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

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	112.085	103.987	93.966	-	93.966	-	-	-	-	-	-
0149: <i>International Coop RDT&E</i>	0.000	3.221	3.511	3.001	-	3.001	-	-	-	-	-	-
1767: <i>Naval War Col Strategic Studies Supt</i>	0.000	6.190	5.765	5.785	-	5.785	-	-	-	-	-	-
2098: <i>Navy Postgraduate School (NPS) Studies Support</i>	0.000	10.782	11.467	11.553	-	11.553	-	-	-	-	-	-
2221: <i>JT Mission Assessment Studies</i>	0.000	26.402	22.333	22.173	-	22.173	-	-	-	-	-	-
3017: <i>Enterprise Information Systems</i>	0.000	0.904	0.950	0.969	-	0.969	-	-	-	-	-	-
3027: <i>Defense Critical Infrastructure Program</i>	0.000	7.440	5.746	7.450	-	7.450	-	-	-	-	-	-
3312: <i>MTMD-Maritime Theater Missile Defense Forum</i>	0.000	10.186	16.179	11.857	-	11.857	-	-	-	-	-	-
3330: <i>Naval Research Laboratory (NRL) Facilities Modernization</i>	0.000	18.455	16.370	17.144	-	17.144	-	-	-	-	-	-
3363: <i>PACOM Initiative</i>	0.000	14.025	11.666	14.034	-	14.034	-	-	-	-	-	-
9999: <i>Congressional Add</i>	0.000	14.480	10.000	0.000	-	0.000	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

International Cooperative RDT&E: provide program management, execution, and support to implement a broad range of cooperative Naval Research and Development, Test and Evaluation initiatives to improve coalition interoperability, harmonize US Navy requirements with allied and friendly nations, and identify cooperative international opportunities, and improve coalition interoperability. In addition, it develops coherent approaches, coordinating with partner nations, to sea-based missile defense, command, control, communications, computers and intelligence (C4I), and cooperative acquisition programs while also identifying technology to support the Global Maritime Partnership initiative.

Naval War College Strategic Studies Support:

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<p>Provides research, analysis and gaming activities which serve as a focal point, stimulus, and major source of strategic and operational thought within the Navy, joint and interagency communities. These efforts generate strategic and operational alternatives, quantitative analysis, war gaming and political military assessments, and provide recommendations regarding the formulation and execution of maritime options . The War Gaming Department plans, designs, executes, analyzes and reports on the Navy's Title 10 war games. These war games provide analytical input to the Navy's Strategic Plan, assessments of future concepts, and recommendations to the Navy's Quadrennial Defense Review, force design, and strategy process. The War Gaming Department also designs, executes and analyzes war games for theater security cooperation plans and operational war fighting issues.</p> <p>Assessment Program:</p> <p>The Navy Assessment Program provides capability-based planning assessment for Joint Capabilities Integration and Development System (JCIDS), conducts analysis to affect war fighting capability trades and enterprise resources, identifies needs, gaps, and overlaps, and assesses alternative solutions to Joint needs. The program supports both the development and use of modeling, simulation and analytically-based warfare and provides business analyses and analytic tools that provide the basis for decision making with respect to concepts of operations (CONOPS), Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) Systems (Information Dominance); warfare systems (Sea Strike, Sea Shield, and Sea Basing) and analytical underpinnings/basis for programmatic decisions of the Navy's top leadership regarding their architectures, force structure, and the Navy's core "organize, train, and equip mission" (the warfare and provider Enterprises). The program provides overarching Planning, Programming, Budgeting and Execution System (PPBES) analyses and guidance for PPBES which provides gap analysis and investment strategy and total obligation authority allocation. It provides independent capability analysis and assists in structuring follow-on Navy analyses. The program coordinates Navy's position for the enhanced planning process and conducts net assessments. It serves as the lead campaign analysis to approve Navy warfare and support requirements. The program supports "A Cooperative Strategy for 21st Century Seapower 21" as modified by the Maritime Strategy which charts a course for the Navy, Coast Guard and Marine Corps to work collectively with each other and international partners to prevent crises from occurring or reacting quickly should one occur to avoid negative impact to the United States. It serves as an independent assessor providing a broad-view perspective across the Navy staff apart from resource sponsors, with an integrated look at both war fighting and war fighting support programs. The program supports the world class modeling efforts to attain a level of Modeling and Simulation (M&S) capability that is world class and establishes the Navy as a leader in the Department of Defense (DoD) M&S community. It provides Navy alternatives in assessing the implications embedded within resource decisions in a quantified context of costs versus capability versus risk. The program provides independent analytic support to Navy leadership in conjunction with various executive level decision forums. It develops tools and analytical methodologies that assist in evaluating Navy programs and provides technical leadership for the analysis functional area of Naval Modeling and Simulation.</p> <p>Operations Integration Group: Classified</p> <p>Naval Research Laboratory (NRL)Facilities Modernization: This program has been established to provide a systematic and planned approach to improve vital in-house science and technology (S&T) laboratory facilities which are reaching or have reached critical stages of deterioration. The program includes restoration and modernization (R&M) initiatives for about 350,000 net square feet, where the average age of the buildings is 67 years old.</p>		

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The Joint Information Environment (JIE) initiative provides the supporting IT capability framework comprised of shared information technology infrastructure, enterprise services, interoperability with coalition partners and a single security architecture that enables mission commanders to execute mission partnered operations. JIE provides the U.S. configuration controls necessary for enterprise capabilities. By utilizing a U.S enterprise-wide secure Identity and Access Management system, JIE ensures that authorized users at the right classification level gain access to only the data and services they are entitled. The continued development and refinement of a Joint Information Environment will provide for a significant improvement in data sharing within, and between, coalition maritime elements.

MTMD - Maritime Theater Missile Defense Forum:

This project funds participation in Maritime Integrated Air and Missile Defense projects with other nations through the Maritime Missile Defense Projects Framework Memorandum of Understanding of 2004 (as amended 2009, 2015, 2016, and 2020). Known as the Maritime Theater Missile Defense (MTMD) Forum, it promotes interoperability with the Navies of eleven participating nations (Australia, Canada, Denmark, France, Germany, Italy, Netherlands, Norway, Spain, United Kingdom and the United States). This project funds participation in multiple Projects and includes a maritime contribution to the NATO Active Layered Theater Ballistic Missile Defense (ALTBMD) project, now known as NATO Ballistic Missile Defense (BMD). Engineering analysis and recommendations from MTMD activities are provided to European, Pacific and Central Combatant Commands to influence present day operations. Specifically, the MTMD Forum is addressing challenges with "Maritime Allied Air Defense in Support of Ballistic Missile Defense Operations" that face the Combatant Commanders during present day operations. The MTMD Forum is leveraging At-Sea Demonstration (ASD) test events and operational Fleet Exercises to integrate technology with concepts of operations developed within MTMD Forum working groups.

The MTMD Forum develops systems and techniques that enhance protection and defense against the proliferation of short, medium and long-range Ballistic Missile (BM) and Advanced Anti-Ship Cruise Missile (ASCM) threats through the development of interoperable sea-based Integrated Air and Missile Defense (IAMD) capability among coalition nations. This includes protection across the full spectrum of these threats through the enhanced utilization of existing sea-based systems to protect against current threats while progressively improving and developing systems and system-of- systems to effectively counter evolving threats.

This project supports USN participation in several Maritime IAMD related Project Arrangements and Working Groups including:

- (1) Battle Management Command, Control, Communications, Computers, and Intelligence (BMC4I) to define and develop architectures as well as to perform engineering to address coalition capability gaps.
- (2) Modeling & Simulation (M&S) to establish and maintain a maritime coalition M&S testbed and to perform legacy and future systems simulation testing.
- (3) Coalition Distributed Engineering Plant (CDEP) to establish and maintain a maritime coalition Hardware-in-the-Loop Testbed and to conduct CDEP testing.
- (4) Open Architecture (OA) to develop Interface Standards and Data Models.
- (5) Test Planning and Execution (TPEX) to develop Test Plans, oversee exercise participation and conduct post event data analysis and reporting.
- (6) Operational Requirements (OR) to develop a Coalition Maritime Missile Defense Operational Concept Document and to identify operational constraints and tactical constructs surrounding coalition maritime missile defense activities.
- (7) Reciprocal Use of Test Facilities agreements with other nations to support Maritime IAMD and MTMD related demonstrations.

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(8) Tactical Advancement for Next Generation (TANG) to work with our Allies and International Partners using human-centered design methodologies to identify solutions to technology and sailor performance issues that have been cited during previously conducted experiments, exercises, and demonstrations. This process will seek to leverage R&D investments and risk reduction research commercial companies are making today that can provide potential "dual use" technology and process solutions to complex problems.

Anti-Tamper (AT): The AT program performs as the Navy Technical Process Owner for the Anti-Tamper systems engineering activity that is intended to prevent and/or delay the exploitation of critical technologies in U.S. systems; manages the research, design, development, implementation, and testing of AT measures and coordinates with Department of Defense AT Executive Agent. Starting in FY19, funding for AT is realigned to PE 0605024N Anti-Tamper Technology Support.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under RESEARCH, DEVELOPMENT, TEST and EVALUATION MANAGEMENT SUPPORT because it supports efforts directed toward sustaining or modernizing installations or operations required for general research, development, test and evaluation.

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	113.844	94.297	104.904	-	104.904
Current President's Budget	112.085	103.987	93.966	-	93.966
Total Adjustments	-1.759	9.690	-10.938	-	-10.938
• Congressional General Reductions	-	-0.310			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	10.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	2.150	0.000			
• SBIR/STTR Transfer	-3.909	0.000			
• Program Adjustments	0.000	0.000	-9.487	-	-9.487
• Rate/Misc Adjustments	0.000	0.000	-1.451	-	-1.451

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

Project: 9999: *Congressional Add*

Congressional Add: *Printed Circuit Board Executive Agent*

	FY 2020	FY 2021
Congressional Add Subtotals for Project: 9999	14.480	10.000
Congressional Add Totals for all Projects	14.480	10.000

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<u>Change Summary Explanation</u> The FY2022 funding request was reduced by \$6.577 million to account for the availability of prior year execution balances. PRJ 3312 MTMD - Maritime Theater Missile Defense Forum: The reduction from FY 2021 to FY 2022 is due to the transition of the Tactical Advancement for Next Generation (TANG) project to Office of Naval Research (ONR) PE 0603758N Swampworks/TANG to align with more similar projects. PRJ 3330 NRL Facilities Modernization: The increase from FY21 to FY22 is due to support the growing need to revitalize NRL facilities. The need for items such as roof repair, transformers and switchgears, and Heating, Ventilating, and Air-Conditioning (HVAC) continues to grow and additional resources were provided to accommodate this need.		

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

Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / Management, Technical & Intl Supt	Project (Number/Name) 0149 / International Coop RDT&E
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
0149: <i>International Coop RDT&E</i>	0.000	3.221	3.511	3.001	-	3.001	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Provides funding for program management, execution, and support activities to implement a broad range of cooperative naval Research and Development, Test and Evaluation (RDT&E) initiatives to improve coalition interoperability, harmonize US Navy requirements with allied and friendly nations, and identify cooperative international opportunities. The funding is used to develop approaches to international cooperation consistent with combatant commanders (COCOMs), Chief of Naval Operations (CNO), and Secretary of the Navy (SECNAV) priorities in the maritime domain.

Various cooperative RDT&E programs, projects and exchanges are pursued to identify cooperative acquisition programs, enhance Overseas Contingency Operations (OCO) efforts, fill capability gaps, improve US/coalition interoperability, and standardize defense capabilities with international partners. Such efforts have resulted in:

1. Negotiating and developing approximately 57 international RDT&E Agreements annually with allied and friendly nations;
2. Executing Information Exchange Annexes (IEAs) with foreign partners;
3. Improving IEA information dissemination with allied and friendly countries and within Department of the Navy (DON);
4. Coordinating Navy inputs to the Office of the Under Secretary of Defense (OUSD) Acquisition and Sustainment, (A&S) Foreign Comparative Test (FCT) Program, and Coalition Warfare Program (CWP) as well as the DON Technology Transfer Security Assistance Review Boards (TTSARB).
5. Representing the U.S. Navy in Office of the Secretary of Defense (OSD) directed Armaments Cooperation Forums, including the Conference of North Atlantic Treaty Organization (NATO) Armaments Directors' groups (NATO Naval Armaments Group (NNAG)), and Senior National Representative (SNR);
6. Funding of various international RDT&E support databases including Technical Project Officer (TPO), International Agreement Generators, Information/Data Exchange Agreements, and Project Agreements/Memorandums of Understanding;
7. Funding for Engineering and Scientist Exchange Program (ESEP).

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: International Coop RDT&E	3.221	3.511	3.001	0.000	3.001
Articles:	-	-	-	-	-
FY 2021 Plans:					
-Continue all efforts from prior Fiscal Years (FYs).					
-Continue and increase support for an international Theater Advanced Submarine Warfare (ASW) and unmanned maritime systems forums with foreign partners, including expansion of international participation in technical discussions.					

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Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 0149 / <i>International Coop RDT&E</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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-Continue execution and support in placement of U.S. Navy and partner nation engineers and scientists under OSD's Engineer and Scientist Exchange Program (ESEP), with a focused increase (~4-5 additional/year) on ESEP placements.

-Continue execution of approximately 150 Information Exchange Agreements/Data Exchange Annexes (IEAs/DEAs) with more than 30 countries.

-Continue to coordinate U.S. Navy participation in the Office of the Undersecretary of Defense for Acquisition and Sustainment (OUSD (A&S)) Coalition Warfare Program (CWP) selection processes to meet emerging military capability requirements.

-Support U.S.-India Defense Technology and Trade Initiative Working Groups, including the Joint Working Group on Aircraft Carrier Technology Cooperation (JWGACTC), the Jet Engine Technology Joint Working Group (JETJWG), and the Joint Working Group on Naval Systems (JWGNS).

-Support U.S.-India Defense Technology and Trade Initiative Information Exchange and Terms of Reference (TOR) exchanges to promote cooperative opportunity development.

-Continue to support NATO Naval Armaments Group (NNAG) and Five Power Groups on cooperative programs.

-Provide contract support for Senior National Representative (SNR) and Navy International Programs Office for international outreach, development, and administrative activities.

FY 2022 Base Plans:

-Continue all efforts from prior FYs.

-Continue and increase support for an international Theater ASW and unmanned maritime systems forums with foreign partners, including expansion of international participation in technical discussions.

-Continue execution and support in placement of U.S. Navy and partner nation engineers and scientists under OSD's Engineer and Scientist Exchange Program (ESEP), with a focused increase (~4-5 additional/year) on ESEP placements.

-Continue execution of approximately 150 Information Exchange Agreements/Data Exchange Agreements (IEA/DEA) with more than 30 countries.

-Continue to coordinate U.S. Navy participation in OUSD (A&S) Coalition Warfare Program (CWP) selection processes to meet emerging military capability requirements.

-Support U.S.-India Defense Technology and Trade Initiative Working Groups, including the Joint Working Group on Aircraft Carrier Technology Cooperation (JWGACTC), the Jet Engine Technology Joint Working Group (JETJWG), and the Joint Working Group on Naval Systems (JWGNS).

-Support U.S.-India Defense Technology and Trade Initiative Information Exchange and Terms of Reference (TOR) exchanges to promote cooperative opportunity development.

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
-Continue to support NATO Naval Armaments Group (NNAG) and Five Power Groups on cooperative programs. -Provide contract support for Senior National Representative (SNR) and Navy International Programs Office for international outreach, development, and administrative activities. -Provide travel support for SNR participation in Senior Naval National Representative (SNNR) meetings with key foreign partners, and for select NATO meetings in support of CNO priorities. FY 2022 OCO Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: The funding decrease of -\$0.510M is due to reduced support for the Engineer and Scientist Exchange Program (ESEP), information exchange / data collection workshops, as well as travel in order to maintain support for higher priority efforts.					
Accomplishments/Planned Programs Subtotals	3.221	3.511	3.001	0.000	3.001

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

N/A

Remarks

D. Acquisition Strategy

N/A

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Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0605853N / Management, Technical & Intl Supt				Project (Number/Name) 1767 / Naval War Col Strategic Studies Supt			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
1767: Naval War Col Strategic Studies Supt	0.000	6.190	5.765	5.785	-	5.785	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Naval War College (NWC) research, analysis and gaming activities serve as a focal point, stimulus, and major source of strategic and operational thought within the Navy, Joint and Interagency communities. These efforts generate strategic and operational alternatives, tactical imperatives, quantitative analysis, war gaming, political-military assessments, and provide recommendations to the Chief of Naval Operations (CNO), Fleet Commanders and numbered Fleet Commanders regarding the formulation and execution of maritime options for the President of the United States.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Strategic Studies	0.714	0.728	0.729	0.000	0.729
Articles:	-	-	-	-	-
Description: Naval War College (NWC) conducts research in strategic studies in response to tasking from the Secretary of the Navy (SECNAV), Chief of Naval Operation (CNO), Fleet Commanders, numbered Fleet Commanders, and Combatant Commanders. NWC research includes strategic documents produced by its Chinese Maritime Studies Institute (CMSI), Russia Maritime Studies Institute (RMSI), Center for Cyber Conflict Studies (C3S), and Institute for Future Warfare Studies (IFWS).					
FY 2021 Plans:					
- Conduct research and analysis projects and provide supporting events for OPNAV, the numbered Fleets, Navy Component Commanders, and Combatant Commanders.					
- Continue to support OPNAV Staff on tasked research projects.					
- Conduct research into Cyber, Chinese, Russian, and Future maritime capabilities and affairs to enhance understanding of global developments and provide studies and advice for CNO and Fleet.					
- Continue research on cyber capabilities, focusing on deterrence.					
- Continue Mahan Program research on deterrence capabilities with increased focus on Navy contribution to national nuclear deterrence missions and future Navy capabilities.					
FY 2022 Base Plans:					
- Conduct research and analysis projects and provide supporting events for OPNAV, the numbered Fleets, Navy Component Commanders, and Combatant Commanders.					

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<ul style="list-style-type: none"> - Continue to support OPNAV Staff on tasked research projects. - Conduct research into Cyber, Chinese, Russian, and Future maritime capabilities and affairs to enhance understanding of global developments and provide studies and advice for CNO and Fleet. - Continue research on cyber capabilities, focusing on deterrence. - Continue Mahan Program research on deterrence capabilities with increased focus on Navy contribution to national nuclear deterrence missions and future Navy capabilities. <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: There is no significant increase from FY 2021 to FY 2022.</p>					
<p>Title: Naval War Gaming Support</p> <p align="right">Articles:</p> <p>Description: Naval War College (NWC) conducts strategic and operational war gaming and research for Office of the Chief of Naval Operations (OPNAV), the numbered Fleets, Fleet Commanders, and the Combatant Commanders. Each year, 45-60 major war games and associated events provide support to efforts that explore and analyze military, political, informational and economic aspects of differing strategic and operational scenarios and tactical imperatives. NWC continues to expand its capability and capacity to execute war games of increased scope, magnitude and complexity.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Conduct 30-40 major war games and related events in support of OPNAV, the numbered Fleets, and the Combatant Commands. - Conduct 35 events supporting 6-8 Executive Committee and CNO approved war games and Navy Title X war games, directed research, and analysis. - Continue to foster cooperative relationships with international partners through use of war gaming, research, analysis and education. - Refine capstone war gaming exercises that support the International Maritime Staff Operators Course. - Execute Fleet Synchronization Conferences. 	4.836	4.385	4.392	0.000	4.392
	-	-	-	-	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<ul style="list-style-type: none"> - Execute capstone war game exercise for the Joint Force Maritime Component Commander (JFMCC) Course. Fleet Synchronization Conferences. - Resource and provision life cycle maintenance requirements for networks, communications, and modeling and simulation capacity. - Resource and provision required manpower and equipment for the High Security Research and Wargaming Facility. <p>FY 2022 Base Plans:</p> <ul style="list-style-type: none"> - Conduct 30-40 major war games and related events in support of OPNAV, the numbered Fleets, and the Combatant Commands. - Conduct approximately 35 events supporting 6-8 Executive Committee and CNO approved war games and Navy Title X war games, directed research, and analysis. - Continue to foster cooperative relationships with international partners through use of war gaming, research, analysis and education. - Refine capstone war gaming exercises that support the International Maritime Staff Operators Course. - Execute Fleet Synchronization Conferences. - Execute capstone war game exercise for the Joint Force Maritime Component Commander (JFMCC) Course. Fleet Synchronization Conferences. - Resource and provision life cycle maintenance requirements for networks, communications, and modeling and simulation capacity. - Resource and provision required manpower and equipment for the High Security Research and Wargaming Facility. <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: There is no significant increase from FY 2021 to FY 2022.</p>					
<p>Title: Warfare Analysis and Research</p> <p align="right">Articles:</p> <p>Description: Naval War College (NWC) supports senior decision-makers from the Department of Defense, Department of the Navy, the numbered Fleets, Fleet Commanders and Combatant Commanders in reaching</p>	0.555 -	0.566 -	0.577 -	0.000 -	0.577 -

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>well-informed, objective decisions on strategic, operational and programmatic issues through collaborative research which integrates traditional research and analysis with advanced decision support tools.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue conducting major decision events in support of OPNAV, the numbered Fleets, Fleet Commanders, and the Combatant Commanders. - Continue warfighting analysis requirements for numbered Fleet commanders. - Continue analytical research on key strategic and operational challenges such as maritime ballistic missile defense, proliferation security initiative, global maritime security, maritime situational awareness, maritime operations headquarters, interconnectivity, and multi-service force deployment. - Continue evaluation of concepts and decision events in conjunction with war gaming center. - Continue research targeted at the strategic and policy level decision making within China and Russia. - Continue providing direct support to NWC student research groups and war gaming. - Execute approximately 20 major decision events in support of these efforts. <p>FY 2022 Base Plans:</p> <ul style="list-style-type: none"> - Continue conducting major decision events in support of OPNAV, the numbered Fleets, Fleet Commanders, and the Combatant Commanders. - Continue warfighting analysis requirements for numbered Fleet commanders. - Continue analytical research on key strategic and operational challenges such as maritime ballistic missile defense, proliferation security initiative, global maritime security, maritime situational awareness, maritime operations headquarters, interconnectivity, and multi-service force deployment. - Continue evaluation of concepts and decision events in conjunction with war gaming center. - Continue research targeted at the strategic and policy level decision making within China and Russia. - Continue providing direct support to NWC student research groups and war gaming. - Execute approximately 20 major decision events in support of these efforts. <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: There is no significant increase from FY 2021 to FY 2022.</p>					
<p>Title: NWC Student Research Projects</p> <p align="right">Articles:</p>	0.085	0.086	0.087	0.000	0.087
	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / Management, Technical & Intl Supt	Project (Number/Name) 1767 / Naval War Col Strategic Studies Supt

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>Description: Selected top performing Naval War College (NWC) students to conduct focused research and analysis of current and future strategic and operational challenges and tactical imperatives. These students are organized under the supervision of the Mahan Scholars Program and the Halsey Group Program.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Conduct focused research, analysis and war gaming of current and future strategic/operational challenges and tactical imperatives by the Halsey, Gravely and Holloway Group Programs and Mahan Scholars. - Research groups continue to conduct focused research, analysis and free-play war gaming of current and future operational challenges and tactical imperatives arising from regional threats, homeland defense and access denial efforts at the high end of the conflict spectrum in the Pacific, European Command (EUCOM), Central Command (CENTCOM) and Northern Command (NORTHCOM) area of responsibility (AOR). Research and analysis efforts continue in those areas above, and will be expanded to include a detailed focus on counter-targeting, operational deception, and countering information denial and missile defense at the theater joint operational level. <p>FY 2022 Base Plans:</p> <p>Conduct focused research, analysis and war gaming of current and future strategic/operational challenges and tactical imperatives by the Halsey, Gravely and Holloway Group Programs and Mahan Scholars.</p> <ul style="list-style-type: none"> - Research groups continue to conduct focused research, analysis and free-play war gaming of current and future operational challenges and tactical imperatives arising from regional threats, homeland defense and access denial efforts at the high end of the conflict spectrum in the Pacific, European Command (EUCOM), Central Command (CENTCOM) and Northern Command (NORTHCOM) area of responsibility (AOR). Research and analysis efforts continue in those areas above, and will be expanded to include a detailed focus on counter-targeting, operational deception, and countering information denial and missile defense at the theater joint operational level. <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: There is no significant increase from FY 2021 to FY 2022.</p>					
Accomplishments/Planned Programs Subtotals	6.190	5.765	5.785	0.000	5.785

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / Management, Technical & Intl Supt	Project (Number/Name) 1767 / Naval War Col Strategic Studies Supt

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 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0605853N / Management, Technical & Intl Supt				Project (Number/Name) 2098 / Navy Postgraduate School (NPS) Studies Support			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
2098: Navy Postgraduate School (NPS) Studies Support	0.000	10.782	11.467	11.553	-	11.553	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Navy Postgraduate School (NPS) research and analysis activities serve as a focal point, stimulus, and major source of strategic, tactical and operational thought within the Navy communities. These efforts generate strategic and operational alternatives, tactical imperatives, quantitative analyses, technical developments and assessments, and political-military assessments. Also, provide recommendations to the Chief of Naval Operations (CNO), Fleet Commanders and numbered Fleet Commanders regarding the formulation and execution of maritime options for the President of the United States. Research will be conducted that will enhance graduate education for Naval Officers and potentially provide students with areas of studies for theses and faculty projects. These research activities also serve as a means for OPNAV Resource Sponsors and Major Commands to have analysis and decision support research conducted in the uses of the applied, soft, and hard sciences in solving diverse and complex resource allocation and strategic issues facing the Navy today and envisioned in the future.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Faculty and Student Studies, Analysis and Research	10.782	11.467	11.553	0.000	11.553
Articles:	-	-	-	-	-
Description: Navy Postgraduate School (NPS) research and analysis activities serve as a focal point, stimulus, and major source of strategic, tactical and operational alternatives, tactical imperatives, quantitative analyses, technical developments and assessments, and political-military assessments. Also, provide recommendations to the Chief of Naval Operations (CNO), Fleet Commanders and numbered Fleet Commanders regarding the formulation and execution of maritime options for the President of the United States. Research will be conducted to support graduate students theses determination and completion as part of Faculty projects. These research activities also serve as a means for OPNAV Resource Sponsors and Major Commands to have analysis and decision support research conducted in the uses of the applied, soft, and hard sciences in solving diverse and complex resource allocation and strategic issues facing the Navy today and envisioned in the future.					
FY 2021 Plans: Continue Studies planned in the following areas: - 1 in the area of Applied Mathematics - 15 in the area of Executive Education					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 2098 / <i>Navy Postgraduate School (NPS) Studies Support</i>

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<ul style="list-style-type: none"> - 24 in the area of Computer Science - 97 in the area of Defense Analysis - 7 in the area of Electrical and Computer Engineering - 14 in the area of Energy Academic Group - 76 in the area of Business & Public Policy - 112 in the area of Information Sciences - 31 in the area of Information Sciences and Modeling, Virtual Environments and Simulation (MOVES) - 25 in the area of Mechanical and Aerospace Engineering - 10 in the area of Meteorology - 20 in the area of National Security Affairs - 12 in the area of Oceanography - 276 in the area of Operations Research - 32 in the area of Physics - 3 in the area of Space Systems - 138 in the area of Systems Engineering <p>FY 2022 Base Plans: Continue Studies planned in the following areas:</p> <ul style="list-style-type: none"> - 1 in the area of Applied Mathematics - 15 in the area of Executive Education - 24 in the area of Computer Science - 97 in the area of Defense Analysis - 7 in the area of Electrical and Computer Engineering - 14 in the area of Energy Academic Group - 76 in the area of Business & Public Policy - 112 in the area of Information Sciences - 31 in the area of Information Sciences and Modeling, Virtual Environments and Simulation (MOVES) - 25 in the area of Mechanical and Aerospace Engineering - 10 in the area of Meteorology - 20 in the area of National Security Affairs - 12 in the area of Oceanography - 278 in the area of Operations Research 					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / Management, Technical & Intl Supt	Project (Number/Name) 2098 / Navy Postgraduate School (NPS) Studies Support

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
- 32 in the area of Physics - 3 in the area of Space Systems - 138 in the area of Systems Engineering					
<i>FY 2022 OCO Plans:</i> N/A					
<i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> Funding has increased from FY2021 to FY2022 due to additional research projects being executed for Operational Research.					
Accomplishments/Planned Programs Subtotals	10.782	11.467	11.553	0.000	11.553

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 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>				Project (Number/Name) 2221 / <i>JT Mission Assessment Studies</i>			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
2221: <i>JT Mission Assessment Studies</i>	0.000	26.402	22.333	22.173	-	22.173	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This exhibit has been updated to reflect the establishment of the Navy Analytic Office (NAO), which is responsible for the executive oversight of Navy studies and analysis. The NAO was stood up to better align the annual Analytic Agenda to Chief Naval Operation's (CNO) strategic priorities while also providing for study of the more tactical requirements of the Fleet and Navy writ large. The outcome will be synchronized modeling, simulation, assessments, wargames, experiments and exercises providing rich, shared data to support and refine warfighting concepts and to inform budget decisions.

The Navy Annual Studies Program supports the Analytic Agenda by providing both the development and use of modeling, simulation and analytically-based warfare, business analyses and analytic tools that provide the basis for decision making with respect to concepts of operations (CONOPS), Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) Systems; warfare systems, and analytical underpinnings/basis for programmatic decisions of the Navy's top leadership regarding their architectures, force structure, and the Navy's core "organize, train, and equip mission" (the warfare and provider Enterprises). The program provides capability-based planning assessment for Joint Capabilities Integration and Development System (JCIDS), conducts analysis to affect warfighting capability trades and enterprise resources, identifies needs, gaps and overlaps, and assesses alternative solutions to Joint needs. The program provides overarching Planning, Programming, Budgeting and Execution System (PPBES) analyses and guidance for PPBES which provides gap analysis and investment strategy and total obligation authority allocation. It provides independent capability analysis and assists in structuring follow-on Navy analyses. The program coordinates Navy's position for the enhanced planning process and conducts net assessments. It serves as the lead campaign analysis to approve Navy warfare and support requirements. The program supports the Maritime Strategy which charts a course for the Navy, Coast Guard and Marine Corps to work collectively with each other and international partners to prevent crises from occurring, or reacting quickly should one occur to avoid negative impact to the United States. The Studies Program provides a broad-view perspective across the Fleet and Navy staff, with an integrated look at both warfighting and warfighting-support programs. It provides Navy alternatives in assessing the implications embedded within resource decisions in a quantified context of costs versus capability versus risk. The program provides independent analytic support to Navy leadership in conjunction with various executive level decision forums.

This project funds concept development engineering, mission effectiveness analysis, and other analyses for formulation of future surface ship and associated platform force structure along with development of the tools to accomplish these efforts. Advanced platform concept studies and systems technology assessments will be conducted as will the development and upgrade of concept design and engineering tools, methods, and criteria. Concept Formulation (CONFORM)/Concept Development and Experimentation (CDE) for ships, boats and unmanned maritime vehicles must be continuously exercised to remain viable. It takes years to train competent practitioners, and knowledge currency is quickly lost without practice. Evolving threats and technologies drive concepts (and the tools, processes, and skills needed to produce them) towards obsolescence without constant attention. Capability Based Assessments and Analysis of Alternatives (AoA) timelines are insufficient for establishing potential material solution cost versus capability relationships without significant concept formulation work beforehand. Active collaboration between the Office of the Chief of Naval Operations requirement sponsors, Program Offices, and the various System Commands (Naval Sea Systems Command, Naval Air

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy	Date: May 2021
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Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 2221 / <i>JT Mission Assessment Studies</i>
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Systems Command and Space and Naval Warfare Systems Command) engineers is critical for fully exploring the trade space by conducting analysis for affordability, effectiveness and risk. The majority of Total Ownership Cost (TOC) is locked into a design before it is even a program. In the later stages of a program it becomes much more costly to make changes that will significantly impact TOC. Investment up front in concept design can have a high payoff in TOC reduction over the life of a platform class. Outputs include concept costing and performance parameterization for comparative assessment against capability objectives and synthesis to quantify overall (Fleet) capabilities. These products (expressions of cost vs. capability) will serve as the basis of requirements and Joint Capabilities Integration and Development System analysis, define the trade space for AoA efforts, and underpin discussion of force architecture/structure during Quadrennial Defense Review, Long Range Shipbuilding Strategy builds, and Joint Requirements Oversight Council reviews.

Capabilities-Based Assessment (CBA) is the Joint Capabilities Integration and Development System (JCIDS) analysis process that includes three phases: Functional Area Analysis (FAA), Functional Needs Analysis (FNA), and Functional Solution Analysis (FSA). The results of the CBA are used to develop a joint capabilities document (based on the FAA and FNA) or initial capabilities document (based on the full analysis). CBA funding provides the resource sponsors the means to develop the analytic underpinning required by Chairman of the Joint Chiefs of Staff Instruction 3170.01G to support the determination of Naval warfighting capabilities and force structure needed to support the Joint Requirements Oversight Council (JROC)/JCIDS requirements validation process and to inform Program Objective Memorandum programming decisions. This analysis includes evaluation of integration and interoperability gaps of both current and future Navy platforms and systems capabilities.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Navy Studies & Analysis	20.692	18.547	18.677	0.000	18.677
Articles:	-	-	-	-	-
FY 2021 Plans:					
-To develop, update and maintain detailed level Navy Standard scenarios based on Defense Planning Guidance (DPG).					
-To develop alternative scenarios in support of Defense Review guidance, Joint studies, and Navy resource analyses.					
-To develop, update and maintain analytic baselines for the Major combat operation (MCO) based on DPG.					
-To develop details required to execute analysis of designated Defense Planning Scenarios and their respective Multi-Service Force Deployment Plans.					
-To develop and maintain a framework and common set of processes to ensure that essential elements of warfare analyses, including scenarios, operational concepts, tactics, capabilities of platforms and systems (for Navy, Joint, coalition and threat forces), key assumptions and input data are defined and traceable to government approved/provided source material.					
-To develop scenarios and operational concepts based on government inputs that are sufficiently detailed for use in naval and joint campaign analyses.					
-At the mission level, to script Operational Situations (OPSITS) or Tactical Situations (TACSITS) for use in effectiveness analyses in specific warfare mission areas.					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 2221 / <i>JT Mission Assessment Studies</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>-To provide analytically-based decision recommendations to Chief of Naval Operations (CNO) for both warfighting and support areas.</p> <p>-To develop CNO investment strategy recommendations and assessments for Program Review and Program Objective Memorandum.</p> <p>-To perform rigorous, time critical naval and joint campaign and mission-level analyses, usually based on modeling and simulation that illuminated complex warfare issues which support decision-making in the Planning, Programming, Budgeting and Execution (PPBE) process.</p> <p>-To conduct Intelligence, Surveillance, Reconnaissance (ISR) and Meteorological and oceanographic systems (METOC) assessments to determine the optimal mix of Naval ISR and METOC sensors, platforms, and processing, analysis and fusion disposition to support Major combat operations (MCOs), the Overseas Contingency Operations (OCO), and intelligence preparation of the environment for both MCOs and OCO.</p> <p>-To develop and maintain common baselines from which campaign excursions and mission-level analyses are executed.</p> <p>-To identify, develop and improve data and modeling, and broker agreements upon assumptions, Concepts of Operation (CONOPS), scenarios, and data.</p> <p>-Continue to lead campaign analysis for Office of the Chief of Naval Operations (OPNAV) and lead Navy's participation in Office of the Secretary of Defense (OSD)/Joint Staff analytic agenda, baseline development, and collection of data.</p> <p>-To conduct modeling and simulation support for ongoing OPNAV missile defense analysis requirements.</p> <p>-To provide analytically-based decision recommendations to OPNAV for joint warfighting and support areas.</p> <p>-To develop new analytic models and techniques for informing resource allocation decisions; conduct all campaign and warfare mission-level analyses and develop investment strategies.</p> <p>-To develop and improve the Navy's analysis capabilities which support Joint and Navy analytic agendas and resource-allocation decision making by refining the linkages between cost and performance in performance-modeled programs in support of Navy analysis and assessment. Areas of tool development and improvement included mission and campaign-level warfighting models, active and reserve manpower, afloat and ashore readiness, and medical capabilities.</p> <p>-To focus on integrated analysis capabilities that cut across business and program accounts. Specific efforts address cyber warfare and security, optimizing the training pipeline, integrating ship maintenance and operations price performance models, and improving mission- and campaign-level Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) models and representations.</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 2221 / <i>JT Mission Assessment Studies</i>

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>-To develop medical analysis that links to campaign analysis including movement of injured between care facilities, life-saving treatment of injured and recuperation support of injured to support Navy Medical Program decisions.</p> <p>-To update the high-level readiness model that fully integrates all aspects of warfighting support (operational utilization, training cycles, training centers, depots, etc.) and personnel (recruitment, training, development, deployment, retention, etc.) across the Navy's warfighting platforms (aircraft, ships, submarines, etc.), facilities and personnel development centers.</p> <p>-To conduct ship, boat, and unmanned marine vehicle concept studies in preparation for Capabilities Based Assessments (CBAs) and Analysis of Alternatives (AoAs). Studies will be performed in a continuous manner to support future recapitalization of Surface Combatants, Amphibious Ships, Carriers, Auxiliary Ships and other emerging program requirements.</p> <p>-To collaborate with Warfare Systems design experts to perform continuous Warfare Systems analysis at the ship and fleet level. Warfare Systems effectiveness assessment tools are being continually developed and enhanced as required to address future concepts and to incorporate improvements in information technology systems. Additionally, collaborate with aircraft, Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR), and networks by continuing dialog and collaboration between Naval Sea Systems Command (NAVSEA), Naval Air Systems Command (NAVAIR), and Naval Warfare Systems Command (NAVWAR) systems commands which refines fleet level requirements.</p> <p>-To conduct future force structure concept formulation. Fleet synthesis and analysis will be conducted, which includes capabilities requirements, platform design and cost and quantitative tracking of the long-term evolution of the fleet as new platforms are introduced and old ones are retired. Areas to be examined include interoperability concepts, force architecture impact studies, and operational employment concept studies.</p> <p>FY 2022 Base Plans:</p> <p>-Continue to identify, develop and improve data and modeling, and broker agreements upon assumptions, Concepts of Operation (CONOPS), scenarios, and data.</p> <p>-Continue to lead campaign analysis for Office of the Chief of Naval Operations (OPNAV) and lead Navy's participation in Office of the Secretary of Defense (OSD)/Joint Staff analytic agenda, baseline development, and collection of data.</p> <p>-Continue to conduct modeling and simulation support for ongoing OPNAV missile defense analysis requirements.</p> <p>-Continue to provide analytically-based decision recommendations to OPNAV for joint warfighting and support areas.</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 2221 / <i>JT Mission Assessment Studies</i>

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>-Continue to develop new analytic models and techniques for informing resource allocation decisions; conduct all campaign and warfare mission-level analyses and develop investment strategies.</p> <p>-Continue to develop and improve the Navy's analysis capabilities which support Joint and Navy analytic agendas and resource-allocation decision making by refining the linkages between cost and performance in performance-modeled programs in support of Navy analysis and assessment. Areas of tool development and improvement included mission and campaign-level warfighting models, active and reserve manpower, afloat and ashore readiness, and medical capabilities.</p> <p>-Continue to focus on integrated analysis capabilities that cut across business and program accounts. Specific efforts address cyber warfare and security, optimizing the training pipeline, integrating ship maintenance and operations price performance models, and improving mission- and campaign-level Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) models and representations.</p> <p>-Continue to develop medical analysis that links to campaign analysis including movement of injured between care facilities, life-saving treatment of injured and recuperation support of injured to support Navy Medical Program decisions.</p> <p>-Continue to update the high-level readiness model that fully integrates all aspects of warfighting support (operational utilization, training cycles, training centers, depots, etc.) and personnel (recruitment, training, development, deployment, retention, etc.) across the Navy's warfighting platforms (aircraft, ships, submarines, etc.), facilities and personnel development centers.</p> <p>-Continue to conduct ship, boat, and unmanned marine vehicle concept studies in preparation for Capabilities Based Assessments (CBAs) and Analysis of Alternatives (AoAs). Studies will be performed in a continuous manner to support future recapitalization of Surface Combatants, Amphibious Ships, Carriers, Auxiliary Ships and other emerging program requirements.</p> <p>-Continue to collaborate with Warfare Systems design experts to perform continuous Warfare Systems analysis at the ship and fleet level. Warfare Systems effectiveness assessment tools are being continually developed and enhanced as required to address future concepts and to incorporate improvements in information technology systems. Additionally, collaborate with aircraft, Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR), and networks by continuing dialog and collaboration between Naval Sea Systems Command (NAVSEA), Naval Air Systems Command (NAVAIR), and Naval Warfare Systems Command (NAVWAR) systems commands which refines fleet level requirements.</p> <p>-Continue to conduct future force structure concept formulation. Fleet synthesis and analysis will be conducted, which includes capabilities requirements, platform design and cost and quantitative tracking of the long-term</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021		
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 2221 / <i>JT Mission Assessment Studies</i>			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
evolution of the fleet as new platforms are introduced and old ones are retired. Areas to be examined include interoperability concepts, force architecture impact studies, and operational employment concept studies.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Increase of .13K from FY21 to FY22 are attributed to mission area kill chain solution development and fleet warfighter gap assessments.					
Title: Joint Mission Assessment Studies					
Articles:					
Description: Capabilities-Based Assessment (CBA) is the JCIDS analysis process that includes three phases: the Functional Area Analysis (FAA), the Functional Needs Analysis (FNA), and the Functional Solution Analysis (FSA). The results of the CBA are used to develop a joint capabilities document (based on the FAA and FNA) or initial capabilities document (based on the full analysis). CBA funding provides the resource sponsors the means to develop the analytic underpinning required by Chairman of the Joint Chiefs of Staff Instruction 3170.01G to support the determination of Naval war fighting capabilities and force structure needed to support the JROC/ JCIDS requirements validation process and to inform Program Objective Memorandum programming decisions.					
FY 2021 Plans: CBA such as advanced Naval Warfare fires and Naval aviation integrated analysis to identify future capability requirements. Develop metrics to describe the effectiveness of solutions, and evaluate current and programmed systems ability to meet capability requirements to determine capability gaps. Expand warfighting gap assessments addressing interaction of mission area kill chain platforms, sensors, and weapons in a system-of-system construct.					
FY 2022 Base Plans: CBA such as advanced Naval Warfare fires and Naval aviation integrated analysis to identify future capability requirements. Develop metrics to describe the effectiveness of solutions, and evaluate current and programmed systems ability to meet capability requirements to determine capability gaps. Expand warfighting gap assessments addressing interaction of mission area kill chain platforms, sensors, and weapons in a system-of-system construct.					
FY 2022 OCO Plans:					
	5.710	3.786	3.496	0.000	3.496
	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / Management, Technical & Intl Supt	Project (Number/Name) 2221 / JT Mission Assessment Studies

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A					
<i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> The decrease from FY21 to FY22 decreases development of mission area kill chain solution development and fleet warfighter gap assessments.					
Accomplishments/Planned Programs Subtotals	26.402	22.333	22.173	0.000	22.173

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 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0605853N / Management, Technical & Intl Supt				Project (Number/Name) 3017 / Enterprise Information Systems			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3017: Enterprise Information Systems	0.000	0.904	0.950	0.969	-	0.969	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project funds the Office of Naval Research (ONR) Next Generation Enterprise Network (NGEN) Information Technology corporate costs.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Next Generation Enterprise Network (NGEN)	0.904	0.950	0.969	0.000	0.969
Articles:	-	-	-	-	-
Description: This project funds the Office of Naval Research (ONR) Next Generation Enterprise Network (NGEN) Information Technology corporate costs.					
FY 2021 Plans: Funds for NGEN Corporate requirements, such as (obsolescence migration, etc.).					
FY 2022 Base Plans: Continue to support NGEN Corporate requirements, such as (tech refresh, etc.).					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: No significant funding change from FY2021 to FY2022.					
Accomplishments/Planned Programs Subtotals	0.904	0.950	0.969	0.000	0.969

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 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0605853N / Management, Technical & Intl Supt				Project (Number/Name) 3027 / Defense Critical Infrastructure Program			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3027: Defense Critical Infrastructure Program	0.000	7.440	5.746	7.450	-	7.450	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funds received pursuant to the transfer of budget authority from Office of the Secretary of Defense (Policy) Homeland Defense Mission Assurance Directorate will be used for infrastructure analysis, assessment, and research required to support execution of the Defense Critical Infrastructure and Mission Assurance Program (DCIP / MA). Additionally, the transferred budget authority will be used to provide in-depth/cross-cutting analysis to the Mission Assurance (MA)/DCIP programs at the Office of the Secretary of Defense (OSD), Joint Staff, Military Departments/Services, Defense Agencies, and Combatant Commands. NSWCDD-A40 will also perform cyber mission assurance research and provide expertise in infrastructure mitigation techniques and solutions.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Mission Assurance Risk Management System (MARMS) Technical Support	0.530	0.530	0.530	0.000	0.530
Articles:	-	-	-	-	-
Description: Provide capabilities to meet the technical requirements in support of the developmental efforts for the current and future common operating picture for Mission Assurance supporting Joint Staff MARMS development team, program office and A40 mission assurance database organization.					
The Office of the Undersecretary of Defense for Policy (OUSD-P) Mission Assurance Directorate and the Joint Staff provide oversight for funding that will be used for infrastructure analysis, assessment, and research required in support of Mission Assurance and Defense Critical Infrastructure(DCI)programs at the Joint Staff and Office of the Secretary of Defense Policy (OSD)(P).					
FY 2021 Plans:					
1 MARMS Technical Working Group (TWG) guidance & requirements traceability tracking and enforcement upon anticipated FY 2020 contract award					
2 MARMS programmatic acquisition support to Joint Staff and Defense Threat Reduction Agency (DTRA) Program Office based on milestone decision authority phase entry and anticipated system engineering support					
3 MARMS Architecture tracking and incorporating data registry scheme between existing Joint Staff portals and MARMS developed user interface, the Enterprise Protection Risk Management portal (EPRM)					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021		
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 3027 / <i>Defense Critical Infrastructure Program</i>			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
4 Database mapping and analysis for MARMS and update of data from emerging analysis and assessment data for initial operational capability for MARMS use and implementation - Data Librarian & Mission Mapping task					
FY 2022 Base Plans:					
1 MARMS Technical Working Group (TWG) guidance & requirements traceability tracking and enforcement upon anticipated FY 2021 contract awards					
2 MARMS programmatic acquisition support to Joint Staff and Defense Threat Reduction Agency (DTRA) Program Office based on milestone decision authority phase entry and anticipated system engineering support					
3 MARMS Architecture tracking and incorporating data registry scheme between existing Joint Staff portals and MARMS developed user interface, the Enterprise Protection Risk Management portal (EPRM)					
4 Database development and analysis for MARMS and update of data from emerging analysis and assessment data for initial operational capability for MARMS requirement phases and implementation of each - Data Librarian & Mission Mapping task					
FY 2022 OCO Plans:					
N/A					
FY 2021 to FY 2022 Increase/Decrease Statement:					
There is no change from FY2021 to FY2022					
Title: Mission Assurance Assessments (MAA) Support					
Articles:					
	1.365	0.697	1.333	0.000	1.333
	-	-	-	-	-
Description: Provide analysis and characterization of Defense Critical Infrastructure through research and study of existing assessment data and incoming assessment data to analyze trends, provide feedback, and significant impacts to defense missions and assets during events, exercises, and planning efforts.					
The Office of the Undersecretary of Defense for Policy (OUSD-P) Mission Assurance Directorate and the Joint Staff will provide oversight to A40 for funding that will be used for infrastructure analysis, assessment, and research required in support of Mission Assurance and Defense Critical Infrastructure (DCI) programs at the Joint Staff and OuSD (P).					
FY 2021 Plans:					
1 Mission Assurance Trends Analysis Methodology continue refinement of data inputs from latest assessment results					

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>2 Annual trends analysis on MAA reports conducted to ensure common vulnerabilities are identified, tracked, and enterprise solutions offered to enhance efficient use of limited budgets and funding for risk mitigations</p> <p>3 Review of Joint Staff quantitative processes in Mission Assurance Assessments to ensure viable and verified risk estimates are defensible within the budget process and gain attention for immediate resolution from cyber and physical threats</p> <p>4 Incorporate NAVSEA 001 assessment needs into existing Mission Assurance methods and execute two Mission Assurance / Cyber Network Assurance combined assessments at NAVSEA laboratory as pilot and shipyard as initial rollout.</p> <p>FY 2022 Base Plans:</p> <p>1 Mission Assurance Trends Analysis Methodology-continued refinement of data inputs from latest assessment results with centers of excellence inputs</p> <p>2 Annual trends analysis on MAA reports conducted to ensure common vulnerabilities are identified, tracked, and enterprise solutions offered to enhance efficient use of limited budgets and funding for risk mitigations</p> <p>3 Review of Joint Staff quantitative processes in Mission Assurance Assessments to ensure viable and verified risk estimates are defensible within the budget process and gain attention for immediate resolution from cyber and physical threats</p> <p>4 Incorporate NAVSEA 03 assessment needs into existing Mission Assurance methods and execute Mission Assurance / Cyber Assessments at NAVSEA sites and shipyards as directed and coordinated with OPNAV N46, NAVSEA 03 & 00P</p> <p>FY 2022 OCO Plans:</p> <p>N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p> <p>The funding increase from FY2021 to FY2022 reflects the incorporation of lessons learned from previous year tasking developing methodologies of pilot assessments and increased scheduled assessments and planned team hiring.</p>					
<p>Title: Cyber Mission Assurance (MA)</p> <p align="right">Articles:</p> <p>Description: Analysts will investigate cyber impacts to missions and infrastructure associated with DoD assets. This information will be conveyed in assessments, memorandums, and white papers to inform senior leaders and teams about the significance of cyber infrastructure and the interdependencies with physical infrastructure.</p>	1.195	0.849	1.227	0.000	1.227
	-	-	-	-	-

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>The Office of the Undersecretary of Defense for Policy (OUSD-P) Mission Assurance Directorate and the Joint Staff will provide oversight to A40 for funding that will be used for infrastructure analysis, assessment, and research required in support of Mission Assurance and Defense Critical Infrastructure (DCI) programs at the Joint Staff and OUSD (P).</p> <p>FY 2021 Plans: 1 Best Practices report for risk reduction to Platform Information Technology - Control Systems (PIT-CS) will be edited to encompass weapons platform IT constructs and other critical infrastructure platforms on which DoD has dependencies 2 Annual Industrial Control Systems (ICS) update to Best Practices Report will be conducted to identify enhanced methods and metrics to monitor progress and accomplishment towards categorizing entire inventory of critical DoD control systems and their known vulnerabilities 3 Research and develop cyber-specific infrastructure assessment methods to complement assessment teams and data incoming from ongoing assessments across DoD and Services, with particular focus on NAVSEA Red Team enhancement 4 Technical Liaison Support to Cyber MA Enterprise will continue to identify paths for engaging Mission Assurance partners on a collaborative tool that identifies cyber mission risks from assets identified as part of ongoing assessment efforts across multiple missions and cyber domains</p> <p>FY 2022 Base Plans: 1 Best Practices report for risk reduction to Platform Information Technology - Control Systems (PIT-CS) will be edited to encompass weapons platform IT constructs and other critical infrastructure platforms on which DoD has dependencies 2 Annual Industrial Control Systems (ICS) update to Best Practices Report will be conducted to identify enhanced methods and metrics to monitor progress and accomplishment towards categorizing entire inventory of critical DoD control systems and their known vulnerabilities 3 Research and develop cyber-specific infrastructure assessment methods to complement assessment teams and data incoming from ongoing assessments across DoD and Services, with particular focus on NAVSEA Red Team enhancement</p>					

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
4 Technical Liaison Support to Cyber Mission Assurance (MA) Enterprise will continue to identify paths for engaging Mission Assurance partners on a collaborative tool that identifies cyber mission risks from assets identified as part of ongoing assessment efforts across multiple missions and cyber domains					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: The funding increase from FY021 to FY2022 is based on the plan to execute Cyber Mission Assurance Assessments using NAVSEA Red Team resources and other cyber protection teams. The increase will additionally fund Mission Relevant Terrain - Cyber analysis and methodology development.					
Title: Defense Critical Electric Infrastructure (DCEI)					
Articles:					
Description: Provide electric power analysis and characterization of defense installations at the request of senior leaders engaged with energy security and resilience efforts for national security with interagency representatives from industry utilities, DHS, and DoE.					
The Office of the Undersecretary of Defense for Policy (OUSD-P) Mission Assurance Directorate and the Joint Staff will provide oversight to A40 for funding that will be used for infrastructure analysis, assessment, and research required in support of Mission Assurance and Defense Critical Infrastructure (DCI) programs at the Joint Staff and OUSD (P).					
FY 2021 Plans:					
1 Update installation peak power methodology and primary Electric Power (EP) infrastructure pathways in support of interagency Fixing America's Surface Transportation (FAST) act collaboration					
2 Update Defense Critical Electric Infrastructure (DCEI) analysis as requested per ongoing interagency collaborations in DoD cluster areas					
3 Analyzing post table top exercise feedback (Constrained Eagle) to enhance leadership understanding of commercial electric power grid dependencies for DoD Missions					
4 Provide recommendations on what DoD processes may be appropriate to use to engage with utilities to discuss analysis findings					
	0.494	0.494	0.494	0.000	0.494
	-	-	-	-	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
5 Engage with other federal and private industry agencies to deepen understanding of utility operations and grid operations (the Federal Energy Regulatory Commission (FERC), North American Electric Reliability Corporation (NERC), National Rural Electric Cooperative Association (NRECA), etc.)					
FY 2022 Base Plans:					
1 Update installation peak power methodology and primary Electric Power (EP) infrastructure pathways in support of interagency collaboration on energy resilience efforts					
2 Update Defense Critical Electric Infrastructure (DCEI) analysis as requested per ongoing interagency collaborations in DoD cluster areas					
3 Continued analysis on priority installations to enhance leadership understanding of commercial electric power grid dependencies for DoD Missions					
4 Provide recommendations on what DoD processes may be appropriate to use to engage with utilities to discuss analysis findings and develop energy resilience requirements for DoD installations					
5 Engage with other federal and private industry agencies to deepen understanding of utility operations and grid operations (the Federal Energy Regulatory Commission (FERC), North American Electric Reliability Corporation (NERC), National Rural Electric Cooperative Association (NRECA), etc.)					
FY 2022 OCO Plans:					
N/A					
FY 2021 to FY 2022 Increase/Decrease Statement:					
There is no change from FY2021 to FY2022					
Title: Mission Assurance Program Management					
Articles:					
	0.900	0.770	0.900	0.000	0.900
	-	-	-	-	-
Description: Monitor, track and report on all budget related inquiries and task planning and execution for the Mission Assurance / DCIP programs including data calls, weekly budget reports, and deliverables.					
The Office of the Undersecretary of Defense for Policy (OUSD-P) Mission Assurance Directorate and the Joint Staff will provide oversight to A40 for funding that will be used for infrastructure analysis, assessment, and research required in support of Mission Assurance and Defense Critical Infrastructure (DCI) programs at the Joint Staff and OUSD (P).					
FY 2021 Plans:					

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>research required in support of Mission Assurance and Defense Critical Infrastructure (DCI) programs at the Joint Staff and OUSD (P).</p> <p>FY 2021 Plans:</p> <ol style="list-style-type: none"> 1 Maintain Global Mission Assurance Portal (GMAP) portal documentation requirements and continue development of database solution and provide best practices / option in support and coordination with MARMS effort 2 DCI criticality assessments and nominations will continue to flow in and be reviewed / analyzed for completeness and prioritized for review 3 Mission Mitigation and Risk Reduction Plan coordination and review of new or existing nominated assets and need for budget prioritization of vulnerability solutions 4 Risk Management Plan draft summaries will be coordinated, edited, and reviewed for correctness, completeness and identified appropriate vulnerabilities and threats to justify risk management plan efforts cover the issues 5 Continue nomination package preparation for biannual update and finalization of critical defense assets and infrastructure 6 Revalidation packages for Defense Critical Assets (DCAs) will be reviewed and nominated based on previous mission plan inputs and current Joint Staff and OSD defense planning guidance updates 7 Development and support of Defense Industrial Base pilot assessment "Supporting Eagle" will be executed and feedback gained from exercise execution to implement in future policy documents <p>FY 2022 Base Plans:</p> <ol style="list-style-type: none"> 1 Maintain Global Mission Assurance Portal (GMAP) portal documentation requirements and continue development of database solution and provide best practices / option in support and coordination with MARMS & EPRM efforts 2 DCI criticality assessments and nominations will continue to flow in and be reviewed / analyzed for completeness and prioritized for review 3 Mission Mitigation and Risk Reduction Plan coordination and review of new or existing nominated assets and need for budget prioritization of vulnerability solutions 4 Risk Management Plan draft summaries will be coordinated, edited, and reviewed for correctness, completeness and identified appropriate vulnerabilities and threats to justify risk management plan efforts cover the issues 					

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Appropriation/Budget Activity 1319 / 6		R-1 Program Element (Number/Name) PE 0605853N / Management, Technical & Intl Supt		Project (Number/Name) 3027 / Defense Critical Infrastructure Program	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
<p>5 Continue nomination package preparation for biannual update and finalization of critical defense assets and infrastructure</p> <p>6 Revalidation packages for Defense Critical Assets (DCAs) will be reviewed and nominated based on previous mission plan inputs and current Joint Staff and OSD defense planning guidance updates</p> <p>7 Development and support of follow - on Surge Layer Defense and National Defense Strategy assessments will be executed and feedback gained to implement findings into exercise execution and implement in future policy documents for technical relevancy</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase from FY2021 to FY2022 due to increased interest and need from senior leader's to develop and enhance assessments on defense critical infrastructure supporting strategic missions and planning</p>					
<p>Title: Defense Critical Mission (DCM)</p> <p align="right">Articles:</p> <p>Description: Conduct research and provide expertise on the defense critical missions nominated by the Joint Staff and Mission Assurance community for development of mitigations and solutions to vulnerabilities discovered as part of mission assurance assessment processes. Analysts will provide expertise and knowledge in multiple areas of engineering and infrastructure to provide robust and resilient plans and projects to enhance installation infrastructure and planning to increase successful support of critical missions.</p> <p>The Office of the Undersecretary of Defense for Policy (OUSD-P) Mission Assurance Directorate and the Joint Staff will provide oversight to A40 for funding that will be used for infrastructure analysis, assessment, and research required in support of Mission Assurance and Defense Critical Infrastructure (DCI) programs at the Joint Staff and OUSD (P).</p> <p>FY 2021 Plans:</p> <p>1 Continue update of Mission Maps to maintain awareness of existing and new DCMs and the assets supporting multiple AORs and across mission owners (and de-conflict)</p> <p>2 Provide DCM process briefings to MA community to enhance awareness of critical mission assets and their common vulnerabilities within domains and across operational areas to enhance enterprise solutions and identify funding dollars to fix vulnerabilities</p>					
	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
	0.526	0.326	0.503	0.000	0.503
	-	-	-	-	-

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>3 Support Mission Assurance Senior Steering and Executive Steering Group briefings and papers to Joint Staff led initiatives incorporating the DCM concept into doctrine or best practices</p> <p>4 Continued update of Defense Critical Mission Methodology Brief to include Plan of Action and Milestones and execute tasks to provide a more holistic concept of mission assurance and protection of assets in support of multiple missions</p> <p>FY 2022 Base Plans:</p> <p>1 Continue update of Mission Maps to maintain awareness of existing and new DCMs and the assets supporting multiple AORs and across mission owners (and de-conflict)</p> <p>2 Provide DCM process briefings to MA community to enhance awareness of critical mission assets and their common vulnerabilities within domains and across operational areas to enhance enterprise solutions and identify funding dollars to fix vulnerabilities</p> <p>3 Support Mission Assurance Senior Steering and Executive Steering Group briefings and papers to Joint Staff led initiatives incorporating the DCM concept into doctrine or best practices</p> <p>4 Continued update of Defense Critical Mission Methodology Brief to include Plan of Action and Milestones and execute tasks to provide a more holistic concept of mission assurance and protection of assets in support of multiple missions</p> <p>FY 2022 OCO Plans:</p> <p>N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p> <p>Increase from FY2021 to FY2022 reflects increased requirements from senior leaders on enhanced risk management and decision making from mission analysis methods and assessments</p>					
<p>Title: Outside the Wire (OTW) Infrastructure Reports</p> <p align="right">Articles:</p> <p>Description: Provide infrastructure characterization reports on non-DoD owned supporting infrastructure at DoD installations on the same schedule as the Defense Threat Reduction Agency (DTRA) mission assurance assessments</p> <p>FY 2021 Plans:</p>	0.620	0.500	0.620	0.000	0.620
	-	-	-	-	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
Up to 16 OTW reports anticipated to be provided by A40 Dahlgren to Defense Threat Reduction Agency (DTRA) teams ahead of pre-site scheduled visit					
FY 2022 Base Plans: 1-Up to 16 OTW reports anticipated to be provided by A40 Dahlgren to Defense Threat Reduction Agency (DTRA) teams ahead of pre-site scheduled visits 2-Development of upgraded OTW reports to engage assessments on threat and vulnerability integration					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Funding increase from FY2021 to FY 2022 reflects the increase in the number of reports from this effort supporting outside agency mission assurance and cyber assessments and upgrades to methodology and data / intelligence development.					
Title: MA Advanced Homeland Analysis & Assessment Integration					
Articles:					
Description: Provide technical assessment support and improve mission assurance implementation to enterprise systems, and provide leadership in support of OSD and NAVSEA efforts between mission assurance, threat intelligence, big data analysis and cybersecurity network programs. This includes identifying and categorizing Mission Relevant Terrain-Cyber (MRT-C) data via Red Team capabilities.					
FY 2021 Plans: Grow team from FY2020 to 3-4 assessments per year on a steady periodic basis through FY2021. Provide cyber and mission assurance analysis and expertise to assets, infrastructure, and networks and provide reporting to senior leadership to mitigate found vulnerabilities; grow local expertise and persistent cyber awareness based on initial assessment team survey					
FY 2022 Base Plans: 1-Sustain team from FY2021 growth to 3-4 assessments per year on a steady periodic basis through FY2022 2-Provide cyber and mission assurance analysis and expertise to assets, infrastructure, and networks for Navy and NAVSEA entities 3-Provide reporting to senior leadership to mitigate found vulnerabilities and develop enterprise solutions 4-Grow local expertise and persistent cyber awareness based on initial assessment team survey					
	1.210	1.184	1.243	0.000	1.243
	-	-	-	-	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
5-Support NAVSEA Mission Assurance office establishment and provide on-site support to NAVSEA 00P security directorate at Washington Navy Yard FY 2022 OCO Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: Increase from FY2021 to FY2022 due to increased requirements for analysis and support from Navy and DoD red team and cyber mission analysts.					
Accomplishments/Planned Programs Subtotals	7.440	5.746	7.450	0.000	7.450

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

N/A

Remarks

D. Acquisition Strategy

N/A

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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3312: <i>MTMD-Maritime Theater Missile Defense Forum</i>	0.000	10.186	16.179	11.857	-	11.857	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project funds participation in Maritime Integrated Air and Missile Defense projects with other nations through the Maritime Missile Defense Projects Framework Memorandum of Understanding of 2004 (as amended 2009, 2015, 2016 and 2020). Known as the Maritime Theater Missile Defense (MTMD) Forum, it promotes interoperability with the Navies of twelve participating nations (Australia, Belgium, Canada, Denmark, France, Germany, Italy, Netherlands, Norway, Spain, United Kingdom and the United States). This project provides direct support to NATO Ballistic Missile Defense (BMD). Engineering analysis and data analytics from MTMD activities are provided to European, Pacific and Central Combatant Commands in direct support of theater priorities. Specifically, the MTMD Forum is addressing challenges with "Maritime Allied Air Defense in Support of Ballistic Missile Defense Operations" that face the Combatant Commanders during present-day operations. The MTMD Forum is leveraging At-Sea Demonstration (ASD) test events and operational Fleet Exercises (Formidable Shield and Pacific Dragon) to integrate technology with concepts of operations developed within MTMD Forum working groups.

The MTMD Forum develops systems and techniques that enhance protection and defense against the proliferation of short, medium and long-range Ballistic Missile (BM) and Advanced Anti-Ship Cruise Missile (ASCM) threats through the development of interoperable sea-based Integrated Air and Missile Defense (IAMD) capability among coalition nations. This includes protection across the full spectrum of these threats through the enhanced utilization of existing sea-based systems to protect against current threats while progressively improving and developing systems and system-of-systems to effectively counter evolving threats.

This project supports USN participation in a Maritime IAMD Project Arrangement focused on:

- (1) Battle Management Command, Control, Communications, Computers, and Intelligence (BMC4I) to define and develop architectures and perform engineering to address coalition capability gaps.
- (2) Modeling & Simulation (M&S) to establish and maintain a maritime coalition M&S testbed and to perform legacy and future systems simulation testing.
- (3) Hardware-in-the-Loop Testing of Coalition combat systems to assess interoperability within the Coalition Distributed Engineering Plant (CDEP).
- (4) Open Architecture (OA) work to develop Interface Standards and Data Models.
- (5) Test Planning and Execution (TPEX) to develop Test Plans, oversee exercise participation and conduct post event data analysis and reporting.
- (6) Operational Requirements (OR) to develop a Coalition Maritime Missile Defense Operational Concept Document and to identify operational constraints and tactical constructs surrounding coalition maritime missile defense activities.
- (7) Reciprocal Use of Test Facilities agreements with other nations to support Maritime IAMD and MTMD related demonstrations.
- (8) Tactical Advancement for Next Generation (TANG) to work with our Allies and International Partners using human-centered design methodologies to identify solutions to technology and sailor performance issues that have been cited during previously conducted experiments, exercises, and demonstrations. This process will

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seek to leverage R&D investments and risk reduction research commercial companies are making today that can provide potential "dual use" technology and process solutions to complex problems.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>Title: MTMD-Martime Theater Missile Defense Forum</p> <p align="right">Articles:</p> <p>FY 2021 Plans:</p> <p>(1) Battle Management Command, Control, Communications, Computers and Intelligence (BMC4I) Working Group will continue engineering analysis of multi-national interoperability gap assessment for the optimal, coalition Target Architecture that provides increased interoperability with a vision towards automation of some command and control functions, utilizing test results from project events and request for information inputs from member nations. BMC4I will evaluate emergent Possible Point Solutions for information, data, and system information and provide recommendations for implementation in correcting coalition interoperability gaps. BMC4I examination of allied capabilities and limitations, and follow-on production of a capabilities and limitations database, is critical to the understanding of compatible link, data, and other coalition systems. BMC4I will develop updates to MTMD Coalition Capabilities and Interoperability (CCI) publications that contribute to alignment of acquisition requirements among the participating nations of the MTMD Forum.</p> <p>(2) Modeling & Simulation (M&S) Working Group will continue analysis of Target Architectures and conduct further assessments in support of providing recommendations to improve information exchange requirements identified by BMC4I and the System Engineering Team (SET). M&S will refresh equipment and software procured in the 2013 timeframe and ensure all associated authorities to operate are in place for continued coalition modeling and simulation. The technical refresh is required in order to maintain compatibility with allied M&S systems. M&S will model future Target Architectures and provide analysis in support of future at-sea demonstrations. The M&S team will continue development of the test bed and add additional computing power to the test environment to provide faster and more powerful analytical capability to the Forum System Engineering Team. The M&S Working Group will continue development of Mission Models in support of capability development to illustrate operational impact of proposed solutions to complex Integrated Air and Missile Defense (IAMD) problems.</p> <p>(3) Coalition Distributed Engineering Plant (CDEP) Working Group will continue to assess interoperability of joint air and land assets in Annual Test Events. The controlled test environment offers greater repeatability than at-sea events. Three additional nations have fielded national Hardware in the Loop (HWIL) capabilities in the last three years, requiring more frequent connection testing by the U.S. CDEP Team. CDEP will work</p>	10.186	16.179	11.857	0.000	11.857
	-	-	-	-	-

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>with BMC4I and Operational Requirements (OR) working groups to update the Coalition Capabilities and Interoperability (CCI) gaps document and develop test plans to assess capabilities suitable for synthetic-based testing. CDEP will prepare for and conduct HWIL tests with allied partners, and will provide assessments and recommendations to improve information exchanges required to conduct effective IAMD operations. CDEP will perform early-look testing that assesses Identification Friend or Foe (IFF) Mode S interoperability between the US and Coalition partners and the impacts to interoperability. CDEP plans to test Link 22 between the US and its Coalition partners to characterize interoperability impacts of this newly implemented Tactical Data Link. CDEP will continue to align with the stated objectives within the MTMD Forum Capability Roadmap. CDEP will continue to operate an HWIL suite that can supplement live testing and facilitate a robust engineering evaluation of integrated air and missile defense performance for coalition interoperability.</p> <p>(4) Open Architecture Working Group (OAWG) will model and extend the component software interfaces for additional Force Level Functions (FLFs), including Track Management. The Force Data Model will be extended to support the information exchange of additional FLFs. The Force Level Open Architecture Technical Standard (FLOATS) will be implemented in national Force Threat Evaluation and Weapons Assignment (FTEWA) prototype efforts such as ONR's The Technical Cooperation Program (TTCP). It will also be finalized and exercised via scenarios within the Project's M&S and CDEP environments. In addition to identifying errors and deficiencies in the standard, these exercises and FLOATS implementations will demonstrate various operational methodologies for distributing data within the Force as well as identifying performance parameters. Comments submitted against the standard will be adjudicated and the standard will be updated as required. The OAWG will continue to collaborate with BMC4I, OR, CDEP and the System Experts Meeting (SEM) to ensure these interfaces align with the Target and Reference Architectures as well as selected Possible Point Solutions (PPSs). The OAWG will collaborate with the FTEWA Workshops and Subject Matter Experts (SMEs) to ensure the FLF component interfaces align with FTEWA and operational requirements. The OAWG will monitor the Open Architecture Radar Interface Standard (OARIS) Industry Group and relevant commercial standards as required.</p> <p>(5) Test Planning and Execution (TPEX) Working Group will continue preparations for MTMD participation and support for ongoing at-sea test event series. At-Sea Demonstration 21 / Exercise Formidable Shield 2021 (ASD/FS21) will execute in Q3 of FY21. Data analysis for At Sea Demonstration / Formidable Shield 2021 (ASD/FS21) will be critical to affirm the interoperability of new capabilities like Link 22, Interrogation Friend or Foe (IFF) Mode 5/S, and Allied Launch on Remote Ballistic Missile Defense functionality. The ASD/FS21 exercise is specified and endorsed by the Joint Chiefs of Staff Joint Exercise Program, and incorporated into the U.S.</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 3312 / <i>MTMD-Maritime Theater Missile Defense Forum</i>

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>European Command schedule for FY 21 activity. Further, the event is specified and scheduled in NATO's Master Training Exercise Program for FY21 conduct. Live-fire Integrated Air and Missile Defense (IAMD) events are planned to be conducted with MTMD Forum nations bringing ships, aircraft, and ground based sensors. These at-sea demonstrations will include live tracking events and a combination of live and simulated engagements within a fleet exercise, focused on interoperability assessment. Data analysis of the results will be integral to shaping future Formidable Shield exercise objectives. The MTMD Forum Project is the sponsor for supersonic target associated activity and responsible for the integration efforts of ground-launched supersonic targets at the Ministry of Defence Hebrides Range. Planning for At-Sea Demonstrations and follow-on at-sea testing will continue into future years and include ballistic target procurement. The data analysis effort contained within the TPEX line of effort provides the linkage and measures of success between the various MTMD-F supported at sea demonstrations that enabled key policy makers and leaders to understand capability gaps / possible solutions with quantified metrics. Future planning in FY21 will include Pacific Dragon 22, and FS-23, which will be risk reduction for future ASD events. Initiation of target developments to support PD 22 and PD 24 as well as FS-23 and ASD/FS-25 will also occur in FY21.</p> <p>(6) Operational Requirements Working Group will continue to provide operator's perspective and recommendations to the engineering and test activity conducted in the other working groups. This critical cooperation with Naval Surface & Mine Warfare Development Command (SMWDC) enables the allied linkage into the established relationship between SMWDC and NAVSEA.</p> <p>(7) Tactical Advancements for the Next Generation (TANG) will lead projects that solve mission focused, human-centered challenges using innovation and systems engineering methods for the Navy, United States Marine Corps (USMC) and International Partners. Planned projects in FY21 include improved approach to the PEO COLUMBIA commitments process; Surface Ship Redesign process for PEO SHIPS; Next Generation Combat Information Center (CIC) concept development for Missile Defense Agency (MDA); NAVSEA Digital Engineering effort; development of USMC Future Vertical Lift design requirements; exploration of Surface Training and Readiness concepts to assess tactical proficiency on surface ships; exploration of the Future Surface Combatant for Royal Canadian Navy via PMS325F and other projects for the Department of the Navy.</p> <p>FY 2022 Base Plans: (1) BMC4I will continue in its mission of engineering analysis of multi-national interoperability gap assessment for the Target Architecture utilizing test results from project events and complete development of the Target Architecture based on additional request for information inputs from member nations. BMC4I will evaluate</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 3312 / <i>MTMD-Maritime Theater Missile Defense Forum</i>

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>emergent Possible Point Solutions and provide recommendations for implementation in correcting coalition interoperability gaps. BMC4I examination of allied capabilities and limitations, and follow-on production of a capabilities / limitations database, is critical to the success of future Modeling and Simulation work, Coalition Distributed Engineering Plant experiments, and At-Sea Demonstrations. BMC4I will develop updates to MTMD Coalition Capabilities and Interoperability (CCI) publications that contribute to alignment of requirements among the participating nations of the MTMD-F as well as to future versions of the MTMD Capabilities and Limitations (Caps & Lims) documents.</p> <p>(2) M&S will continue in their constant, cyclical work providing analysis of Target Architectures and conduct further assessments in support of creating data and analysis to support recommendations to improve information exchange requirements identified by BMC4I and the System Engineering Team (SET). M&S will continue to ensure all associated authorities to operate are in place for continued coalition modeling and simulation. M&S will ensure all coalition partners in the MTMD Forum who participate in the M&S working group will have online access as required to M&S modeling and simulation equipment to continue to run simulations in support of these MTMD efforts. M&S will model future Target Architectures and provide analysis in support of future at-sea demonstrations. The M&S team will continue development of the test bed and add additional computing power to the test environment to provide faster and more powerful analytical capability to the Forum System Engineering Team in order to provide more timely responses to requests for model/simulation data to support recommendations. The M&S Working Group will continue development of Mission Models in support of capability development to illustrate operational impact of proposed solutions to complex Integrated Air and Missile Defense (IAMD) problems.</p> <p>(3) CDEP will continue to assess interoperability of joint air and land assets in Annual Test Event (ATE) consistent with the MTMD Forum Project Management Framework. CDEP will provide technical leadership and expertise to the BMD Integration, FTE2C, IAMD Interoperability/ Common Tactical Picture (CTP), Joint Integration, and Knowledge Management projects in accordance with the MTMD LSE's guidance. CDEP will continue to assess interoperability of joint air and land assets in Annual Test Event (ATE) 2022. The controlled test environment offers greater repeatability than comparable at-sea events. Three additional nations have fielded their national Hardware in the Loop (HWIL) capabilities in the last two years, requiring more frequent connection testing by the U.S. CDEP Team. CDEP will also characterize risks of future at-sea events such as At Sea Demonstration (ASD) 2022 and ASD 2023. CDEP will work with BMC4I and OR working groups to update the Coalition Capabilities and Interoperability (CCI) gaps document and develop test plans to assess capabilities suitable for synthetic-based testing. CDEP will prepare for and conduct hardware-in-the-loop tests</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 3312 / <i>MTMD-Maritime Theater Missile Defense Forum</i>

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>with allied partners, and will provide assessments and recommendations to improve information exchanges required to conduct at-sea demos or to evaluate performance as an effective and efficient alternative to at-sea events. CDEP will perform early-look testing that assesses Identification Friend or Foe (IFF) Mode S interoperability between the US and Coalition partners and the impacts to interoperability. CDEP will test Link 22 between the US and its Coalition partners to characterize interoperability impacts during future ASD events. CDEP will continue to align with the stated objectives within the MTMD Forum Capability Roadmap. CDEP will utilize results from the Sufficiency Survey to continue to improve a hardware-in-the-loop (HWIL) suite that can supplement live testing and facilitate a robust engineering evaluation of integrated air and missile defense performance for coalition interoperability.</p> <p>(4) Open Architecture will model and extend the component software interfaces for additional Force Level Functions (FLFs): Network Management and Planning and Tasking. The Force Data Model will be extended to support the information exchange of additional FLFs. The Force Level Open Architecture Technical Standard (FLOATS) will be implemented in national Force Threat Evaluation and Weapons Assignment (FTEWA) prototype efforts such as ONR's The Technical Cooperation Program (TTCP). It will also be finalized and exercised via scenarios within an M&S and CDEP environment. In addition to identifying errors and deficiencies in the standard, these exercises and FLOATS implementations will demonstrate various operational methodologies for distributing data within the Force as well as identifying performance parameters. Comments submitted against the standard will be adjudicated and the standard will be updated as required. The OAWG will continue to collaborate with BMC41, OR, CDEP and the System Experts Meeting (SEM) to ensure these interfaces align with the Target and Reference Architectures as well as selected Possible Point Solutions (PPSs). The OAWG will collaborate with the FTEWA Workshops and Subject Matter Experts (SMEs) to ensure the FLF component interfaces align with FTEWA and operational requirements. The OAWG will monitor the OARIS Industry Group and relevant commercial standards as required.</p> <p>(5) TPEX will continue preparations for MTMD participation and support for ongoing at-sea test event series. Pacific Dragon (PD) 2022 exercise will execute in Q4 of FY22. The exercise is specified and endorsed by COMPACFLT. Target development initiated in FY21 will continue to support the live-fire objectives for PD 22 and future PD exercises. During PD, live-fire Integrated Air and Missile Defense (IAMD) events are planned to be conducted with MTMD Forum nations bringing ships, aircraft, and ground based sensors. These at-sea demonstrations will include live tracking events and a combination of live and simulated engagements within a fleet exercise, focused on interoperability assessment. The MTMD Forum Project will sponsor the targets for these and will leverage 3rd Fleet Rim of the Pacific (RIMPAC) resources to conduct the PD exercise. Planning</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 3312 / <i>MTMD-Maritime Theater Missile Defense Forum</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>for At-Sea Demonstrations and follow-on at-sea testing will continue into future years and include further IAMD target procurement. The data analysis effort contained within the TPEX line of effort provides the linkage and measures of success between the various MTMD Forum supported at-sea demonstrations that enable key policy makers and leaders to understand capability gaps / possible solutions with quantified metrics. Future planning in FY22 will include Pacific Dragon 24 in August 2024, Formidable Shield (FS) -23 in May 2023, and At-Sea Demo/ FS-25 in May 2025. Formidable Shield exercises are endorsed by Commander U.S. Naval Forces Europe (NAVEUR). Target developments to support PD 24 as well as FS-23 and ASD/FS-25 will also occur in FY22.</p> <p>(6) Operational Requirements group will continue to provide operator's perspective and recommendations to the engineering and test activity conducted in the other working groups. This critical cooperation with Naval Surface & Mine Warfare Development Command (SMWDC) enables the allied linkage into the established relationship between SMWDC and NAVSEA.</p> <p><i>FY 2022 OCO Plans:</i> N/A</p> <p><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> The reduction from FY 2021 to FY 2022 is due to the transition of the Tactical Advancement for Next Generation (TANG) project to Office of Naval Research (ONR) PE 0603758N Swampworks/TANG to align with more similar projects.</p>					
Accomplishments/Planned Programs Subtotals	10.186	16.179	11.857	0.000	11.857

<p>C. Other Program Funding Summary (\$ in Millions) N/A</p> <p>Remarks</p> <p>D. Acquisition Strategy N/A</p>

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 6					R-1 Program Element (Number/Name) PE 0605853N / Management, Technical & Intl Supt				Project (Number/Name) 3330 / Naval Research Laboratory (NRL) Facilities Modernization			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3330: Naval Research Laboratory (NRL) Facilities Modernization	0.000	18.455	16.370	17.144	-	17.144	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program has been established to provide a systematic and planned approach to improve vital in-house science and technology (S&T) laboratory facilities at the Naval Research Laboratory (NRL) which are reaching or have reached critical stages of deterioration. The program includes restoration and modernization (R&M) initiatives for about 531 facilities, where the average age of the infrastructure is 67 years old.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: NRL Facilities Modernization	18.455	16.370	17.144	0.000	17.144
Articles:	-	-	-	-	-
Description: Critical Science and Technology research cannot be sustained or succeed in deteriorated facilities. World class research can only be accomplished in facilities that are at a minimum "adequate", but preferably "state-of-the-art." Due to their advanced age and deterioration, funds are planned to restore/modernize various laboratory facilities at the Naval Research Laboratory.					
FY 2021 Plans: The Naval Research Laboratory plan to undertake numerous planned and emergent studies, evaluations, and modernization projects of laboratory facilities and infrastructure modernization of laboratories to meet future technological threats. Plans in FY 2021 include providing upgrades to current facilities to increase effectiveness as well as critical facilities and equipment repairs.					
Upgrades to facilities planned for in FY 2021 include: - Fire suppression system in laboratory space utilized by the Naval Center for Space Technology. This project is planned to be funded fully in FY 2021.					
Facility repair projects planned for in FY 2021 include:					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 3330 / <i>Naval Research Laboratory (NRL) Facilities Modernization</i>

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>- Replacement of numerous transformers and switchgears to ensure NRL main-site is able to meet the electrical power needs to conduct S&T work. This project is planned to be funded fully in FY 2021.</p> <p>- Replacement and repair of numerous air handling units to ensure that proper regulation and circulation of air in the heating, ventilating, and air-conditioning (HVAC). This project is planned to be funded fully in FY 2021.</p> <p>- Repair of numerous roofs to ensure laboratory space is not impacted by weather. This project is planned to be funded fully in FY 2021.</p> <p>FY 2022 Base Plans: The Naval Research Laboratory plan to undertake numerous planned and emergent studies, evaluations, and modernization projects of laboratory facilities and infrastructure modernization of laboratories to meet future technological threats. Plans in FY 2022 include providing upgrades to current facilities to increase effectiveness as well as critical facilities and equipment repairs.</p> <p>Upgrades to facilities planned for in FY 2022 include: - Remodeling of numerous spaces to accommodate changing laboratory and administrative workload. These projects are planned to be funded fully in FY 2022.</p> <p>Facility repair projects planned for in FY 2022 include: - Replacement of numerous transformers and switchgears to ensure NRL main-site is able to meet the electrical power needs to conduct S&T work. These projects are planned to be funded fully in FY 2022. - Replacement and repair of chilled water piping and hot water piping to ensure that proper regulation of laboratory space temperatures. This project is planned to be funded fully in FY 2022. - Replacement and repair of numerous air handling units to ensure that proper regulation and circulation of air in the Heating, Ventilating, and Air-Conditioning (HVAC). These projects are planned to be funded fully in FY 2022. - Repair of numerous roofs to ensure laboratory space is not impacted by weather. These projects are planned to be funded fully in FY 2022.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 3330 / <i>Naval Research Laboratory (NRL) Facilities Modernization</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
The increase from FY21 to FY22 is due to support the growing need to revitalize NRL facilities. The need for items such as roof repair, transformers and switchgears, and Heating, Ventilating, and Air-Conditioning (HVAC) continues to grow and additional resources were provided to accommodate this need.					
Accomplishments/Planned Programs Subtotals	18.455	16.370	17.144	0.000	17.144

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

N/A

Remarks

D. Acquisition Strategy

None

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

Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / Management, Technical & Intl Supt	Project (Number/Name) 3363 / PACOM Initiative
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3363: PACOM Initiative	0.000	14.025	11.666	14.034	-	14.034	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

China Strategic Initiative (CSI) (LI 0605853N). The CSI became a DoD RDTE program in FY 2014. The CSI program is U.S. Indo-Pacific Command's(INDOPACOM)first Asia Rebalance initiative and provides critical support to planning efforts across the Command addressing Secretary of Defense's # 1 priority. CSI is a command-directed program that provides the Commander, INDOPACOM, and his staff vital support at all levels of planning and decision-making within the INDOPACOM Area Of Responsibility. The CSI program provides: cutting-edge research on adversary approaches to warfare, monitoring and analysis of adversary social media and censorship, unique understanding of effects of U.S. actions at the strategic and operational levels, sponsorship of Track 1.5/2 Strategic Nuclear Dialogue with China, etc. This funding is for a classified effort and details can be provided at a higher classification level.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: INDOPACOM Initiative	14.025	11.666	14.034	0.000	14.034
Articles:	-	-	-	-	-
<p>Description: China Strategic Initiative (CSI) (LI 0605853N). RDTE funding supports critical classified research that directly advances the core mission and functionality of INDOPACOM's China Strategic Initiative (CSI - a DoD program of record). CSI informs senior U.S. Gov't / DoD policymakers with long-term & strategic insights into the People's Republic of China (PRC) actions/ policies across the spectrum, including domestic/foreign policymaking, political thinking, military policies, economic policies, and many other areas. Part of CSI consists of a series of integrated analytical working groups comprised of experts from the U.S. Gov't (policy, planning, and intelligence), Federally Funded Research and Development Corporations (FFRDCs), academia, and private industry. All PACOM CSI efforts are overseen by a 25-member PACOM Review Board (PRB) to ensure all CSI programs are integrated and not redundant. All program efforts are done under direction of OSD and the China Strategic Roundtable, supporting Great-power competition with China, DoD's top priority for defense planning. CSI program is DoD/PACOM's first Rebalance to Asia initiative issue nomination priority.</p> <p>FY 2021 Plans: Continue development and refinement of: deeper analysis of Chinese war theory and strategic planning; increase in the overall number of critical vulnerabilities assessments and methodology, increase in the number of effects testing events at both strategic and operational levels; expansion and sustainment of China media</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy	Date: May 2021
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Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 3363 / <i>PACOM Initiative</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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analysis to all Combatant Commands; research/analysis on China's economy and short/long-term effects of U.S. Integration with routine policy and planning processes will mature, alongside efforts to consolidate knowledge management of high-output data yields that generate unique insights into adversary intentions and methodologies in warfare approaches; continue to monitor/analyze Chinese economy and Made in China 2025 plan.

FY 2022 Base Plans:
CSI requires continued/sustained support for expanded studies & analysis of operational/intelligence planning against regional adversaries; deepen understanding of PRC crisis management and strategic decision-making; and core analysis and expertise for strategic and operational level emulation efforts across the entire DIMEFIL. The CSI program office and its Community of Interest (COI) comprise a broad range of subject matter expertise which includes supporting Modeling & Simulation services to assist CSI in researching, developing, testing, and demonstrating a theater-level campaign model based on a range of inputs. Developing a modeling plan which details the method to research, develop, test, and demonstrate a theater level campaign model. Developing a campaign model which details a method of scenario creation that supports a broad range of strategic and operational planning efforts, including C4ISR planning and collection at the national and operational levels. Providing gap analysis to identify shortfalls in the baseline model and suggest alternatives for resolution. The outputs and lessons learned from campaign-level modeling and scenarios will be used to inform CSI COI partners including DoD, the Joint Staff, the COCOMs, the Intelligence Community (IC), and the Interagency to enable key stakeholder decision-making processes across a broad range of topics that include strategic and operational planning, national defense systems acquisition research & development, intelligence collection tasking and target prioritization, strategic messaging, and other critical areas of interest.

FY 2022 OCO Plans:
N/A

FY 2021 to FY 2022 Increase/Decrease Statement:
FY2021 to FY2022 increase supports critical classified research that directly advances the core mission and functionality of INDOPACOM's China Strategic Initiative (CSI). CSI requires continued/sustained support for expanded studies & analysis of operational/intelligence planning against regional adversaries; deepen understanding of People's Republic of China (PRC) crisis management and strategic decision-making; and core analysis and expertise for strategic and operational-level emulation efforts across the entire Diplomatic, Information, Military, Economic, Financial, Intelligence and Law Enforcement (DIMEFIL). We continue to support

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 3363 / <i>PACOM Initiative</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Federal Funded Resource and Development Centers (FFRDC) work, various studies from private researchers, think tanks and other academic institutions.					
Accomplishments/Planned Programs Subtotals	14.025	11.666	14.034	0.000	14.034

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 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / Management, Technical & Intl Supt	Project (Number/Name) 9999 / Congressional Add
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
9999: Congressional Add	0.000	14.480	10.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funds execution of DoD's Executive Agent (EA) for Printed Circuit Board (PrCB) Technologies as established by the 2009 National Defense Authorization Act (Section 256, PL 110-417). The primary deliverable from this effort will be a PrCB and Interconnect Technology Roadmap, or strategic plan, identifying domestic technology gaps, future research and development needs, and any policy changes required to ensure that the DoD has access to PrCB manufacturing capabilities and technical expertise necessary to meet future military requirements. As mandated, the EA will also address DoD PrCB supply chain issues, including diversity and vulnerabilities, and develop trustworthiness requirements for PrCBs used in defense systems.

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

	FY 2020	FY 2021
Congressional Add: Printed Circuit Board Executive Agent	14.480	10.000
FY 2020 Accomplishments: N/A		
FY 2021 Plans: - Continue to coordinate executive agent activities, receive and assess Service Component PCB R&D activities, and establish DoD Cross-Service Advisory Panel - Continue to conduct Organic Substrate Risk & Gap Analysis - Continue to implement and maintain PCB Trust Specification (IPC-1791) - Continue to Monitor/Assess/Evaluate Technology Development Issues & Topics - Continue to conduct DoD PCB manufacturing capability projects - Continue to develop processes for Embedded Devices, Additive Manufacturing, and Printed Electronics - Continue coordinate with Department of Commerce and Industry Organizations to resolve Industrial Base Supply Chain Issues - Continue to develop & implement SCRM Solutions & Tools - Continue to conduct Research, Development, and Assessment in support of PCB Roadmap creation - Continue to coordinate Knowledge and Capability efforts across DoD to avoid duplication and ensure appropriate technology focus - Continue to develop PCB-related Training Modules		
Congressional Adds Subtotals	14.480	10.000

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 6	R-1 Program Element (Number/Name) PE 0605853N / <i>Management, Technical & Intl Supt</i>	Project (Number/Name) 9999 / <i>Congressional Add</i>

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

N/A

Remarks

D. Acquisition Strategy

N/A