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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 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</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	21.980	3.611	4.645	6.327	-	6.327	-	-	-	-	-	-
0995: <i>Naval Facilities System</i>	15.599	2.005	2.206	2.140	-	2.140	-	-	-	-	-	-
3018: <i>Facilities Related Controls Systems (FRCS) Cybersecurity RDTE</i>	0.000	0.000	0.000	3.247	-	3.247	-	-	-	-	-	-
3155: <i>Force Protection Ashore</i>	6.381	1.154	2.439	0.940	-	0.940	-	-	-	-	-	-
3460: <i>Red Hill Secondary Containment Research</i>	0.000	0.452	0.000	0.000	-	0.000	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Mission Description and Budget Item Justification:

This program provides for capabilities to: a) overcome performance limitations and reduce the life cycle cost of shore facilities and, b) provide protection against terrorist attacks for shore installations and their operations. The program focuses on technical and operational issues of specific Navy interest, where there are no unbiased test validated Commercial Off the Shelf (COTS) solutions available, and where timely capabilities may not materialize without specific demonstration or validation by the Navy. Additionally, the program completes the development of technologies originating from Navy, DOD and other sources of Science and Technology programs, including the National Science Foundation (NSF), the National Institute of Standards and Technology (NIST) and Department of Energy (DOE). Validated technologies are implemented in the Navy's Military Construction (MILCON) and Facilities, Sustainment Restoration and Modernization (FSRM) program, and Antiterrorism and Force Protection (ATFP) Other Procurement, Navy (OP,N) program.

Naval Facilities System Project 0995 addresses Facilities Sustainment, Restoration and Modernization for reducing the total ownership cost (TOC) of future and existing Facilities and addressing natural and catastrophic risk of critical Naval Waterfront Facilities.

Project 3018: Facilities Related Controls Systems (FRCS) Cybersecurity RDTE. The Cyber Vulnerability Assessments and Evaluations program funds cyber vulnerability assessments of critical shore infrastructure as directed by Section 1650 of the FY17 National Defense Authorization Act (NDAA). Funding will be used for assessments of prioritized critical shore infrastructure. Sec. 1650 of the FY17 NDAA directs the Secretary of Defense to submit a plan for assessing the cyber vulnerability of critical defense infrastructure and begin assessment of this infrastructure during a preliminary pilot program that will assess no fewer than two installations by December, 31 2019. Funded vulnerability assessments will end by calendar year 2020 and will build upon existing mission assurance, blue team, and red team capabilities. As instructed by the Congressional language, the assessments will utilize DoE and DoD national laboratory partnerships. Assessments will end with the submission of a final report to Congress. Strategies and procedures for mitigating the risk of cyber vulnerabilities should be identified during the course of evaluation vulnerability.

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Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>
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Force Protection Ashore Project 3155 addresses selective topics in modeling, and material technologies to reduce the vulnerability of installations; and reduce the acquisition and operating costs of protective technologies. The demonstrations and validations provide the independent, technical and operational test data for the development of competitive performance specifications to acquire the required capabilities. The ATFP project is coordinated with other DOD programs.

The Red Hill Secondary Containment Research Project 3460 was created to provide fiscal clarity for a second containment research study due to environmental concerns for researching containment options at the Red Hill underground fuel storage site in Hawaii. The study was originally conducted within the Facilities, Sustainment Restoration and Modernization (FSRM) program which falls under PE 0603725N PRJ 0995.

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	3.440	4.664	6.607	-	6.607
Current President's Budget	3.611	4.645	6.327	-	6.327
Total Adjustments	0.171	-0.019	-0.280	-	-0.280
• Congressional General Reductions	-	-0.019			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.226	0.000			
• SBIR/STTR Transfer	-0.055	0.000			
• Program Adjustments	0.000	0.000	-0.200	-	-0.200
• Rate/Misc Adjustments	0.000	0.000	-0.080	-	-0.080

Change Summary Explanation

The FY2022 funding request was increased due to Project 3018 - Facilities Related Controls Systems (FRCS) Cybersecurity, which is a new project.

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Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>				Project (Number/Name) 0995 / <i>Naval Facilities System</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
0995: <i>Naval Facilities System</i>	15.599	2.005	2.206	2.140	-	2.140	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

In accordance with the National Defense Strategy (NDS) of 2018, A Design for Maintaining Maritime Superiority 2.0 and the NAVFAC Strategic Design 2.0 Guidance, this program provides the Navy with new engineering capabilities that are required to overcome specific performance limitations of Naval shore facilities while reducing the cost of sustaining the Naval shore infrastructure and increasing resiliency. The program focuses available RDT&E resources on satisfying facility requirements where the Navy is a major stakeholder or where there are no tested validated Commercial Off the Shelf (COTS) solutions available, and a timely solution will not emerge without a Navy sponsored demonstration and validation. The program completes the development and validation of facility technologies originating in Navy science and technology programs, plus a variety of other sources that includes the National Science Foundation (NSF) and the National Institute of Standards and Technology (NIST). This program introduces the idea of resilient facilities and infrastructure thru hardening, rapid assessment, and recovery. The validated technologies will be implemented in the Navy's Military Construction (MILCON) and Facilities Sustainment Restoration and Modernization Programs (FSRM). The Duncan Hunter National Defense Authorization Act of 2009 laid down very specific guidelines for the correction of corrosion deficiencies in DoD shore facilities which is estimated to be \$1.9B (DOD Annual Cost of Corrosion for the Department of Defense Facilities and Infrastructure July 2010).

Project 0995 addresses two Navy facilities requirements: 1) waterfront facilities repair, upgrade and service life extension; and, 2) validation testing/performance monitoring of critical facilities (such as dry docks, piers, runways, magazines, etc.), testing and evaluation of the performance of alternative materials, and surfacing concepts, and, methods and corrosion technologies to reduce the cost of Sustainment, Restoration and Modernization (SRM).

Waterfront facilities, repair, upgrade and service life extension:

Improved resilience of our installations (employing key technology focus areas defined in the NDS) will enable readiness and fleet lethality. An urgent requirement exists for early identification of strategies and solution recommendations for sea level rise at Naval Facilities, and especially nuclear capable waterfront facilities. Recent weather patterns have heightened anxiety levels on perceived huge risks to Navy waterfront facilities. The sub-project will provide analysis and solution recommendations for facilities affected by sea level rise. Approximately 75% of the Navy's waterfront facilities are over 45 years old, but they were designed for a service life of 25 years. The over aged reinforced concrete requires costly and repetitive repairs. Besides providing more pier side ship maintenance and thus reduce dry dock costs, these piers must be strengthened to support concentrated crane loads up to 140 tons when piers were originally not designed for concentrated loads. Piers were previously designed to service one, or possibly two, specific ship classes. Berthing flexibility is now limited by mooring and utility arrangements. This sub-project addresses new material design and retrofit methods, which extends the service life of existing waterfront facilities by an additional 15 years, or longer. The project also addresses updating the mission-based service, environmental, and protection loading requirements imposed by changes in platforms, operations and threats. Other initiatives include leveraging Building Information Modeling (BIM) technology to provide for enhanced facilities management processes and waterfront utilities service enhancements using models to achieve flexible berthing arrangements consistent with current and future platform mooring configurations and hotel service requirements including Facilities and Infrastructure Integrated Product Support for Acquisition Category (ACAT) Programs.

Technologies to reduce the cost of Sustainment, Restoration and Modernization (SRM):

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Technologies to reduce the cost of SRM issues of high operational significance are addressed on a priority basis. The Navy's portion of corrosion deficiencies at DoD shore facilities is estimated to be \$433M (DOD Annual Cost of Corrosion for the Department of Defense Facilities and Infrastructure July 2010). This effort will demonstrate and validate the cost and reliability of advanced corrosion technologies in order to ensure their acceptance and implementation.					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
Title: Waterfront Facilities, Repair, Upgrade and Service Life Extension					
Articles:					
FY 2021 Plans:					
-Continue the development of methodologies for Field Carrier Landing Practice (FCLP) pavement repairs and material selection capable of withstanding repeated exposure to Joint Strike Fighter (JSF) F-35 Short Take-Off and Vertical Landing (STOVL) conditions.					
-Continue funding technologies that facilitate the assessment, repair and continued operation of Strategic Airlift (STRATLIFT) sorties.					
-Continue funding technologies to physically harden critical facility elements that enable fleet operations and mitigate the effects of sea level rise and strenuous, repeated usage.					
FY 2022 Base Plans:					
FY 2022 Base Plans:					
-Continue funding technologies from FY 2021, with the exception of Fluid Induced Vibration Degradation and AR.					
-Increase investment in autonomous inspection technologies for piers, pavements and runways.					
FY 2022 OCO Plans:					
N/A					
FY 2021 to FY 2022 Increase/Decrease Statement:					
Increase of \$0.327K in FY 2022 to support increasing work in technologies area based on proposals and HQ guidance.					
Investment planned for validating use of unmanned aerial systems for enhanced design reconstruction and waterfront facility upgrades. Will also be investing in risk based inspection tools to mitigate the costs of seawalls, bulkheads, and tieback anchors.					
Title: Sustainment, Restoration & Modernization					
Articles:					
FY 2021 Plans:					
-Continue funding strategies and technologies to better maintain and modernize Navy undersea facility infrastructure, focusing on harvesting, distribution and supply of subsea power and communications.					

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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>-Continue funding technologies that will significantly reduce the sustainment cost of installations. This includes technologies that mitigate corrosion, facilitate inspection and assessment, increase longevity while reducing the cost of construction, and reducing the cost of maintenance by developing systems that are more reliable and maintainable by the user.</p> <p>FY 2022 Base Plans: FY 2022 Base Plans: -Continue funding technologies from FY 2021, with the exception of Additive Manufacturing and Vapor Phase Corrosion Inhibitors.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease of \$0.393K in FY 2022 due to decreasing work; project has evolved and transitioned due to technical maturity.</p>					
Accomplishments/Planned Programs Subtotals	2.005	2.206	2.140	0.000	2.140

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

N/A

Remarks

D. Acquisition Strategy

The Projects identified in this budget have been carefully selected to respond to: Facilities support for the National Defense Strategy of 2018, Acquisition Category Programs, to address TOC and resiliency considerations of an evolving and aging infrastructure, and to facilitate rational risk based decisions and solutions to protect and decrease risk levels for Department of the Navy-critical infrastructure and facilities. Each project has been assessed to ensure that it is addressing legitimate risks and requirements of the shore establishment. The results of these projects will be the development of design and construction criteria and or components that directly influence shore facilities.

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

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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Unmanned Systems for Facilities Inspection and Design Reconstruction																												
Additive Manufacturing (AM)																												

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

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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Waterfront Facilities, Repair, Upgrade and Service Life Extension</i>				
Continue Waterfront Facilities, Repair, Upgrade and Service Life Extension	1	2020	4	2022
Engineering Coatings for Fasteners	1	2020	4	2022
Carbon Fiber Reinforced Polymer Rebar for Concrete Waterfront Facilities	1	2020	4	2022
Autonomous Inspection Technology and Systems for Waterfront Facilities	1	2020	4	2022
Sea Level Rise Effects	1	2020	4	2022
Fluid Induced Vibrational (FIV) Degradation and Augmented Reality (AR)	1	2020	4	2022
<i>Sustainment, Restoration & Moderization</i>				
Continue Sustainment, Restoration & Moderization	1	2020	4	2022
Corrosion Prevention and Control	1	2020	4	2022
High Temperature Pavement Design Mix Optimization	1	2020	4	2022
Evaluate Solutions to Develop Design and Construction Criteria	1	2020	4	2022
Retrofitting Existing Facilities to Conform to High Performance Building Standards	1	2020	4	2022
Develop Design Criteria for Closed Piers and Wharves	1	2020	4	2022
Effectiveness of Vapor Phase Corrosion Inhibitors in Protection of Aboveground Storage Tanks	1	2020	1	2020
Unmanned Systems for Facilities Inspection and Design Reconstruction	1	2020	4	2022
Additive Manufacturing (AM)	1	2020	1	2020

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Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>				Project (Number/Name) 3018 / <i>Facilities Related Controls Systems (FRCS) Cybersecurity RDTE</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
3018: <i>Facilities Related Controls Systems (FRCS) Cybersecurity RDTE</i>	0.000	0.000	0.000	3.247	-	3.247	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project 3018: Facilities Related Controls Systems (FRCS) Cybersecurity RDTE

The Cyber Vulnerability Assessments and Evaluations program funds cyber vulnerability assessments of critical shore infrastructure as directed by Section 1650 of the FY17 National Defense Authorization Act (NDAA). Funding will be used for assessments of prioritized critical shore infrastructure. Sec. 1650 of the FY17 NDAA directs the Secretary of Defense to submit a plan for assessing the cyber vulnerability of critical defense infrastructure and begin assessment of this infrastructure during a preliminary pilot program that will assess no fewer than two installations by December, 31 2019. Funded vulnerability assessments will end by calendar year 2020 and will build upon existing mission assurance, blue team, and red team capabilities. As instructed by the Congressional language, the assessments will utilize DoE and DoD national laboratory partnerships. Assessments will end with the submission of a final report to Congress. Strategies and procedures for mitigating the risk of cyber vulnerabilities should be identified during the course of evaluation vulnerability.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Cyber Protection and Response Capability	0.000	0.000	1.000	0.000	1.000
Articles:	-	-	-	-	-
FY 2021 Plans:					
-Participate in Joint Testing and Training exercises for ICS/SCADA Assessments					
-Conduct Red Team review of deployed FRCS Architecture and (CSPE) Control Systems Platform Enclave					
-Continue a common environment to TRL-6 to monitor and configure SDN flow controllers					
-Develop implementation guides for future FRCS SDN deployments					
-Continue Fleet Level Experimentation Exercise (FLEX) participation and integration in to Control systems Test Bed					
-Continue Modeling and Simulation (SCEPTRE) deployment into CSTB					
FY 2022 Base Plans:					
Participate in Joint Testing and Training exercises for ICS/SCADA Assessments					
-Continue conducting Red Team review of deployed FRCS Architecture and (CSPE) Control Systems Platform Enclave					

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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 a common environment to TRL-6 to monitor and configure SDN flow controllers -Continue development and implementation guides for future FRCS SDN deployments -Continue Fleet Level Experimentation Exercise (FLEX) participation and integration in to Control systems Test Bed -Continue Modeling and Simulation (SCEPTRE) deployment into CSTB -Implement and test FRCS Standardized models into CSTB and analyze -Cyber Protection and Response Capability [\$1.000] <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase of \$1.000M in FY 2022 is to continue demonstration, validation and conducted maximum transfer and interaction with industry such as, to influence the industry COTS with the results of this demonstration and prototype validation. Acquisition is based on performance specifications enabled by this project.</p>					
<p>Title: More Situational Awareness (MOSAICS)</p> <p align="right">Articles:</p>	0.000	0.000	0.947	0.000	0.947
<p>FY 2021 Plans:</p> <ul style="list-style-type: none"> -Participate in Joint Testing and Training exercises for ICS/SCADA Assessments -Conduct Red Team review of deployed FRCS Architecture and (CSPE) Control Systems Platform Enclave -Conduct a common environment to TRL-6 to monitor and configure SDN flow controllers -Develop implementation guides for future FRCS SDN deployments -Fleet Level Experimentation Exercise (FLEX) participation and integration in to Control systems Test Bed -Modeling and Simulation (SCEPTRE) deployment into CSTB <p>FY 2022 Base Plans: FY22 total control of \$0.947 was realigned from project 3155 to new project 3018:</p> <ul style="list-style-type: none"> -Continue support in Joint Testing and Training exercises for ICS/SCADA Assessments -Continue conduct of Red Team review of deployed FRCS Architecture and (CSPE) Control Systems Platform Enclave -Continue a common environment to TRL-6 to monitor and configure SDN flow controllers -Continue development and implementation guides for future FRCS SDN deployments 	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>	Project (Number/Name) 3018 / <i>Facilities Related Controls Systems (FRCS) Cybersecurity RDTE</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
-Continue Fleet Level Experimentation Exercise (FLEX) participation and integration in to Control systems Test Bed -Integrate FRCS Standard models (SCEPTRE) into CSTB -More Situational Awareness (MOSAICS) FY 2022 OCO Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: Increase of \$0.947 in FY 2022 to continue support of MOSAICS program to include Integrate FRCS Standard models (SCEPTRE) into CSTB.					
Title: Digital Twin Development <div style="text-align: right;">Articles:</div>	0.000	0.000	1.300	0.000	1.300
FY 2021 Plans: Provide support of Digital Twin Development in support of Cyber Protection and Response Capability FY 2022 Base Plans: FY22 total control of \$1.300 was realigned from project 3155 to new project 3018: - Continue support of Digital Twin Development in support of Cyber Protection and Response Capability, and demonstration and prototype validation project. FY 2022 OCO Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: Increase of \$1.300 in to FY 2022 to provide procurement support for continued Digital Twin Development with the demonstration and prototype validation project.	-	-	-	-	-
Accomplishments/Planned Programs Subtotals	0.000	0.000	3.247	0.000	3.247

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

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D. Acquisition Strategy

Demonstration and validation is conducted for maximum transfer and interaction with industry such as to influence the industry COTS with the results of this demonstration and prototype validation. Acquisition is based on performance specifications enabled by this project.

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

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Facilities Related Controls Systems (FRCS) Cybersecurity</i>				
Cyber Protection and Response Capability (CPRC)	2	2022	4	2022
Continue More Situational Awareness (MOSAICS) Industrial Control systems	2	2022	4	2022
Digital Twin Development	2	2022	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>				Project (Number/Name) 3155 / <i>Force Protection Ashore</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
3155: <i>Force Protection Ashore</i>	6.381	1.154	2.439	0.940	-	0.940	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Protection of Navy installations against terrorist activities requires deployment of advanced technology for force protection capabilities. This antiterrorism and force protection (AT/FP) ashore project will develop, demonstrate and validate technologies for the following: access control and integrated perimeter security surveillance sensors and intelligent electronic security systems for automated intruder detection (Installation Protection); perimeter security; waterside protection against craft and swimmer intrusion; secure and efficient operations centers and emergency management centers including human and information support systems (Command and Control). Programs currently being evaluated are, standard-based enterprise physical security system integration and automation; Command, Control, and Communications (C3) capabilities for emergency operations; integrated and networked mass notification systems (MNS); Waterside intelligent video security systems; integrated over-the-water sensors and analytics for automated course of action planning; identifying and interdicting malevolent threats - watercraft, swimmers, divers, and unmanned underwater vessels (UUVs) to reduce injury and death to the warfighter and damage to high value units (HVUs)(Waterside Protection). Through demonstration and validation of risk modeling and simulation models, the potential of emerging technologies will be evaluated and installation security strategies that reduce manpower and other costs will be formulated. Multiple systems with sensors and cameras are being deployed on Navy installations to be used for threat assessment. These systems are not integrated and there is not a centralized location or system that all the data can be analyzed. The Sensor Assessment Cell (SAC) brings all these sensor feeds into one location and the Physical Security Information Management (PSIM) software provides an integrated picture so that an intelligent assessment can be made. Current AT/FP systems to be integrated include Automated Vehicle Gates (AVG), Regional Alarms/Local Alarms (AMAS), Navy Munition Command enclave (NMC), and Electronic Harbor Security System. These demonstrations and validations derive advanced technology from science and technology programs of government academia and industry. The technology evaluation and validation produces data for performance specifications used for competitive procurement. All work will be coordinated with other programs and through industry forums as appropriate.

Facilities Related Controls Systems (FRCS) Cybersecurity RDTEN

The Cyber Vulnerability Assessments and Evaluations program funds cyber vulnerability assessments of critical shore infrastructure as directed by Section 1650 of the FY17 National Defense Authorization Act (NDAA). Funding will be used for assessments of prioritized critical shore infrastructure and to assess the cyber vulnerability of critical defense infrastructure. Funded vulnerability assessments will build upon existing mission assurance, blue team, and red team capabilities. As instructed by the Congressional language, the assessments will utilize DoE and DoD national laboratory partnerships.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Force Protection Ashore	1.154	1.139	0.940	0.000	0.940
Articles:	-	-	-	-	-
FY 2021 Plans:					

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Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>	Project (Number/Name) 3155 / <i>Force Protection Ashore</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
<p>-Continue Waterside Intelligent Video Security System (WSIVDS) - Integrated over-the-water sensors and analytics for automated course of action planning. Identifying and interdicting malevolent threats (watercraft, swimmers, divers, and unmanned underwater vessels (UUVs)) for the protection of personnel and High Value Units (HVU). [\$0.300K]</p> <p>-Initiate the Integrated Multi-sensor Perimeter Awareness with Intelligent LiDAR (IMPAIL) System of Systems (SoS) will leverage advancements and ubiquity in autonomous vehicle obstacle detection / avoidance sensors (LiDAR), fusing with Installations' existing electronic security systems to enhance unauthorized access situational awareness, detection, threat classification, and tracking in 3-Dimensions.[\$0.250K]</p> <p>-Initiate Multimodal Automated Vehicle Barrier (MAVB)- Integrate Active Vehicle Barriers (AVB's) using a PLC and Sensor alarms into an enterprise Physical Security Information Manager (PSIM) architecture able to be monitored at the Sensor Assessment Cells (SAC) and develop multimode active vehicle interface to further reduce unauthorized access by reducing likely avenues of approach.[\$0.450K]</p> <p>-Initiate Modeling and Simulation of Requirements (M/S - REQ) Modeling and Simulation of system requirements using SysML modeling software. Changes in requirements will be tracked via the model to ascertain how a system requirements change affects the enterprise systems architecture[\$0.149K]</p> <p>FY 2022 Base Plans:</p> <p>-Initiate Waterside Defensive Sensor Systems (WDSS). WDSS will leverage sensors and improvements to current waterside systems, including but not limited to, boat barriers and unmanned underwater vessels (UUV). The system will look to integrate with the Waterside Intelligent Video Security System (WSIVDS) COP which is a harbor view using video analytics [\$0.551K]</p> <p>-Initiate Perimeter Defense Sensor Systems (PDSS). PDSS will investigate sensors and their integration into a Physical Security Information Management (PSIM) system. Sensors included, but not limited to, biometrics, video analytics, Drone tracking with integration into the current PSIM. [\$0.400]</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease of \$0.199 in FY 2022 is due to lesser cost of initiate programs: Waterside Defensive Sensor Systems (WDSS) and Perimeter Defense Sensor Systems (PDSS).</p>					
<p>Title: Cyber Protection an Response Capability</p> <p align="right">Articles:</p>	0.000	0.400	0.000	0.000	0.000
	-	-	-	-	-
FY 2021 Plans:					

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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 / 4	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>	Project (Number/Name) 3155 / <i>Force Protection Ashore</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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<p>Please note: FY21 Control of \$0.400 will be realigned to new project 3018 upon enactment.</p> <ul style="list-style-type: none"> -Participate in Joint Testing and Training exercises for ICS/SCADA Assessments -Conduct Red Team review of deployed FRCS Architecture and (CSPE) Control Systems Platform Enclave -Continue a common environment to TRL-6 to monitor and configure SDN flow controllers -Develop implementation guides for future FRCS SDN deployments -Continue Fleet Level Experimentation Exercise (FLEX) participation and integration in to Control systems Test Bed -Continue Modeling and Simulation (SCEPTRE) deployment into CSTB -Cyber Protection and Response Capability (CPRC) [\$0.400] <p>FY 2022 Base Plans: N/A</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease of \$0.400 in FY 2022 is due to realignment to new project 3018.</p>					
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Title: More Situation Awareness (MOSAICS)	0.000	0.800	0.000	0.000	0.000
Articles:	-	-	-	-	-

<p>FY 2021 Plans: Please note: FY21 Control of \$0.800 will be realigned to new project 3018 upon enactment.</p> <ul style="list-style-type: none"> -Participate in Joint Testing and Training exercises for ICS/SCADA Assessments -Conduct Red Team review of deployed FRCS Architecture and (CSPE) Control Systems Platform Enclave -Continue a common environment to TRL-6 to monitor and configure SDN flow controllers -Develop implementation guides for future FRCS SDN deployments -Continue Fleet Level Experimentation Exercise (FLEX) participation and integration in to Control systems Test Bed -Continue Modeling and Simulation (SCEPTRE) deployment into CSTB - More Situational Awareness (MOSAICS) [\$0.800] <p>FY 2022 Base Plans:</p>					
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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>	Project (Number/Name) 3155 / <i>Force Protection Ashore</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Decrease of \$0.800 in FY 2022 is due to realignment to new project 3018.					
Title: Digital Twin Development	0.000	0.100	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2021 Plans: Please note: FY21 Control of \$0.100 will be realigned to new project 3018 upon enactment.					
- Digital Twin Development in support of Cyber Protection and Response Capability - Program increase to provide Digital Twin Development in support of the demonstration and prototype validation project.					
FY 2022 Base Plans: N/A					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Decrease of \$0.100 in FY 2022 is due to realignment to new project 3018.					
Accomplishments/Planned Programs Subtotals	1.154	2.439	0.940	0.000	0.940

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

Remarks

D. Acquisition Strategy
Demonstration and validation is conducted for maximum transfer and interaction with industry such as to influence the industry COTS with the results of this demonstration and prototype validation. Acquisition is based on performance specifications enabled by this project.

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>	Project (Number/Name) 3155 / <i>Force Protection Ashore</i>
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Command and Control Capability Development: Government Engineering Support	Various	SPAWAR : San Diego, CA	0.499	0.000		0.000		0.000		-		0.000	-	-	-
Installation Protection: Airborne Threat	WR	NAWCAD/ONR : Pax River, MD	1.237	0.450	Feb 2020	0.000		0.000		-		0.000	-	-	-
Access Control Point (ACP)	Various	SPAWAR : San Diego, CA	0.000	0.250	Feb 2020	0.000		0.000		-		0.000	-	-	-
Waterside Intelligent Video Security System (WSIVDS)	Various	SPAWAR : San Diego, CA	0.000	0.454	Feb 2020	0.300	Dec 2020	0.000		-		0.000	-	-	-
Command and Control Capability Development: Virtual Field Support	WR	SPAWAR : San Diego, CA	0.897	0.000		0.000		0.000		-		0.000	-	-	-
Integrated Multi-sensor Perimeter Awareness with Intelligent LiDAR (IMPAIL) System	Various	NIWC-PAC : San Diego, CA	0.000	0.000		0.250	Dec 2020	0.000		-		0.000	-	-	-
Waterside Protection: Boat Barriers	C/CPFF	CTTSO : CTTSO	0.999	0.000		0.000		0.000		-		0.000	-	-	-
Multimodal Automated Vehicle Barrier (MAVB)	Various	NIWC-PAC : San Diego, CA	0.000	0.000		0.440	Dec 2020	0.000		-		0.000	-	-	-
Sensor Assessment Cell (SAC) Capability Development	Various	SPAWAR : San Diego, CA	0.304	0.000		0.000		0.000		-		0.000	-	-	-
Modeling and Simulation of Requirements (M/S ? REQ)	Various	NIWC-LANT : Charleston, SC	0.000	0.000		0.149	Dec 2020	0.000		-		0.000	-	-	-
Installation Protection Capability Development - Integrated Physical Security and Access Control Automation: Spiral Development	Various	NSWC : Dahlgren, VA	0.597	0.000		0.000		0.000		-		0.000	-	-	-

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>	Project (Number/Name) 3155 / <i>Force Protection Ashore</i>
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Installation Protection Capability Development - Integrated Physical Security and Access Control Automation: Test & Evaluation (DT)	Various	NSWC : Dahlgren, VA	0.449	0.000		0.000		0.000		-		0.000	-	-	-
Installation Protection Capability Development - Integrated Physical Security and Access Control Automation: Test & Evaluation (OT)	Various	SPAWAR : San Diego, CA	0.332	0.000		0.000		0.000		-		0.000	-	-	-
Water Protection - Common Information Exchange Spiral Development	WR	SSC-PAC : SSC-PAC	0.244	0.000		0.000		0.000		-		0.000	-	-	-
Installation Protection - Versatile Access Control Spiral Development	WR	NSWC : Dahlgren, VA	0.339	0.000		0.000		0.000		-		0.000	-	-	-
Waterside Protection - Boat Barrier Electronic Infrastructure - Spiral Development	WR	SSC-PAC : SSC-PAC	0.484	0.000		0.000		0.000		-		0.000	-	-	-
Waterside Intelligent Video Security System (WDSS)	Various	SPAWAR : SAN DIEGO, CA	0.000	0.000		0.000		0.535	Dec 2021	-		0.535	-	-	-
Perimeter Defense Sensor Systems (PDSS)	Various	EXWC : Pt. Hueneme, CA	0.000	0.000		0.000		0.405	Dec 2021	-		0.405	-	-	-
Project 3018: Cyber Protection and Response Capability	WR	EXWC : Pt. Hueneme, CA	0.000	0.000		0.400	Apr 2021	0.000		-		0.000	-	-	-
Project 3018: More Situational Awareness (MOSAICS)	C/CPFF	SANDIA National Labs : SANDIA National Labs	0.000	0.000		0.800	Apr 2021	0.000		-		0.000	-	-	-
Project 3018: Digital Twin Development	C/CPFF	GSA : GSA	0.000	0.000		0.100	Apr 2021	0.000		-		0.000	-	-	-

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>	Project (Number/Name) 3155 / <i>Force Protection Ashore</i>
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			6.381	1.154		2.439		0.940		-		0.940	-	-	N/A

Remarks
 Please note: FY21 total control of \$1.300 will be realigned from project 3155 to new project 3018 upon enactment:
 -(\$0.400 FY21) Decrease is due to Cyber Protection and Response Capability
 -(\$0.800 FY21) Decrease is due to More Situational awareness for Industrial Control Systems(MOSAICS)
 -(\$0.100 FY21) Decrease is due to New Digital Twin development

FY22 total control of \$2.295 was realigned from project 3155 to new project 3018:
 - (\$1.000 FY22) Decrease is due to Cyber Protection and Response Capability
 - (\$0.995 FY22) Decrease is due to More Situational awareness for Industrial Control Systems(MOSAICS)
 - (\$1.300 FY22) Decrease is due to New Digital Twin development

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	6.381	1.154	2.439	0.940	-	0.940	-	-	N/A

Remarks

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>	Project (Number/Name) 3155 / <i>Force Protection Ashore</i>
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<i>Installation Protection Capability Development</i>	
Installation Protection Capability Development	
Subproj: Integrated Physical Security and Access Control Automation: Spiral Development	
Subproj: Installation Protection - Airborne Threat: Test & Evaluation (DT)	
Installation Protection - Access Control: Test & Evaluation (DT)	
Subproj: (Access Control Point) ACP Video Analytics	
<i>Command and Control Capability Development</i>	
Command and Control Capability Development	
Subproj: Command and Control Capability Development - Virtual Field Support: Test & Evaluation (DT)	
<i>Waterside Protection Capability Development</i>	
Waterside Protection Capability Development	
Subproj: Automated Sensor Assessment and Course of Action Planning: Spiral Development	
Subproj: Waterside Protection: Common Information Exchange - Sprial Development	

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>	Project (Number/Name) 3155 / <i>Force Protection Ashore</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Installation Protection Capability Development</i>				
Installation Protection Capability Development	1	2020	4	2022
Subproj: Integrated Physical Security and Access Control Automation: Spiral Development	2	2020	4	2022
Subproj: Installation Protection - Airborne Threat: Test & Evaluation (DT)	2	2020	4	2022
Installation Protection - Access Control: Test & Evaluation (DT)	2	2020	4	2022
Subproj: (Access Control Point) ACP Video Analytics	1	2020	4	2022
<i>Command and Control Capability Development</i>				
Command and Control Capability Development	1	2020	4	2022
Subproj: Command and Control Capability Development - Virtual Field Support: Test & Evaluation (DT)	2	2020	4	2022
<i>Waterside Protection Capability Development</i>				
Waterside Protection Capability Development	1	2020	4	2022
Subproj: Automated Sensor Assessment and Course of Action Planning: Spiral Development	1	2020	4	2022
Subproj: Waterside Protection: Common Information Exchange - Sprial Development	1	2020	4	2022
Waterside Protection Boat Barriers - Test and Evaluation (OT)	2	2020	4	2022
Subproj: Waterside Intelligent Video Security System	1	2020	4	2022
Subproj: Waterside Defensive Sensor Systems (WDSS)	1	2022	4	2022
Sensor Assessment Cell (SAC) Capability Development: Subproj: Physical Security Information Manager (PSIM)	1	2020	4	2022
Sensor Assessment Cell (SAC) Capability Development: Subproj: PSIM Sensor Integration	1	2020	4	2022

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>	Project (Number/Name) 3155 / <i>Force Protection Ashore</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Sensor Assessment Cell (SAC) Capability Development: Subproj: Regional Dispatch/ SAC systems Integration	1	2020	4	2022
Sensor Assessment Cell (SAC) Capability Development: Subproj: Perimeter Defense Senor Systems (PDSS)	1	2022	4	2022

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

Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>				Project (Number/Name) 3460 / <i>Red Hill Secondary Containment Research</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
3460: <i>Red Hill Secondary Containment Research</i>	0.000	0.452	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Red Hill Secondary Containment Research Project 3460 was created to provide fiscal clarity for a second containment research study due to environmental concerns for researching containment options at the Red Hill underground fuel storage site in Hawaii. The study was originally conducted within the Facilities, Sustainment Restoration and Modernization (FSRM) program which falls under PE 0603725N PRJ 0995. There is a \$968K FY21 requirement funded via BTR to complete the study.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Proj: 3460 Red Hill Secondary Containment Research	0.452	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2021 Plans: N/A					
FY 2022 Base Plans: N/A					
FY 2022 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.452	0.000	0.000	0.000	0.000

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

N/A

Remarks

D. Acquisition Strategy

Acquisition was based on performance specifications enabled by this project.

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>	Project (Number/Name) 3460 / <i>Red Hill Secondary Containment Research</i>

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

Proj 3460	
Sustainment, Restoration & Modernization	████████████████████

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>	Project (Number/Name) 3460 / <i>Red Hill Secondary Containment Research</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Proj 3460</i>				
Sustainment, Restoration & Modernization	3	2020	4	2021