy.  
 - Initiate research effort to conduct a series of operational analysis and experiments to rapidly advance technologies in select focus areas related to littoral maneuver into the hands of Marines to evaluate military utility.  
 - Initiate integration and field testing of AI-enabled autonomy Command and Control (C2) into Unmanned Swarming Amphibious Assault Craft (USAAC).

**FY 2024 OCO Plans:**

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2223 / Marine Corps ATD

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
N/A					
<b><i>FY 2023 to FY 2024 Increase/Decrease Statement:</i></b> The increase in funding from FY 2023 to FY 2024 is due to the initiation of efforts to 1) conduct a series of operational analysis and experiments to rapidly advance technologies in select focus areas related to littoral maneuver into the hands of Marines to evaluate military utility and 2) conduct integration and field testing of AI-enabled autonomy Command and Control (C2) into Unmanned Swarming Amphibious Assault Craft (USAAC).					
<b>Accomplishments/Planned Programs Subtotals</b>	106.408	118.183	126.171	0.000	126.171

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy										<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 1319 / 3					<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo				<b>Project (Number/Name)</b> 2297 / Futures Directorate			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
2297: Futures Directorate	0.000	101.747	157.064	177.046	-	177.046	139.865	136.609	131.420	130.757	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

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

The mission of the Marine Corps Warfighting Laboratory / Futures Directorate (MCWL/FD) is to generate and examine threat-informed operating concepts and capabilities and provide analytically-supported recommendations to inform subsequent force design and development activities. The Deputy Commandant, Combat Development and Integration (DC, CD&I) is the United States Marine Corps (USMC) advocate for Science and Technology (S&T). MCWL's Commanding General (CG) is the proponent of USMC S&T and serves as the USMC Executive Agent for Marine Corps S&T. The MCWL/FD also serves as the Marine Corps' liaison to the Joint Staff for Joint Concept Development and Experimentation; thereby, facilitating service-specific experiments as well as participation in joint service experimentation.

As reflected in strategic guidance, expeditionary forces will provide an ever-ready quick strike force to protect United States (US) interests. MCWL/FD pursues concepts, capabilities, and solutions to ensure that Marines of the future force will be effectively organized, trained, and equipped to win across the range of military operations in an uncertain and complex environment. Prioritized investments in S&T are necessary to enable the future Marine Corps and maintain a technological advantage over our adversaries.

This project is organized into 6 activities, the core of which are represented by the Warfighting Capability Areas of the Marine Air-Ground Task Force (MAGTF). The project emphasizes development and demonstration of advanced technology capability concepts, and the examination of their operational application and military utility in the context of formal wargames, Modeling, Simulation, and Analysis (MS&A), and live-force field experimentation with Marines. This operational experimentation directly supports Marine Corps combat development to inform future capability requirements and optimize the acquisition process.

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<b>Title:</b> Combat Service Support (CSS) and Force Protection	31.734	73.324	87.232	0.000	87.232
<b>Articles:</b>	-	-	-	-	-
<b>Description:</b> This activity includes Marine Corps Warfighting Laboratory / Futures Directorate (MCWL/FD) Combat Service Support and Force Protection experimentation efforts, to include overarching experimentation planning/execution, management, technical, and engineering support, assessment of equipment, new Tactics, Techniques, and Procedures (TTPs), training opportunities, and proposed organizational changes associated with enhanced capabilities. This activity develops technology in support of a more distributed technologically advanced force, increasing range, effectiveness, sustainability, and survivability of the Marine Corps Air-Ground Task Force (MAGTF). Most programs listed below are considered major (valued at \$500K or more) or have near					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2297 / Futures Directorate

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

real-time operational impact. Investments in this activity are conducted under the Thrust Areas of Expeditionary Logistics, Expeditionary Medical, Force Protection, or Autonomy and Robotics.

***FY 2023 Plans:***

Unmanned Logistics and Defense:

- Continue development and experimentation with highly autonomous and synchronous logistics capabilities in support of expeditionary Marine Air-Ground Task Force (MAGTF) operations.
- Continue to assess execution of high tempo unmanned sustainment to dispersed and disaggregated forces during joint combined air-ground operations in contested environments including transiting over water from surface vessels to shore and other surface vessels.
- Complete development efforts in support of littoral staging and autonomous resupply, which provides a landing craft, utility (LCU) with hardened autonomy system that can deploy with Marine Expeditionary Units as part of extended user evaluations (EUEs) to inform requirements for autonomous and unmanned crafts in the littorals.

Sustainment:

- Continue to sustain and investigate multiple technologies integrated within the MAGTF to experiment with alternate vehicle power, extended mobility, hybrid energy, expeditionary fuel distribution, and small unit water purification to enable logistics demand reduction and provide alternate sustainment to the MAGTF at all levels.
- Complete experimentation with hybrid power systems.
- Complete design, development, manufacturing, and testing of an amphibious towable fuel container (unit/system).
- Complete evaluating Limited Technical Assessment (LTA) results on the ability to organically construct expeditionary air fields, roadways, and hardened structures.
- Initiate demonstrations with naval logistics information technology integration with low earth orbit and military satellite networks; ultimately reducing reliance on continuous emission systems and leveraging low probability of detection waveforms.
- Initiate the research, design, and build of a littoral maneuver enabler prototype.

Counter Unmanned Aerial System (CUAS):

- Complete efforts to develop an enhanced capability to locate, identify, access, and neutralize small UAS threats.

FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2297 / Futures Directorate

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Complete development efforts for automatic target recognition algorithms for radar optics as well as a library of 3-dimensional imagery to enhance current technology, reduce false positives, and shorten the systematic kill-chain for targeting.</p> <p>Explosive Detection/Defeat:</p> <ul style="list-style-type: none"> <li>- Continue to develop an autonomous explosive detection and defeat capability; integrating specialized sensors for enhanced neutralization.</li> <li>- Initiate spiral technology development to produce a mobile explosive hazard in-depth defense.</li> </ul> <p>Medical:</p> <ul style="list-style-type: none"> <li>- Continue to experiment with systems to support a smaller, modular, multifunctional medical concept that can support medical care ashore and Marine Littoral Regiments (MLR) by performing studies, integration with unmanned systems, demonstrations, and experimentation.</li> <li>- Continue to integrate, test, and demonstrate wearable bio-sensors and their applicability to a multifunctional medical team supporting the MLR.</li> <li>- Complete integration of automated casualty care, providing therapeutic care during movement.</li> <li>- Initiate research regarding the constraints of performing medical interventions aboard shallow draft vessels.</li> </ul> <p>Warfighter Performance:</p> <ul style="list-style-type: none"> <li>- Continue to provide increased lethality and mobility to the warfighter through the integration of technology directly attributable to individual combat equipment.</li> <li>- Continue to develop, test, and assess a Radio Agile Integrated Device (RAID) Plate.</li> <li>- Initiate development of common user interface and fully integrate Primary, Alternate, Contingency, Emergency (PACE) plan for dismounted troops.</li> </ul> <p>Littoral Connectors:</p> <ul style="list-style-type: none"> <li>- Continue development and enhancement of capabilities for diversified distribution, providing risk worthy, inexpensive platforms for maneuver and sustainment distribution. Utilize current commercial technology to enhance maneuver to and from seabases and expeditionary advanced bases in the littorals with the ability to deliver directly to the users at shore. Efforts will advance anti-access and area denial capabilities to forward deployed forces.</li> </ul> <p>Robotic Modernization:</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2297 / Futures Directorate

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Continue to provide ground combat element robotic asset maintenance, repair, and upgrades; ultimately ensuring systems viability for experimentation and user evaluation.</p> <p>Camouflage, Concealment, and Detection (CC&amp;D):</p> <p>- Initiate the development of CC&amp;D capabilities, enabling persistence within enemy's Weapons Engagement Zone (WEZ).</p> <p><b>FY 2024 Base Plans:</b></p> <p>Unmanned Logistics and Defense:</p> <p>- Continue development and experimentation with highly autonomous and synchronous logistics capabilities in support of expeditionary Marine Air-Ground Task Force (MAGTF) operations.</p> <p>- Continue to assess execution of high tempo unmanned sustainment to dispersed and disaggregated forces during joint combined air-ground operations in contested environments including transiting over water from surface vessels to shore and other surface vessels.</p> <p>Sustainment:</p> <p>- Continue to sustain and investigate multiple technologies integrated within the MAGTF to experiment with alternate vehicle power, extended mobility, hybrid energy, expeditionary fuel distribution, and small unit water purification to enable logistics demand reduction and provide alternate sustainment to the MAGTF at all levels.</p> <p>- Continue demonstrations with naval logistics information technology integration with low earth orbit and military satellite networks; ultimately reducing reliance on continuous emission systems and leveraging low probability of detection waveforms.</p> <p>- Continue the research, design, and build of a littoral maneuver enabler prototype.</p> <p>Counter Unmanned Aerial System (CUAS):</p> <p>- Initiate a comprehensive experimentation plan to successfully execute an end-to-end kill chain for developed CUAS capabilities. Specifically, demonstrating the ability to employ CUAS from the sea bases to support Marine forces in austere locations.</p> <p>Explosive Detection/Defeat:</p> <p>- Continue to develop an autonomous explosive detection and defeat capability; integrating specialized sensors for enhanced neutralization.</p> <p>- Continue spiral technology development to produce a mobile explosive hazard in-depth defense.</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2297 / Futures Directorate

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>Medical:</p> <ul style="list-style-type: none"> <li>- Continue to experiment with systems to support a smaller, modular, multifunctional medical concept that can support medical care ashore and Marine Littoral Regiments (MLR) by performing studies, integration with unmanned systems, demonstrations, and experimentation.</li> <li>- Continue research regarding the constraints of performing medical interventions aboard shallow draft vessels.</li> <li>- Complete the integration, testing, and demonstration of wearable bio-sensors and their applicability to a multifunctional medical team supporting the MLR.</li> </ul> <p>Warfighter Performance:</p> <ul style="list-style-type: none"> <li>- Continue to provide increased lethality and mobility to the warfighter through the integration of technology directly attributable to individual combat equipment.</li> <li>- Continue to develop, test, assess, and experiment with a Radio Agile Integrated Device (RAID) Plate.</li> <li>- Continue the development of common user interface and fully integrate Primary, Alternate, Contingency, Emergency (PACE) plan for dismounted troops.</li> </ul> <p>Littoral Connectors:</p> <ul style="list-style-type: none"> <li>- Continue development and enhancement of capabilities for diversified distribution, providing risk worthy, inexpensive platforms for maneuver and sustainment distribution. Utilize current commercial technology to enhance maneuver to and from seabases and expeditionary advanced bases in the littorals with the ability to deliver directly to the users at shore. Efforts will advance anti-access and area denial capabilities to forward deployed forces.</li> <li>- Initiate assessments, evaluations, and experimentation with the Navy and Fleet Marine Forces to inform future naval surface vessel requirements, develop TTPs, and refine Distributed Maritime Operations (DMO)/ Expeditionary Advanced Base Operations (EABO) concept of operations (CONOPS), pertaining to Force Design 2030 and the activation of the MLR. Efforts will provide enhanced maneuver to and from expeditionary advance bases in the littorals with the ability to deliver personnel, equipment, and all classes of supply, directly to the shore. Because the Marine Corps requires intermodal maneuver and sustainment assets, these assets will compliment larger naval vessels supporting operational requirements.</li> <li>- Initiate assessments, evaluations, and experimentation with small boats to augment littoral maneuver capability in support of Force Design 2030. Provide detailed analysis to support capability development and future</li> </ul>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2297 / Futures Directorate

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>Program Objective Memoranda (POM) decisions. Combine efforts from wargames, studies, modeling and simulation, live force experimentation, and analysis to refine concept of operations (CONOPS) for sustainment as well as littoral maneuver capability.</p> <p>Robotic Modernization: - Continue to provide ground combat element robotic asset maintenance, repair, and upgrades; ultimately ensuring systems viability for experimentation and user evaluation.</p> <p>Camouflage, Concealment, and Detection (CC&amp;D): - Continue the development of CC&amp;D capabilities, enabling persistence within enemy's Weapons Engagement Zone (WEZ).</p> <p><b>FY 2024 OCO Plans:</b> N/A</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The funding increase from FY 2023 to FY 2024 is directly attributable to advancements in the Littoral Connectors arena. Specifically, a third hull is added within the Stern Landing Vessel (SLV) program to improve resilience, dispersion, and the ability to operate in complex archipelagoes and contested littorals without incurring unacceptable risk. In addition, Ancillary Surface Connector (ASC) efforts are initiated to improve the sustainment of the future naval expeditionary force, through its tailored ability to support expeditionary forces operating in contested and austere environments, complicating enemy decision and targeting calculus, and freeing Navy operational availability that would have to originally be focused on sustainment to the Marine Corps. All efforts directly support Force Design 2030.</p>					
<p><b>Title:</b> Marine Air-Ground Task Force (MAGTF) Command, Control, Communications, and Computers (C4)</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> This activity encompasses all Marine Corps Warfighting Laboratory/Futures Directorate (MCWL/ FD) Command, Control, Communications, and Computers (C4) experimentation efforts, to include overarching experimentation planning/execution, management, technical, and engineering support, assessment of equipment, new Tactics, Techniques, and Procedures (TTPs), training programs, and proposed organizational changes associated with enhanced C4 capabilities. The area provides cutting edge/enhanced Over-The-Horizon (OTH), Beyond Line of Sight (BLOS), satellite and non-satellite based C4 capabilities to support experimentation. Programs listed below are considered major (valued at \$500K or more) or have near real-time</p>	8.650	15.144	9.733	0.000	9.733
	-	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2297 / Futures Directorate

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>operational impact. Investments in this activity are conducted under the Thrust Areas of Command, Control, Communications, and Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) and Cyber/Electronic Warfare (Cyber/EW).</p> <p><b>FY 2023 Plans:</b>                      Asymmetric Command and Control (C2):                      - Continue to provide secure "one-to-many" (netted) push-to-talk (PTT) voice and command, control, communications, and computers (C4) data services to disadvantaged users in an easy to use, hand-held radio for both mounted and dismounted operations with no reliance on local ground infrastructure.                      - Continue mini-crypto development.                      - Initiate mission play-back capabilities for enhanced analysis and training and continue development and limited technical assessments with an expeditionary transportable communications platform.                      - Initiate a series of limited technical assessments to provide secure "one-to-many" (netted) push-to-talk (PTT) voice and command, control, communications, and computers (C4) data services to disadvantaged users in an easy to use, hand-held radio for both mounted and dismounted operations with no reliance on local ground infrastructure.</p> <p>Integrated C2:                      - Continue experimentation with an expeditionary transportable communications platform.                      - Continue the development of persistent satellite communications (SATCOM) point-of-presence to enable Expeditionary Advanced Base (EAB), Distributed Maritime Operations (DMO), and Joint All-Domain C2 (JADC2) experimentation.                      - Initiate the integration of a proliferated-Low Earth Orbit (pLEO) satellite constellation capability which will facilitate connectivity to elements of the Family of Integrated Targeting Cells (FITC) and other pLEO enabled platforms and agencies.</p> <p>Electronic Warfare (EW) / Information Environment Operations:                      - Continue to pursue multiple electronic and cyber-secure warfare efforts.                      - Complete efforts to test and assess, which provide a ruggedized case for sensing WiFi, Bluetooth, and other electro-magnetic transmissions.                      - Initiate the development and integration of an airborne EW/Signals Intelligence (SIGINT) radio frequency sensor that is optimized for Group I - III unmanned aerial system (UAS) deployment.</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2297 / Futures Directorate

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Initiate the integration of a full-spectrum SIGINT and EW capability onto Group V UAS. Effort will provide a modular system architecture with the ability to integrate into multiple platforms.</p> <p>- Initiate experimentation with a cyber application of swarmable, autonomous UASs used to accomplish intelligence, surveillance, and reconnaissance (ISR) and EW operations in a contested environment.</p> <p>- Initiate the development of a resilient, cyber-secure high-performance network within the littorals.</p> <p>Naval Force Tactical Communications:</p> <p>- Initiate experimentation opportunities for high frequency silent transmission over a resilient meshed network. Developed technology will support C2 in heavily contested electro-magnetic environments (EME).</p> <p><b>FY 2024 Base Plans:</b></p> <p>Asymmetric Command and Control (C2):</p> <p>- Continue to provide secure "one-to-many" (netted) push-to-talk (PTT) voice and command, control, communications, and computers (C4) data services to disadvantaged users in an easy to use, hand-held radio for both mounted and dismounted operations with no reliance on local ground infrastructure.</p> <p>- Continue mini-crypto development.</p> <p>- Continue mission play-back capabilities for enhanced analysis and training and continue development and limited technical assessments with an expeditionary transportable communications platform.</p> <p>- Continue a series of limited technical assessments to provide secure "one-to-many" (netted) push-to-talk (PTT) voice and command, control, communications, and computers (C4) data services to disadvantaged users in an easy to use, hand-held radio for both mounted and dismounted operations with no reliance on local ground infrastructure.</p> <p>Integrated C2:</p> <p>- Continue experimentation with an expeditionary transportable communications platform.</p> <p>- Continue the development of persistent satellite communications (SATCOM) point-of-presence to enable Expeditionary Advanced Base (EAB), Distributed Maritime Operations (DMO), and Joint All-Domain C2 (JADC2) experimentation.</p> <p>- Continue the integration of a proliferated-Low Earth Orbit (pLEO) satellite constellation capability which will facilitate connectivity to elements of the Family of Integrated Targeting Cells (FITC) and other pLEO enabled platforms and agencies.</p> <p>Electronic Warfare (EW) / Information Environment Operations:</p>					

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<ul style="list-style-type: none"> <li>- Continue to pursue multiple electronic and cyber-secure warfare efforts.</li> <li>- Continue the development and integration of an airborne EW/Signals Intelligence (SIGINT) radio frequency sensor that is optimized for Group I - III unmanned aerial system (UAS) deployment.</li> <li>- Continue the integration of a full-spectrum SIGINT and EW capability onto Group V UAS. Effort will provide a modular system architecture with the ability to integrate into multiple platforms.</li> <li>- Continue experimentation with a cyber application of swarmable, autonomous UASs used to accomplish intelligence, surveillance, and reconnaissance (ISR) and EW operations in a contested environment.</li> <li>- Continue the development of a resilient, cyber-secure high-performance network within the littorals.</li> <li>- Initiate a Size, Weight, and Power (SWAP) analysis on an advanced High Frequency (HF) Radio Frequency (RF) signal processing and emitter exploitation.</li> </ul> <p>Naval Force Tactical Communications:</p> <ul style="list-style-type: none"> <li>- Complete experimentation with high frequency silent transmission over a resilient meshed network.</li> </ul> <p><b>FY 2024 OCO Plans:</b> N/A</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The decrease from FY 2023 to FY 2024 is attributable to the following areas:</p> <p>Electronic Warfare (EW) / Information Environment Operations:</p> <ul style="list-style-type: none"> <li>- Reduction in overall EW related investment areas.</li> </ul> <p>Naval Force Tactical Communications:</p> <ul style="list-style-type: none"> <li>- Completion of experimentation opportunities with high frequency silent transmission over a resilient meshed network.</li> </ul>					
<p><b>Title:</b> Fires, Targeting, and Maneuver</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> This activity includes Marine Corps Warfighting Laboratory / Futures Directorate (MCWL/FD) experimentation efforts in the areas of fires, targeting, and maneuver, to include overarching experimentation planning/execution, management, technical, and engineering support, assessment of equipment, new Tactics, Techniques, and Procedures (TTPs), training programs, and proposed organizational changes associated with enhanced capabilities. This area increases fires, targeting, and maneuver related troop environmental</p>	6.297	11.744	7.433	0.000	7.433
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
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**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>awareness, lethality, and mobility using fused sensors as well as unmanned weaponized and reconnaissance air and ground vehicle platforms to support experimentation. Most programs listed below are considered major (valued at \$500K or more) or have near real-time operational impact. Investments in this activity are conducted under the Thrust Areas of Marine Air-Ground Task Force (MAGTF) Fires, Maneuver, and Autonomy and Robotics.</p> <p><b>FY 2023 Plans:</b>                      Unmanned Ground Vehicle (UGV):                      - Continue to provide a multi-purposed UGV, with modular payload architecture, with specific focus on vehicle sustainment as well as command and control structure.                      - Continue to integrate program of record (POR) and non-POR payloads for the UGV platform that enhance dismounted units across the warfighting functions.                      - Continue to perform tests, demonstrations, and assessments prior to dedicated live-force experimentation.</p> <p>Aerial Munitions:                      - Continue to pursue company level precision guided munitions to increase responsiveness, survivability, and lethality to the ground combat element.                      - Continue experimentation with fully autonomous, remotely operated unmanned aerial systems (UASs) that serves as a dual electro-optical (day) and infra-red (IR) (night), precision-guided, loitering munition designed to seek, locate, and engage selected targets.                      - Initiate development of a common launcher system that can be integrated onto ultra-light and autonomous vehicles; capable of firing light and medium or medium and heavy precision fires assets.                      - Initiate tasks to integrate existing weapons technology into a single killer munition.</p> <p>Multi-Domain Fires:                      - Continue the examination and testing of precision guided munitions. Efforts promote artillery force protection.                      - Complete investigations into low cost hypersonic technologies as well as multi-domain over-the-horizon (OTH) targeting.                      - Initiate the incorporation of POR command and control (C2) infrastructure with modified long-range aerial munitions to identify feasibility or recoverable, canister launched, platforms.                      - Initiate fire coordination cognizance investigations to reduce the cognitive load on fire support officers and commanders as they seek to understand events, make decisions, and take actions during high-stakes operations.</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
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**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>- Initiate small unmanned close air support efforts to determine most capable product (platform + weapon + C2); leading to subsequent development and experimentation.</p> <p>- Initiate organic sensor-to-shooter data that expedites the targeting process at the tactical level by integrating national technical means and is interoperable with Joint fires. Funding will be used to conduct a series of Developmental Tests and Limited Technical Assessments that matures the technology and validates USMC service level requirements.</p> <p>- Initiate preliminary design for a hypersonic capability in the 227mm (~9 inch variant) form factor to fit into a M142 High Mobility Artillery Rocket System (HIMARS) Launcher and support an expeditionary concept of operation. Pursuing this size will enable the Marine Corps to leverage existing legacy program of record technologies for both the launcher system (HIMARS) and the command and control software Advanced Field Artillery Tactical Data System (AFATDS).</p> <p><b>FY 2024 Base Plans:</b> Unmanned Ground Vehicle (UGV):</p> <ul style="list-style-type: none"> <li>- Continue to provide a multi-purposed UGV, with modular payload architecture, with specific focus on vehicle sustainment as well as command and control structure.</li> <li>- Continue to integrate program of record (POR) and non-POR payloads for the UGV platform that enhance dismounted units across the warfighting functions.</li> <li>- Continue to perform tests, demonstrations, and assessments prior to dedicated live-force experimentation.</li> </ul> <p>Aerial Munitions:</p> <ul style="list-style-type: none"> <li>- Continue to pursue company level precision guided munitions to increase responsiveness, survivability, and lethality to the ground combat element.</li> <li>- Continue experimentation with fully autonomous, remotely operated unmanned aerial systems (UASs) that serves as a dual electro-optical (day) and infra-red (IR) (night), precision-guided, loitering munition designed to seek, locate, and engage selected targets.</li> <li>- Continue development of a common launcher system that can be integrated onto ultra-light and autonomous vehicles; capable of firing light and medium or medium and heavy precision fires assets.</li> <li>- Continue tasks to integrate existing weapons technology into a single killer munition.</li> </ul> <p>Multi-Domain Fires:</p> <ul style="list-style-type: none"> <li>- Continue the examination and testing of precision guided munitions. Efforts promote artillery force protection.</li> </ul>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<ul style="list-style-type: none"> <li>- Continue the incorporation of POR command and control (C2) infrastructure with modified long-range aerial munitions to identify feasibility or recoverable, canister launched, platforms.</li> <li>- Continue small unmanned close air support efforts to determine most capable product (platform + weapon + C2); leading to subsequent development and experimentation.</li> <li>- Continue organic sensor-to-shooter data that expedites the targeting process at the tactical level by integrating national technical means and is interoperable with Joint fires. Funding will be used to conduct a series of Developmental Tests and Limited Technical Assessments that matures the technology and validates USMC service level requirements.</li> <li>- Complete fire coordination cognizance investigations to reduce the cognitive load on fire support officers and commanders as they seek to understand events, make decisions, and take actions during high-stakes operations.</li> <li>- Complete preliminary design for a hypersonic capability in the 227mm (~9 inch variant) form factor to fit into a M142 High Mobility Artillery Rocket System (HIMARS) Launcher and support an expeditionary concept of operation. Pursuing this size will enable the Marine Corps to leverage existing legacy program of record technologies for both the launcher system (HIMARS) and the command and control software Advanced Field Artillery Tactical Data System (AFATDS).</li> <li>- Initiate the demonstration and experimentation of a small form factor hypersonic capability in the 227mm (~9 inch variant) form factor to fit into a M142 High Mobility Artillery Rocket System (HIMARS) Launcher and support an expeditionary concept of operation.</li> </ul> <p><b>FY 2024 OCO Plans:</b> N/A</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The funding decrease from FY 2023 to FY 2024 is due to the following Multi-Domain Fires efforts:</p> <ul style="list-style-type: none"> <li>- Completion of fire coordination cognizance investigations.</li> <li>- Completion of preliminary design for a hypersonic capability in the 227mm form factor to fit into a M142 High Mobility Artillery Rocket System (HIMARS) Launcher.</li> </ul>					
<p><b>Title:</b> Marine Air-Ground Task Force (MAGTF) Intelligence, Surveillance, and Reconnaissance (ISR)</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> This activity includes Marine Corps Warfighting Laboratory / Futures Directorate (MCWL/FD) Intelligence, Surveillance and Reconnaissance (ISR) related experimentation efforts, to include overarching experimentation planning/execution, management, technical, and engineering support, assessment of</p>	25.441	25.884	37.740	0.000	37.740
	-	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2297 / Futures Directorate

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>equipment, new Tactics, Techniques, and Procedures (TTPs), training programs, and proposed organizational changes associated with enhanced ISR capabilities. Using a variety of fused sensors to mesh data, video, and images and incorporating a common tactical controller to operate multiple air and ground ISR platforms, this area enhances small unit situational awareness as well as exploitation and forward engagement ability via experimentation. Programs listed below are considered major (valued at \$500K or more) or have near real-time operational impact. Investments in this activity are conducted under the Thrust Areas of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) and Autonomy and Robotics.</p> <p><b>FY 2023 Plans:</b></p> <p>Unmanned Aerial Systems (UASs):</p> <ul style="list-style-type: none"> <li>- Continue to explore, expand mission sets, and exploit the tactical potential of small UASs across multiple Marine Corps domains, focusing on autonomy, innovative applications, and the most advanced small UAS technology.</li> <li>- Continue development of Group I long endurance (24+ hour) small UAS.</li> <li>- Continue to investigate and assess vertical take-off and landing (VTOL) Group II UAS capabilities. Objectives still include integrating, testing, and demonstrating a heavy fuel engine to expand Department of the Navy (DoN) organic ship-board operations.</li> <li>- Continue to explore Group II fixed wing and VTOL payload development.</li> <li>- Continue efforts to provide a highly automated/autonomously operated cargo drone that supports organic resupply via an aerial cargo vehicle; supporting a squad sized element.</li> <li>- Complete efforts using larger UASs to develop shipboard operations using an electric VTOL (EVTOL) asset.</li> <li>- Initiate specialized payload development for Group 2 and 3 UAS organic to tactical units for extended endurance, increased lethality, and developmental testing.</li> </ul> <p>Robotic Autonomous Command and Control (C2):</p> <ul style="list-style-type: none"> <li>- Continue to investigate and experiment with enabling technologies combining sensor and telemetry data from multiple unmanned platforms (ground, surface (water), and air).</li> </ul> <p>Fused Integrated Networking:</p> <ul style="list-style-type: none"> <li>- Continue development and experimentation using an aerial communications gateway platform. Objectives include developing a podded C4 gateway prototype optimized to be hosted on a Group V Mid-Altitude Long Endurance (MALE) UAS as well as optimizing multi-domain (air, land, and sea) system-to-system</li> </ul>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2297 / Futures Directorate

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>interoperability; enabling joint targeting (planned and/or dynamic); and providing a robust capacity to locally hosted applications and services.</p> <p>Information Operations:</p> <ul style="list-style-type: none"> <li>- Continue to develop and enhance capabilities to increase situational awareness and influence decision making.</li> <li>- Continue to investigate technologies and experimentation opportunities to support the operational utility of artificial intelligence/machine learning algorithms, developing Marine Corps intelligence and logistics applications.</li> <li>- Complete the integration of capabilities in the information operation environment, to include monitoring, engaging, and producing effects.</li> </ul> <p>Space:</p> <ul style="list-style-type: none"> <li>- Continue to develop capabilities to conduct electronic warfare in support of Marine Air-Ground Task Force (MAGTF) operations.</li> <li>- Continue to investigate experimentation opportunities for inexpensive commercial based satellites, leveraging existing high volume design/manufacturing/test infrastructures.</li> <li>- Complete low probability of intercept/low probability of detection (LPI/LPD) C2 link for autonomous surface vessels and demonstrate a communication pathway in a C2 degraded environment.</li> <li>- Complete experimentation efforts to reduce overall cost of distributed, space-based observations.</li> <li>- Initiate the construct and experimentation of integrated targeting cells.</li> <li>- Initiate investigations to search and receive messages transmitted outside standard frequency assignments and forward to deployed forces within the Expeditionary Advanced Base Operations (EABO) construct.</li> <li>- Initiate Family of Integrated Targeting Cells (FITC) development in order to enhance the tactical-national interfaces that can support the over-the-horizon awareness, identification, and targeting in stressing environments. Prototypes will demonstrate tactical and resilient networking and processing capabilities that can work with national, commercial, and in-theater tactical feeds to increase capabilities operating at the tactical edge.</li> </ul> <p><b>FY 2024 Base Plans:</b></p> <p>Unmanned Aerial Systems (UASs):</p> <ul style="list-style-type: none"> <li>- Continue to explore, expand mission sets, and exploit the tactical potential of small UASs across multiple Marine Corps domains, focusing on autonomy, innovative applications, and the most advanced small UAS technology.</li> </ul>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2297 / Futures Directorate

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>testing, and demonstrating a heavy fuel engine to expand Department of the Navy (DoN) organic ship-board operations.</p> <ul style="list-style-type: none"> <li>- Continue to explore Group II fixed wing and VTOL payload development.</li> <li>- Continue efforts to provide a highly automated/autonomously operated cargo drone that supports organic resupply via an aerial cargo vehicle; supporting a squad sized element.</li> <li>- Continue specialized payload development for Group 2 and 3 UAS organic to tactical units for extended endurance, increased lethality, and developmental testing.</li> <li>- Complete development efforts of Group I long endurance (24+ hour) small UAS.</li> <li>- Complete assessment of vertical take-off and landing (VTOL) Group II UAS capabilities. Objectives include integrating,</li> </ul> <p>Robotic Autonomous Command and Control (C2):</p> <ul style="list-style-type: none"> <li>- Continue to investigate and experiment with enabling technologies combining sensor and telemetry data from multiple unmanned platforms (ground, surface (water), and air).</li> </ul> <p>Fused Integrated Networking:</p> <ul style="list-style-type: none"> <li>- Continue development and experimentation using an aerial communications gateway platform. Objectives include developing a podded C4 gateway prototype optimized to be hosted on a Group V Mid-Altitude Long Endurance (MALE) UAS as well as optimizing multi-domain (air, land, and sea) system-to-system interoperability; enabling joint targeting (planned and/or dynamic); and providing a robust capacity to locally hosted applications and services.</li> </ul> <p>Information Operations:</p> <ul style="list-style-type: none"> <li>- Continue to develop and enhance capabilities to increase situational awareness and influence decision making.</li> <li>- Continue to investigate technologies and experimentation opportunities to support the operational utility of artificial intelligence/machine learning algorithms, developing Marine Corps intelligence and logistics applications.</li> </ul> <p>Space:</p> <ul style="list-style-type: none"> <li>- Continue to develop capabilities to conduct electronic warfare in support of Marine Air-Ground Task Force (MAGTF) operations.</li> <li>- Continue the construct and experimentation of integrated targeting cells.</li> </ul>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2297 / Futures Directorate

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Continue investigations to search and receive messages transmitted outside standard frequency assignments and forward to deployed forces within the Expeditionary Advanced Base Operations (EABO) construct.</p> <p>- Continue Family of Integrated Targeting Cells (FITC) development in order to enhance the tactical-national interfaces that can support the over-the-horizon awareness, identification, and targeting in stressing environments. Prototypes will demonstrate tactical and resilient networking and processing capabilities that can work with national, commercial, and in-theater tactical feeds to increase capabilities operating at the tactical edge.</p> <p>- Complete assessment of experimentation opportunities for inexpensive commercial based satellites, leveraging existing high volume design/manufacturing/test infrastructures.</p> <p>- Initiate developmental efforts to support redundant command and control in contested and degraded environments.</p> <p>- Initiate investigations, demonstrations, and experimentation of proliferated Low Earth Orbit (LEO) communications as well as support the integration of C2 architectures onto multiple expeditionary platforms.</p> <p><b>FY 2024 OCO Plans:</b> N/A</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The increase from FY 2023 to FY 2024 supports Space investments via an increase in experimentation of MCWL's Family of Integrated Targeting Cells (FITC). Technology will be demonstrated across the globe in support of Joint All Domain Command and Control JADC2. Increase is also attributed to an increase in funding towards developing redundant space layer communication nodes.</p>					
<p><b>Title:</b> Marine Corps Warfighting Laboratory / Futures Directorate (MCWL/FD) Technical, Engineering, and Management Support</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> Marine Corps Warfighting Laboratory / Futures Directorate (MCWL/FD) Technical, Engineering, and Management Support efforts include lab-wide, non-program specific experimentation doctrine, planning, management, and technical/engineering support, as well as technology transition tracking efforts. Tasks listed below are considered major (valued at \$500K or more) or have near real-time operational impact.</p> <p><b>FY 2023 Plans:</b> Commercial Forecasting:</p>	8.155	8.671	7.316	0.000	7.316
	-	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Continue to identify long-range commercially available technologies and innovations that may influence future Marine Corps investments. Efforts provide a means to ensure proactive awareness and leveraging of foreseeable developments in commercial cutting-edge technologies.</p> <p>Technical Support: - Continue to provide a full range of overarching, lab-wide, engineering, analytical, technical, management, and business services; directly related to live-force experimentation.</p> <p>Portfolio Analytics: - Continue to build a comprehensive visualization tool for the Marine Corps Warfighting Laboratory (MCWL) portfolio and integrate it with Science and Technology (S&amp;T) efforts across the Department of Defense's (DoD's) S&amp;T community. Since these efforts are tightly coupled with both Technical Support as well as Collaboration requirements, future discussions will be captured within the Technical Support arena.</p> <p>Collaboration: - Continue to provide critical infrastructure to support the execution of S&amp;T projects. The provided laboratory facility co-locates experimentation designers/implementers with project teams and technologists to enhance effectiveness of experimentation design, development, implementation, reporting, prototyping, and outreach of results.</p> <p><b>FY 2024 Base Plans:</b> Commercial Forecasting: - Continue by exploring new mechanisms to identify long-range commercially available technologies and innovations that may influence future Marine Corps investments. Program goals include leveraging commercial dual use investments to preserve military S&amp;T resources. Efforts center on military focused technologies available in 10 to 20 years.</p> <p>Technical Support: - Continue to provide a full range of overarching, lab-wide, engineering, analytical, technical, management, and business services; directly related to live-force experimentation. Tasks include Portfolio Analytics; a continued exploration of Artificial Intelligence (AI) capabilities to streamline data collection and program presentation, facilitating informed rapid decision-making and strategic planning.</p>					

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
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Collaboration:  
 - Continue to provide a laboratory facility to co-locate experimentation designers/implementers with project teams and technologists to enhance effectiveness of experimentation design, development, implementation, reporting, prototyping, and outreach of results. Effort seeks to facilitate communication, problem solving, risk mitigation, and status reporting in the execution of S&T projects at all classification levels.

**FY 2024 OCO Plans:**  
 N/A

**FY 2023 to FY 2024 Increase/Decrease Statement:**  
 The funding decrease from FY 2023 to FY 2024 is attributable to the following areas:

- Commercial Forecasting: Alternative methods of identifying long-range commercially available technologies and innovations have resulting in cost savings.

- Technical Support: As part of a continuing effort to make re-alignments to better identify command-level support versus specific project level function, overall costs were redistributed. This category did not experience significant growth or decline from FY 2023 to FY 2024; however, the requested budget as shown is now better representative of overarching, lab-wide, non-program specific support.

<b>Title:</b> Warfighting Excellence	21.470	22.297	27.592	0.000	27.592
<b>Articles:</b>	-	-	-	-	-
<b>Description:</b> This activity includes Marine Corps Warfighting Laboratory / Futures Directorate (MCWL/FD) efforts in the development and assessment of joint and service warfighting concepts, joint and service missions, analysis of emerging threats and opportunities, and joint capability experimentation. It also includes MCWL/FD service experimentation (to include planning and analysis) in areas that impact multiple warfighting functions. Programs listed below are considered major (valued at \$500K or more) or have near- real-time operational impact.					
<b>FY 2023 Plans:</b> Wargaming: - Continue to plan and execute executive agent responsibilities for the Marine Corps Title Ten Wargame, Expeditionary Warrior, as well as other wargames to examine Marine Corps capstone, operating, and functional concepts and explore assigned topics. Efforts provide high-level, diverse wargaming support that embrace both					

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>the scope of joint wargaming and experimentation. Tasks support the combat development process by helping to develop and refine emerging concepts, conceptualize force design, and identify capabilities and deficiencies within future operating environments.</p> <ul style="list-style-type: none"> <li>- Continue to enhance on-demand, qualitative, and quantitative modeling capability that executes in a collaborative environment. This is provided by state-of-the-art equipment to improve visualization and allow for seamless collaboration output during wargaming scenarios.</li> </ul> <p>Emerging Threats and Opportunities:</p> <ul style="list-style-type: none"> <li>- Continue to assess and analyze the future security environment; identify and analyze emerging threats; and develop and appraise promising concepts, opportunities and technologies. Efforts include performing as an internal Marine Corps think tank dedicated to developing new ideas and concepts.</li> <li>- Continue to support the full spectrum of combat development-related missions and tasks, to include the assessment of future threats and adversaries and associated geographic, environmental, economic, and demographic conditions that may influence the development of future warfighting concepts, experimentation, and required capabilities in the areas of Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities (DOTMLEPF).</li> </ul> <p>Joint Concept Technology Demonstrations (JCTDs):</p> <ul style="list-style-type: none"> <li>- Continue to monitor and contribute to approved efforts that address joint and combatant command warfighting needs through the execution and demonstration of prototypes within two to four years.</li> <li>- Complete efforts to provide kitted solutions to increase the survivability of expeditionary and permanent logistical support networks in an Anti-Access/Area Denial (A2/AD) environment.</li> <li>- Initiate experimentation and complete efforts to enable barges/vessels to serve as distributed resupply nodes in support of littoral operations.</li> <li>- Initiate explorations into joint efforts that supplement force design initiatives.</li> </ul> <p>Exercise Support:</p> <ul style="list-style-type: none"> <li>- Continue multi-year effort to enhance the ability of the Marine Air-Ground Task Force (MAGTF). Focus areas include demonstrations of an unmanned kill-chain utilizing Group I and II unmanned aerial vehicles (UASs) with Electro-Optic Infrared (EO/IR) payloads and laser target designators, aerial loitering munitions, and unmanned ground vehicles.</li> </ul> <p>Innovation:</p>					

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Continue to develop/conduct/refine warfighter driven challenges to develop/identify prototypes and foster innovation within the Marine Corps. During this series of exercises industry, academia, and the Naval Research and Development Establishment (NR&amp;NE) are invited to demonstrate emerging technology/engineering innovations that address priority Navy and Marine Corps missions.</p> <p>- Continue to reach out to the fleet and conduct capability wheel workshops in order to identify vital requirements for future development of the Expeditionary Advanced Base Operations (EABO) construct. Where applicable, integrate emergent technologies into experimental venues to access feasibility.</p> <p>Modeling, Simulation, and Analysis:</p> <p>- Continue to investigate/use emerging modeling and simulation (M&amp;S) tools and techniques to provide analysis to support capability development activities. Provide M&amp;S of naval operations with a focus on the Pacific Theater. Efforts include conducting comprehensive kill-chain assessment processes to evaluate current and future offensive capabilities against defensive counter-capabilities between the United States and a range of potential adversaries.</p> <p>- Continue to provide a broad range of independent, unique, and comprehensive analytical expertise to facilitate and evaluate experiments in various warfighting areas. This includes the planning, development, and execution of M&amp;S as well as experimentation events.</p> <p>Experimentation Opposition Force:</p> <p>- Continue to demonstrate/hone the abilities of a live adversary force. Force provides a realistic, adaptive, and cohesive adversary as well as civilian environmental characteristics; thus strengthening experiment hypotheses and objectives.</p> <p>Artificial Intelligence (AI):</p> <p>- Continue to leverage joint Component investments to investigate concepts, methods, toolkits, software applications, and ideologies to provide/promote AI support/use for MCWL concept based experimentation.</p> <p>- Initiate investigations into changing service culture, making it more receptive of AI capabilities, and demonstrating how AI can make missions more effective and efficient. The aim is to reduce human processes and decrease resources and time for administrative tasks as well as demonstrating AI capabilities to garner service-wide acceptance.</p> <p><b>FY 2024 Base Plans:</b></p> <p>Wargaming:</p>					

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Continue to plan, coordinate, execute, and access all aspects of specified wargames. This includes examining Marine Corps capstone, operating, and functional concepts via wargaming platforms. At a minimum, games will include Marine Corps Title Ten Wargame Expeditionary Warrior, Naval Services Game, and Force Design.</p> <p>- Continue to sustain the Warfighting Network (WarNet), a stand-alone network that provides improved visualization, collaboration, quantitative, and qualitative output during wargames.</p> <p>Emerging Threats and Opportunities:</p> <p>- Continue to assess and analyze the future security environment; identify and analyze emerging threats; and develop and appraise promising concepts, opportunities and technologies. Serve as a catalyst to stimulate thought and debate on issues of importance to the Marine Corps.</p> <p>- Continue to provide a full spectrum of broad-based technological and analytical support for the Marine Corps combat development and experimentation programs at the component, Service, and Joint levels.</p> <p>Joint Concept Technology Demonstrations (JCTDs):</p> <p>- Continue to monitor and contribute to approved efforts that address joint and combatant command warfighting needs through the execution and demonstration of near-term prototypes.</p> <p>- Re-initiate Resilient Logistics efforts to provide kitted solutions to increase the survivability of expeditionary and permanent logistical support networks in an Anti-Access/Area Denial (A2/AD) environment.</p> <p>- Initiate explorations into joint efforts that supplement force design initiatives.</p> <p>Exercise Support:</p> <p>- Continue multi-year effort to enhance the ability of the MAGTF. Focus areas continue to include experimentation / demonstrations of a battalion-level organic unmanned kill-chain ecosystem.</p> <p>- Initiate Marine Littoral Regiment (MLR) experimentation efforts. A MLR is a self-deployable, multi-domain force optimized for engaging the contact and blunt layers of warfare. It is designed to operate across the competition continuum to support the Joint Force's role in assuring allies and partners, deterring adversaries, conducting and enabling Joint Force's contact, blunt, and surge capabilities.</p> <p>Innovation:</p> <p>- Continue to develop/conduct/refine warfighter driven challenges to develop/identify prototypes and foster innovation within the Marine Corps. Efforts will enable distributed experimentation, wargaming, and analysis while providing a real-time feedback and human-in-the-loop interaction with Program of Record (POR) systems.</p>					

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Continue to reach out to the fleet and host, coordinate, and facilitate a collaborative effort to analyze future capabilities and provide data to aid decision-makers in funding and capability development decisions. Integrate emergent technologies into experimental venues to access feasibility.</p> <p>Modeling, Simulation, and Analysis:</p> <ul style="list-style-type: none"> <li>- Continue to investigate/use emerging modeling and simulation (M&amp;S) tools and techniques to provide detailed, threat-informed, multi-level security analysis to support capability development and future Program Objective Memoranda (POM) decisions. Provide analytical modeling and data-driven, evidence-based assessment. Develop Marine Corps operating concepts, lead Marine Corps participation in the development of naval, joint, multi-service, and multi-national concepts/CONOPS, and deliver Strategic Analysis products in order to guide force development activities.</li> <li>- Continue to provide M&amp;S of naval operations, focusing on the Pacific Theater.</li> <li>- Continue to provide independent, unique, and comprehensive analytical expertise to facilitate and evaluate experiments in various warfighting areas. Building upon lessons learned in previous experimentation, this includes experimentation design as well as data collection. Analysts take active roles in supporting experimentation concept refinement, capability development, and identification of tactics, techniques and procedures; organizational changes; technologies; and training that the experiments are designed to test.</li> </ul> <p>Experimentation Opposition Force:</p> <ul style="list-style-type: none"> <li>- Continue to demonstrate the abilities of a live adversary force; providing a realistic, adaptive, and cohesive adversary as well as civilian environmental characteristics.</li> </ul> <p>Artificial Intelligence (AI):</p> <ul style="list-style-type: none"> <li>- Continue to leverage joint Component investments to investigate concepts, methods, toolkits, software applications, and ideologies to provide/promote AI support/use for MCWL concept based experimentation. Since these efforts are tightly coupled with those listed elsewhere within this exhibit, future discussions will be captured within the MAGTF Intelligence, Surveillance, and Reconnaissance (ISR) Support arena under Information Operations.</li> <li>- Complete investigations into changing service culture, making it more receptive of AI capabilities, and demonstrating how AI can make missions more effective and efficient.</li> </ul> <p>Information Fusion Center (IFC):</p>					

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<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2297 / Futures Directorate

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>- Initiate efforts to provide a consolidated and collaborative environment, allowing the Marine Corps to successfully initiate, inform, and develop key capabilities at all classification levels. This environment will augment overall Marine Corps effectiveness as well as MCWL's experimentation objectives. The IFC is a collaborative effort between multiple Marine Corps organizations and supporting program offices to provide expertise and information with the goal of maximizing ability to support the Commandant's Force Design efforts. Efforts will allow an effective and efficient mechanism to exchange information and intelligence (at higher classification levels); and improve MCWL's ability to support the Marine Expeditionary Forces (MEFs). The IFC will act as the Marine Corps' backbone/strategic node for Fleet Marine Forces (FMFs); complementing the tactical nodes deployed across the globe.</p> <p><b>FY 2024 OCO Plans:</b> N/A</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The funding increase from FY 2023 to FY 2024 is directly attributable to the following areas:</p> <p>Exercise Support:</p> <ul style="list-style-type: none"> <li>- Within the multi-year effort to enhance the ability of the MAGTF; expand kill-chain ecosystem experimentation efforts.</li> <li>- Initiation of Marine Littoral Regiment (MLR) experimentation efforts. Experimentation within the MLR realm is a requirement to conduct Force Design 2030 analysis and is based around the MLR operating environment and conduct of operations.</li> </ul> <p>Modeling, Simulation, and Analysis:</p> <ul style="list-style-type: none"> <li>- Within continuing to investigate/use emerging modeling and simulation (M&amp;S) tools and techniques; incorporate analytical modeling and data-driven, evidence-based assessment as well as development of Marine Corps operating concepts.</li> </ul> <p>Information Fusion Center (IFC):</p> <ul style="list-style-type: none"> <li>- Initiation of efforts to provide a consolidated intelligence facility to augment overall Marine Corps effectiveness as well as MCWL's experimentation objectives.</li> </ul> <p>Technical Support (incorporated into program areas):</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2297 / Futures Directorate

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
- As part of a continuing effort to make re-alignments to better identify command-level support versus specific project level function, overall costs were redistributed. This category showed commensurate growth from FY 2023 to FY 2024 and the requested budget as shown is now better representative of program specific support.					
<b>Accomplishments/Planned Programs Subtotals</b>	101.747	157.064	177.046	0.000	177.046

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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**Exhibit R-2A, RDT&E Project Justification:** PB 2024 Navy **Date:** March 2023

<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2958 / Cyberspace Activities
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
2958: <i>Cyberspace Activities</i>	0.000	4.609	4.800	5.000	-	5.000	5.099	5.201	5.305	5.411	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

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

This Project activity provides freedom of maneuver and influence in the cyber-electronic warfare domain while simultaneously denying the same to the adversary and protecting critical command systems. Technologies are being developed using a multi-disciplinary approach that combines Radio Frequency electronics, digital signal processing, computer engineering, software engineering, machine learning and data science to support Naval Expeditionary warfighters operating with size, weight and power constrained equipment in Disrupted, Intermittent, Limited environments. Areas of applied research include distributed precision time, predictive software defined radio architectures, coordinated Cyber and Spectrum maneuver to mitigate detection and exploitation, tactical Cyber visualization, discovering and mapping networks in dense urban environments, contextual awareness and blind channel characterization.

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<b>Title:</b> Expeditionary Cyber	4.609	4.800	5.000	0.000	5.000
<b>Articles:</b>	-	-	-	-	-
<b>FY 2023 Plans:</b>					
Continue:					
- Continue cyber related research into mitigation techniques related to USMC systems					
- Continue research to better identify key cyber terrain at the physical, logical, and cyber persona layers that can be visualized at small unit level					
- Continue research to develop of RF enabled EW/cyber networking that will deliver actions at scale through the integration of secure orchestration, cyber secure sensors, and resilient networking technologies					
- Continue research into automating cyber analysis and testing tools to enable software developers and reverse engineers to reduce the time required to conduct vulnerability analysis and software testing tasks.					
<b>FY 2024 Base Plans:</b>					
- Complete research into automating cyber analysis and testing tools to enable software developers and reverse engineers to reduce the time required to conduct vulnerability analysis and software testing tasks					
- Continue cyber related research into mitigation techniques related to United States Marine Corps (USMC) systems.					
- Continue research to better identify key cyber terrain at the physical, logical, and cyber persona layers that can be visualized at small unit level.					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 2958 / Cyberspace Activities

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<ul style="list-style-type: none"> <li>- Continue research to develop of RF enabled EW/cyber networking that will deliver actions at scale through the integration of secure orchestration, cyber secure sensors, and resilient networking technologies.</li> <li>- Initiate field experimentation on attended ground systems with Cyber survey and exploitation tools.</li> <li>- Initiate the development of non-traditional platform integration of Cyber-EW capabilities.</li> <li>- Initiate effort to develop a modular defensive cyber kit that can be plugged into an existing vehicle without requiring cutting or irreversible mods and that provides proactive protections against whole classes of cyber-EW attacks against vehicles.</li> </ul> <p><b>FY 2024 OCO Plans:</b> N/A</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> There is no significant funding change from FY 2023 to FY 2024.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	4.609	4.800	5.000	0.000	5.000

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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**Exhibit R-2A, RDT&E Project Justification:** PB 2024 Navy **Date:** March 2023

<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 9999 / Congressional Adds
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
9999: <i>Congressional Adds</i>	0.000	70.568	132.700	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	203.268
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

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

Congressional Interest Items not included in other Projects.

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

	FY 2022	FY 2023
<b>Congressional Add:</b> Adaptive threat force	0.000	7.000
<b>FY 2022 Accomplishments:</b> N/A		
<b>FY 2023 Plans:</b> Sustained by the FY 2021 Congressional Enhancement, the Adaptive Threat Force (ATF) has become an accepted and critical component of live-force experiments conducted by the Marine Corps Warfighting Laboratory (MCWL). The ATF serve as experts on the employment of adversary capabilities. They train and equip adversary force units participating in experiments in order to emulate enemy tactics and operational style. This greatly enhances the relevance and accuracy of data gathered during the experiments and this data then informs capability investment decisions. The necessity of conducting not only concept-based, but threat-informed experiments is clear and the products of MCWL experiments are more relevant and applicable to potential real-world scenarios than ever before.		
As MCWL continues to advance Marine Corps warfighting capabilities to enable Force Design 2030, the ATF will continue to play an essential role. Due to their extensive military experience, ATF personnel will provide mentorship and operational expertise used in planning experiments. Operating within the concepts of Expeditionary Advanced Base Operations (EABO), Littoral Operations in a Contested Environment (LOCE), and Stand-in Forces (SIF), MCWL is conducting experiments with the newly designed infantry battalion, the recently established Marine Littoral Regiment (MLR), and with small boats and littoral connectors for reconnaissance/ counter-reconnaissance and littoral maneuver. The ATF supports each of these ongoing efforts and ensures that enemy capabilities and equipment are considered and included within experiment planning and execution.		
The ATF will be utilized within experiments that will span the globe; in particular within the Indo-Pacific Command (INDOPACOM) Area of Responsibility (AOR). Their involvement in the maritime component of a key		

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023	
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 9999 / Congressional Adds	
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	
exercises will allow them to assist in the planning and execution of the Littoral Maneuver line of effort, including attending planning sessions relating to small boat operations and maritime competition.			
<b>Congressional Add:</b> Expeditionary Process, Exploitation, and Dissemination <b>FY 2022 Accomplishments:</b> Conduct advanced technology development in expeditionary process, exploitation, and dissemination. <b>FY 2023 Plans:</b> Conduct advanced technology development in support of expeditionary process, exploitation, and dissemination.	3.861	4.000	
<b>Congressional Add:</b> Advanced mission planning system SBIR technology insertion <b>FY 2022 Accomplishments:</b> Conduct technology development supporting advanced mission planning system SBIR technology insertion <b>FY 2023 Plans:</b> Conduct advanced technology development in support of advanced mission planning system SBIR technology insertion.	4.827	5.000	
<b>Congressional Add:</b> Data analysis and sharing augmentation <b>FY 2022 Accomplishments:</b> Conduct data analysis and sharing augmentation technology development <b>FY 2023 Plans:</b> N/A	1.931	0.000	
<b>Congressional Add:</b> Low-cost atrittable aircraft technology <b>FY 2022 Accomplishments:</b> Pursue demonstration and experimentation with the tactical and operational alternative uses of highly autonomous, low-cost unmanned aircraft in an operationally representative environment while simultaneously developing the requisite: concepts of employment (CONEMPS), concepts of operation (CONOPS), Tactics, Techniques, Procedures (TTP), and logistics requirements. Pursuits will utilize an unmanned aerial vehicle (UAV) that is runway independent and designed for operations from both austere and improved operations. Efforts are follow-on to an Air Force developmental program. <b>FY 2023 Plans:</b> In concert with the FY 2022 Congressional Enhancement, the Marine Corps Warfighting Laboratory (MCWL) will continue to pursue demonstration and experimentation with the tactical and operational alternative uses of highly autonomous, low-cost unmanned aircraft in an operational environment. Continue to demonstrate an experimental, yet operational Unmanned Aerial System (UAS) prototype capability that will inform acquisition requirements, as well as provide Tactics, Techniques, and Procedure (TTP) development to provide mission flexibility and accelerate the kill chain while imposing a positive "cost" trade-off with adversaries.	24.134	25.000	

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023	
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 9999 / Congressional Adds	
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	
Demonstration will inform Concepts of Employment (COEs) for Manned/Unmanned Teaming (MUM-T) and the development of technology that supports desired COEs.			
<b>Congressional Add:</b> Adaptive future force	7.723	0.000	
<b>FY 2022 Accomplishments:</b> Conduct advance technology development supporting adaptive future force			
<b>FY 2023 Plans:</b> N/A			
<b>Congressional Add:</b> AI-powered tactical ISR	4.923	0.000	
<b>FY 2022 Accomplishments:</b> In response to small drones proliferating on the battlefield, pursue the generation of real-time two-dimensional (2D) maps, near-real-time three-dimensional (3D) models, and analytical layers on handheld devices with no network connectivity required. Software development investigations (interoperable with existing Group 1 - 5 unmanned aerial systems (UASs) imaging payloads) are anticipated to drastically improve individual soldier's capabilities without the need to test and field new drone or mobile device hardware. Efforts are in concert with a similar FY 2022 Army Congressional enhancement.			
<b>FY 2023 Plans:</b> N/A			
<b>Congressional Add:</b> Expeditionary mission support	9.654	8.000	
<b>FY 2022 Accomplishments:</b> Conduct advanced technology development supporting expeditionary mission support objectives			
<b>FY 2023 Plans:</b> Conduct advanced technology development in support of expeditionary mission support objectives.			
<b>Congressional Add:</b> Platform agnostic weapons system	4.827	0.000	
<b>FY 2022 Accomplishments:</b> Platform agnostic weapons system technology development			
<b>FY 2023 Plans:</b> N/A			
<b>Congressional Add:</b> Stand-off security inspection and surveillance system	8.688	10.000	
<b>FY 2022 Accomplishments:</b> Conduct stand-off security inspection and surveillance system technology development			
<b>FY 2023 Plans:</b> Conduct advanced technology development in support of stand-off security inspection and surveillance system.			
<b>Congressional Add:</b> Mutli-function array for C-UAS	0.000	18.000	

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 9999 / Congressional Adds
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>
<b>FY 2022 Accomplishments:</b> N/A		
<b>FY 2023 Plans:</b> Conduct advanced technology development in support of mutli-function array for C-UAS.		
<b>Congressional Add:</b> C5ISR and EW modular open suite of standards	0.000	10.000
<b>FY 2022 Accomplishments:</b> N/A		
<b>FY 2023 Plans:</b> Conduct advanced technology development in support of C5ISR and EW modular open suite of standards.		
<b>Congressional Add:</b> ACV EW/comms/ISR technology	0.000	10.000
<b>FY 2022 Accomplishments:</b> N/A		
<b>FY 2023 Plans:</b> Conduct advanced technology development in support of ACV EW/comms/ISR technology.		
<b>Congressional Add:</b> AI-powered tactical ISR for battlespace awareness	0.000	7.200
<b>FY 2022 Accomplishments:</b> N/A		
<b>FY 2023 Plans:</b> In concert with a similar FY 2022 Congressional Enhancement, continue to support Marine Corps Warfighting Laboratory's Unmanned Aircraft Systems (UAS) development of Tactical Intelligence, Surveillance, and Reconnaissance (ISR) Artificial Intelligence (AI) Software. Provides continuous research, conceptual/first article design, test, evaluation, prototyping, experimentation, and demonstration. Provides research, design, analysis, documentation, fabrication, assembly, delivery, installation, integration, testing, and support of Government prototyping, experimentation, demonstration, and initial fielding activities for prototype aircraft systems and/or modifications, ground-based mission systems, support and test equipment, and associated developmental equipment and systems integrations to promote battlespace awareness.		
<b>Congressional Add:</b> K-MAX next generation autonomouse logistics UAS	0.000	7.000
<b>FY 2022 Accomplishments:</b> N/A		
<b>FY 2023 Plans:</b> The Marine Corps Warfighting Laboratory (MCWL) will pursue investigations into helicopter-based next generation autonomous unmanned aerial vehicles (UAVs). Logistics-based concept design, demonstrations, and experimentation will be examined.		
<b>Congressional Add:</b> Wireless tecnologies for sensing and surveillance at the tactical edge	0.000	6.500

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy		<b>Date:</b> March 2023	
<b>Appropriation/Budget Activity</b> 1319 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603640M / MC Advanced Technology Demo	<b>Project (Number/Name)</b> 9999 / Congressional Adds	
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2022</b>	<b>FY 2023</b>
<i>FY 2022 Accomplishments:</i> N/A			
<i>FY 2023 Plans:</i> Conduct advanced technology development in support of wireless technologies for sensing and surveillance at the tactical edge.			
<i>Congressional Add:</i> Hydrofoil wing in ground effect vehicle		0.000	5.000
<i>FY 2022 Accomplishments:</i> N/A			
<i>FY 2023 Plans:</i> The Marine Corps Warfighting Laboratory (MCWL) will pursue investigations into vehicles that are able to move over the surface by gaining support from the reactions of the air against the surface of the earth or water. Logistics-based concept design, demonstrations, and experimentation will be examined.			
<i>Congressional Add:</i> ENDOR spectrum superiority technology		0.000	10.000
<i>FY 2022 Accomplishments:</i> N/A			
<i>FY 2023 Plans:</i> Conduct advanced technology development in support of ENDOR spectrum superiority technology.			
<b>Congressional Adds Subtotals</b>		70.568	132.700
<b>C. Other Program Funding Summary (\$ in Millions)</b>			
N/A			
<b>Remarks</b>			
<b>D. Acquisition Strategy</b>			
N/A			