Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy											Date: May 2021	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604215N *I Standards Development*							
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	22.952	3.499	4.218	4.082	-	4.082	-	-	-	-	-	-
1857: *Calibration Standards*	22.952	3.499	4.218	4.082	-	4.082	-	-	-	-	-	-

Note

Starting in FY17 the Common Helicopters (PU 2312) and Stores Planning and Weaponeering Module (PU 2311) moved to Mission Planning PE (0605215N).
Starting in FY17 the JT Service/NV Std Avionics CP/SB (PU 0572) PE (0604215N) moved to a new Common Avionics PE (0605217N).

A. Mission Description and Budget Item Justification

This project provides for the identification, study, design, development, demonstration, test, evaluation, and qualification of standard avionics capabilities for Navy use, and wherever practicable, use across all Services and Foreign Military Sales. Such air combat electronics developments include communications and airborne networking, navigation and sensors, flight avionics, safety systems, and flight mission information systems for both forward fit and retrofit aircraft. These efforts continue to maintain federated systems while encouraging transition of procurements to support a modular system for enhanced performance and affordability. Consideration is given up front to reduce acquisition costs through larger procurement quantities that satisfy multi-aircraft customer requirements and that reduce life cycle costs in the areas of reliability, maintainability, and training. This project also provides a Navy-wide program to develop required calibration standards (hardware) in all major measurement technology areas in support of Navy Hull, Mechanical and Electrical (HM&E) systems as well as Navy Weapons systems, ground and air, throughout the Fleet. It funds Navy lead-service responsibilities in the Department of Defense and Joint Services Metrology Research and Development program. This project supports the military requirement to verify the performance of all test systems used to validate the operation of HM&E as well as Navy Weapon Systems with calibration standards traceable to the National Institute of Standards and Technology.

JUSTIFICATION FOR BUDGET ACTIVITY: ($1.424) Continue development of (1) calibration hardware standard in electrical/electronic measurement technology to support combat/operational readiness for submarine periscopes magnetic locks and aircraft tail hook non-destructive testing. Begin Development of (1) Coaxial Microcalorimeter Power calibration standards in support of Navy's ability to detect adversarial threats and to counteract adversarial electronic countermeasures.
($1.066) Continue development of (1) Multi-mode calibration hardware standards in electro optical measurement technology to support shipboard readiness of weapon system communication to missile launch systems, combat Flight operations and ground combat operations. Continue development of (1) high energy measurement technology standards in support of combat and operational readiness, Begin development of (1) Low Level Pulsed standard to support laser designators and rangefinders equipment remain in a ready and operational state.
($1.058) Continue development of (2) calibration hardware standard in Chemical/Biological technology for measuring residual solvent vapors in support of Divers Life Support Systems (DLSS) and Two Solvent Cleaning Capability in support of flight safety, shipboard safety, operational readiness, and CFC-113 Freon removal (treaty compliance).
($.423) Continue development of (1) measurement Uncertainty Automation phase II in support of Component Equipment Operational Readiness.
($.247) Begin development (1) calibration standard in physical mechanical measurement technology to support submarine shipboard safety and sea-based operations.
($1.009) Continue development of (1) calibration hardware standard in electrical/electronic measurement technology to support combat/operational readiness for submarine periscopes magnetic locks and aircraft tail hook non-destructive testing. Continue development of (1) Coaxial Microcalorimeter Powercalibration standards

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy	Date: May 2021
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604215N *I Standards Development*

in support of Navy's ability to detect adversarial threats and to counteract adversarial electronic countermeasures. Begin development of (1) calibration standards to provide real time In-situ cost effective Calibration Test Measurement Diagnostic Equipment (TMDE) support with Zero Chain Traceability.
($.658) Continue development of (2) calibration hardware standard in Chemical/Biological technology for measuring Residual Solvent Vapors in support of Divers Life Support Systems (DLSS). Start development of (1) Biodetector (bio-aerosol detector) Calibration standard in support of Combat and shipboard operational readiness for bio threat detection
($.658) Begin development of (1) calibration hardware standard in Microwave/millimeter-wave technology in support of Vector Network Analyzers to test and repair Weapon Replaceable Assemblies (WRAs) for F-18/P-3/EP-3-E2C/D, EA-6B and P8 aircraft.
($.207) Continue development (1) calibration standard in physical mechanical measurement technology to support submarine shipboard safety and sea-based operations.
($.946) Begin development of (1) calibration hardware standards in electro optical measurement technology to support Night Vision Telescope Auto Focus Capability to support Safety of Flight and combat operations. Continue development of (1) Multi-mode calibration hardware standards in electro optical (Multi-mode) measurement technology to support shipboard readiness of weapon system communication to missile launch systems, combat Flight operations and ground combat operations. Continue development of (1) Low Level Pulsed standard to support laser designators and rangefinders equipment remain in a ready and operational state.
($.810) Begin development of (2) calibration standards in analytical and benchtop metrology focusing in support of metrology benchtop automated physical mechanical calibration methods support equipment operational readiness for both for shore, air and sea-based operations. Continue development of (1) measurement Uncertainty Automation phase III in support of Component Equipment Operational Readiness.

The 190K decrease from FY21 to FY22 will be applied to the Zero Chain Traceabilty capability development. This will push out and delay the new start development effort of this project.
The Navy Metrology program has a requirement to modernize and produce an "out of the lab to direct user" capability to perform precise measurements and equip our ships with improved reliable offensive weapon system performances, sensors, and hard kill/soft kill capabilities that will contribute to the Navy's goal of Distributed Lethality. The National Institute of Standards and Technology (NIST) proposed NIST On A Chip (NOAC) Zero Chain Traceability effort reaches across the entire Joint service metrology requirements to provide intrinsic quantum-based measurement technologies with direct SI Traceable measurement built into calibration instruments and test measurement systems. This capability ensures equipment measurement performance in-situ will increase readiness and reduce costs. This is a multi-year effort that reaches across several FYDP POM cycles.

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy					Date: May 2021
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*		R-1 Program Element (Number/Name) PE 0604215N *I Standards Development*			
B. Program Change Summary ($ in Millions)	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**
Previous President's Budget	3.642	4.237	4.272	-	4.272
Current President's Budget	3.499	4.218	4.082	-	4.082
Total Adjustments	-0.143	-0.019	-0.190	-	-0.190
• Congressional General Reductions	-	-0.019			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.143	0.000			
• Rate/Misc Adjustments	0.000	0.000	-0.190	-	-0.190

Change Summary Explanation

The FY 2022 funding request was reduced by $.109 million to account for the availability of prior year execution balances.

0572:
Tactical Communications: Title corrected from Joint Precision Approach Landing System Software (S/W) Integration to Operation Flight Plan S/W Integration.

Ground Proximity Warning Systems/Terrain Awareness Warning System (GPWS/TAWS II): H-60 TAWS II Software Development extended duration from 4Q/15 through 4Q/16 based on projected platform integration schedule.

Military Flight Quality Assurance: Test and Evaluation, MH-53R/S, M/CH-53E, AH-1Z, UH-1Y, Phase 2 Test extended from 3Q/15 to 4Q/15 due to longer testing required for a number of defects found. Phase 2 Test Readiness Review moved from 1Q/15 to 3Q/15 due to integration test took longer than planned due to number of defects found. Deliveries for H-60R/S, CH-53E, AH-1Z and UH-1Y reflect new date of 2Q/15 to align with F/A-18 procurement order.

Mid Air Collision Avoidance Capability: Re-planned FY16-FY21 program as a result of the Business Case Analysis to properly aligned program. Material Development Decision/Acquisition Strategy Review (MDD/ASR) moved from 2Q/16 to 1Q/17. Added Capability Development Document (CDD) Draft added in 4Q16. Added Requirements Development from 1Q/16 to 4Q/16.

Starting in FY17 the JT Service/NV Std Avionics CP/SB (PU 0572) PE (0604215N) moved to a new Common Avionics PE (0605217N).

2311:
WASP V4.0 Systems Development start was delayed from 4Q16 to 2017 and will be displayed under PE 0605215N.

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy	Date: May 2021
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604215N *I Standards Development*

WASP V3.2 IOC was delayed from 1Q16 to 3Q16 due to the asynchronous release process and requirement for a new build prior to IOC.

FY17 and out schedule is included in the Mission Planning PE 0605215N.

2312:
Common Helicopters schedule FY17 and out is included in Mission Planning PE 0605215N.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy											Date: May 2021	
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604215N / *Standards Development*				Project (Number/Name) 1857 / *Calibration Standards*			
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**
1857: *Calibration Standards*	22.952	3.499	4.218	4.082	-	4.082	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Navy-wide program which addresses Metrology related RDT&E issues for navy weapon systems, shipboard platforms, Naval Air, and Fleet Ground Marines. It supports development of calibration standards (equipment, procedures and technical data) required to resolve Metcal related safety, obsolescence, new and emerging technology support and cost reduction issues. It funds Navy unique and lead service responsibilities in DoD and Joint Services Metrology Research Programs to develop calibration solutions. The line supports development of measurement requirements to verify performance of all test systems used to validate the operation of Navy Weapon Systems with calibration standards traceable to the National Institute of Standards and Technology to calibrate, sustain and ensure performance accuracy.

This program also provides benefits and efficiencies in a joint collaborative environment within the Tri-Services. Projects are identified and defined so that they will meet the universal requirement. Development efforts are integrated in order to achieve the common capabilities required at minimum cost. This is also a regular and common business practice within the Navy Metrology Community where R&D efforts are communicated and integrated into the multiple testing and Monitoring Systems. This is done in support of Program Managers, Sponsors, and Principle Executive officers. As a result, common requirements are established, duplication of efforts are eliminated, and best value, high quality Metcal products are produced for the Navy.

($1.424) Continue development of (1) calibration hardware standard in electrical/electronic measurement technology to support combat/operational readiness for submarine periscopes magnetic locks and aircraft tail hook non-destructive testing. Begin Development of (1) Coaxial Microcalorimeter Power calibration standards in support of Navy's ability to detect adversarial threats and to counteract adversarial electronic countermeasures.
($1.066) Continue development of (1) Multi-mode calibration hardware standards in electro optical measurement technology to support shipboard readiness of weapon system communication to missile launch systems, combat Flight operations and ground combat operations. Continue development of (1) high energy measurement technology standards in support of combat and operational readiness, Begin development of (1) Low Level Pulsed standard to support laser designators and rangefinders equipment remain in a ready and operational state.
($1.058) Continue development of (2) calibration hardware standard in Chemical/Biological technology for measuring residual solvent vapors in support of Divers Life Support Systems (DLSS) and Two Solvent Cleaning Capability in support of flight safety, shipboard safety, operational readiness, and CFC-113 Freon removal (treaty compliance).
($.423) Continue development of (1) measurement Uncertainty Automation phase II in support of Component Equipment Operational Readiness.
($.247) Begin development (1) calibration standard in physical mechanical measurement technology to support submarine shipboard safety and sea-based operations.
($1.009) Continue development of (1) calibration hardware standard in electrical/electronic measurement technology to support combat/operational readiness for submarine periscopes magnetic locks and aircraft tail hook non-destructive testing. Continue development of (1) Coaxial Microcalorimeter Powercalibration standards in support of Navy's ability to detect adversarial threats and to counteract adversarial electronic countermeasures. Begin development of (1) calibration standards to provide real time In-situ cost effective Calibration Test Measurement Diagnostic Equipment (TMDE) support with Zero Chain Traceability.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604215N / *Standards Development*	**Project (Number/Name)** 1857 / *Calibration Standards*

($.658) Continue development of (2) calibration hardware standard in Chemical/Biological technology for measuring Residual Solvent Vapors in support of Divers Life Support Systems (DLSS). Start development of (1) Biodetector (bio-aerosol detector) Calibration standard in support of Combat and shipboard operational readiness for bio threat detection
($.658) Begin development of (1) calibration hardware standard in Microwave/millimeter-wave technology in support of Vector Network Analyzers to test and repair Weapon Replaceable Assemblies (WRAs) for F-18/P-3/EP-3-E2C/D, EA-6B and P8 aircraft.
($.207) Continue development (1) calibration standard in physical mechanical measurement technology to support submarine shipboard safety and sea-based operations.
($.946) Begin development of (1) calibration hardware standards in electro optical measurement technology to support Night Vision Telescope Auto Focus Capability to support Safety of Flight and combat operations. Continue development of (1) Multi-mode calibration hardware standards in electro optical (Multi-mode) measurement technology to support shipboard readiness of weapon system communication to missile launch systems, combat Flight operations and ground combat operations. Continue development of (1) Low Level Pulsed standard to support laser designators and rangefinders equipment remain in a ready and operational state.
($.810) Begin development of (2) calibration standards in analytical and benchtop metrology focusing in support of metrology benchtop automated physical mechanical calibration methods support equipment operational readiness for both for shore, air and sea-based operations. Continue development of (1) measurement Uncertainty Automation phase III in support of Component Equipment Operational Readiness.

The 190K decrease from FY21 to FY22 will be applied to the Zero Chain Traceabilty capability development. This will push out and delay the new start development effort of this project.
The Navy Metrology program has a requirement to modernize and produce an "out of the lab to direct user" capability to perform precise measurements and equip our ships with improved reliable offensive weapon system performances, sensors, and hard kill/soft kill capabilities that will contribute to the Navy's goal of Distributed Lethality. The National Institute of Standards and Technology (NIST) proposed NIST On A Chip (NOAC) Zero Chain Traceability effort reaches across the entire Joint service metrology requirements to provide intrinsic quantum-based measurement technologies with direct SI Traceable measurement built into calibration instruments and test measurement systems. This capability ensures equipment measurement performance in-situ will increase readiness and reduce costs. This is a multi-year effort that reaches across several FYDP POM cycles.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Calibration Standards	3.499	4.218	4.082	0.000	4.082
Articles:	-	-	-	-	-
FY 2021 Plans: ($1.579) Continue development of (1) calibration hardware standard in electrical/electronic measurement technology to support combat/operational readiness for submarine periscopes magnetic locks and aircraft tail hook non-destructive testing. Begin Development of (1) RF Power Measurement calibration standard in support of Navy's ability to detect adversarial threats and to counteract adversarial electronic countermeasures. ($.913) Continue development of (1) calibration hardware standards in electro optical (Multi-mode) measurement technology, (1) high energy measurement technology standard to support shipboard readiness of weapon					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604215N / *Standards Development*	**Project (Number/Name)** 1857 / *Calibration Standards*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
system communication to missile launch systems, combat Flight operations and ground combat operations, and (1) Low Level Pulsed standard to support laser designators and rangefinders equipment remain in a ready and operational state. ($.528) Continue development of (1) calibration hardware standard in Chemical/Biological technology for measuring Residual Solvent Vapors in support of Divers Life Support Systems (DLSS). ($.493) Begin development of (1) calibration hardware standard in Microwave/millimeter-wave technology in support of Vector Network Analyzers to test and repair Weapon Replaceable Assemblies (WRAs) for F-18/P-3/ EP-3-E2C/D, EA-6B and P8 aircraft. ($.398) Begin development (1) calibration standard in analytical and metrology benchtop in support of metrology benchtop automated physical mechanical calibration methods support equipment operational readiness for both for shore, air and sea-based operations. ($.326) Begin development (1) calibration standard in physical mechanical measurement technology to support submarine shipboard safety and sea-based operations ***FY 2022 Base Plans:*** ($.882) Continue development of (1) calibration hardware standard in electrical/electronic measurement technology RF Power Measurement calibration standard in support of Navy's ability to detect adversarial threats and to counteract adversarial electronic countermeasures. Begin Development of (1) calibration hardware standard in electrical/electronic technology for analysis of Report of Value Requirements and reduce out-of-tolerance test equipment used in support of operational Readiness. ($.462) Continue development of (1) calibration hardware standard in Chemical/Biological technology in support of Shipboard Safety of Flight and Operational Readiness by evaluation of using Plasma to clean Oxygen Systems. ($.436) Continue development of (1) calibration hardware standard in Microwave/millimeter-wave technology in support of Vector Network Analyzers to test and repair Weapon Replaceable Assemblies (WRAs) for F-18/P-3/ EP-3-E2C/D, EA-6B and P8 aircraft.					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604215N / *Standards Development*	**Project (Number/Name)** 1857 / *Calibration Standards*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
($.208) Continue development (1) calibration standard in physical mechanical measurement technology to support submarine shipboard safety and sea-based operations. ($.350) Begin development of (1) calibration hardware standards in electro optical measurement technology to support Night Vision Telescope Auto Focus Capability to support Safety of Flight and combat operations. ($1.934) Begin development of (4) calibration standards in analytical and benchtop metrology focusing on support of Reliability Engineering Process Development for Initial Intervals, Multivariable Calibration Intervals, Bayesian Binomial Methods for Calibration Interval Estimation, and automated metrology benchtop applications used in component equipment readiness assessment for shore, air and sea-based operations. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The 35K plus increase from FY21 to FY22 will be applied to the METBENCH Phase IV development and will allow continued efforts on this capability without any schedule delays. Metrology Bench Top (METBENCH) - RACE Phase IV(Development of Physical Mechanical Automated Calibration Methods) The Metrology Bench Top Race Phase IV effort has been pushed out several times into the out years as other emerging and critical requirements were given priority. This project has reached a critical juncture and we during our POM brief we requested that the METBENCH project be given the opportunity to start its first year of a two-year effort to ensure shipboard operational readiness. METBENCH Phase IV will develop the automated capability of physical dimensional and temperature calibration procedures, resulting in a cost avoidance of continued reliance on expensive calibration support (organic or OEM) and realization of a reduction in savings for Fleet OM&N operations. This type of calibration capability represents a significant amount of the Navy's calibration workload when selecting procedures to automate using METBENCH. This solution compliments other METBENCH efforts currently underway. NAVSEA04 has planned, funded, and implemented shore based implementation of METBENCH at NAVSEA depot labs. The results of this effort will be integrated into the fielded METBENCH / MCMS systems currently being deployed to both calibration labs and Surface Ships. The Surface Ship community will utilize the additional					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604215N / *Standards Development*	**Project (Number/Name)** 1857 / *Calibration Standards*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
functionality that this project provides, and the METBENCH platform is positioned for adoption on Air Capable Ships that also currently perform this function.					
Accomplishments/Planned Programs Subtotals	3.499	4.218	4.082	0.000	4.082

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Funds provide for in-service engineering initiation of metrology research and developmental efforts of unique non-commercial hardware standards in the development of six key thrust technological areas which correspond to Physical Mechanical, Electro-Optical, Analytical Metrology, Electrical/Electronic systems, Chembio Defense, Microwave/Millimeter wave. These standards will ensure measurement accuracy in advanced and emerging combat weapon systems and associated test equipment. These hardware test standards will also provide for cost effective and efficient system maintenance and calibration measurements that reduce wrong test decisions and will result in lower maintenance cost and higher system performance reliability.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604215N / *Standards Development*	Project (Number/Name) 1857 / *Calibration Standards*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	NSWC Corona : Corona, CA	5.791	0.374	Mar 2021	0.326	Mar 2021	0.074	Mar 2022	-		0.074	-	-	-
		Subtotal	5.791	0.374		0.326		0.074		-		0.074	-	-	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support	WR	NSWC Corona : Corona, CA	3.438	1.523	Mar 2021	1.334	Mar 2021	0.700	Mar 2022	-		0.700	-	-	-
Government Engineering Support	WR	NSWC Corona : Corona, CA	12.632	1.567	Mar 2021	2.523	Mar 2021	3.273	Mar 2022	-		3.273	-	-	-
Travel	WR	NSWC Corona : Corona, CA	1.091	0.035	Mar 2021	0.035	Mar 2021	0.035	Mar 2022	-		0.035	-	-	-
Need Item Text	C/BA	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	17.161	3.125		3.892		4.008		-		4.008	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	22.952	3.499		4.218		4.082		-		4.082	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604215N / *Standards Development*	**Project (Number/Name)** 1857 / *Calibration Standards*

Schedule Profile

Proj 1857	FY 2021				FY 2022			
	1	2	3	4	1	2	3	4
Management and Coordination	<	—	—	—	—	—	—	—
Chemical/Biological standard (hardware) Two Solvent Method for Oxygen Systems	—	—	—	▼				
Electro-Optical standard (hardware) Fiber Optic Return Loss Standards Phase II (Multimode)	—	—	—	—	—	—	—	—
Electrical/Electronic standard (hardware) Nuclear Magnetic Resonance Replacement Standard	—	—	—	—	—	—	▼	
Analytical Metrology standard Arc Fault Detection System								
Electro-Optical standard (hardware) Beam Box/Next Generation RPPM								
Analytical Metrology standard Measurement Uncertainty Automation (Phase II)	—	—	—	▼				
Analytical Metrology standard TAR/Reliability Exemption Analysis Based on Risk								
Chemical/Biological standard (hardware) Measuring Residual Solvent Vapors in Naval Oxygen and Breathing-Air Systems	—	—	—	—	—	—	▼	
Electro-Optical standard (hardware) NIST Low Level Pulsed Upgrade	—	—	—	▼				
Electro-Optical standard (hardware) High Energy Laser Beam Profiler	—	—	—	—	—	—	—	▼
Electrical/Electronic standard (hardware) RF Power Measurement Improvement			▲	—	—	—	—	▼
Physical/Mechanical standard (hardware) Cost Effective Calibration of Analox SUB MKIIP	▲	—	—	—	—	—	—	▼
Analytical Metrology standard Measurement Uncertainty Automation (Phase III)					▲	—	—	—
Microwave/Millimeter-wave standard (hardware) VNA Verification Kit Uncertainty Reduction					▲	—	—	—
Analytical Metrology standard Metrology Bench Top (METBENCH) - RACE Phase IV (Development of Physical Mechanical Automated Calibration Methods)					▲	—	—	—
Electro-Optical standard (hardware) Night Vision Telescope Auto Focus Capability					▲	—	—	—

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604215N / *Standards Development*	**Project (Number/Name)** 1857 / *Calibration Standards*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1857				
Electro optical standards (hardware) Night Vision Gain Definition	1	2020	4	2020
Electro optical standards (hardware) FTIR -15C Black body Spectral Calibration	1	2020	4	2021
Electro optical Standards (hardware) development in High Energy Laser Standards	2	2021	4	2022
Physical Mechanical standards (hardware) development in Plasma Cleaning	4	2022	4	2022
Physical Mechanical standards (hardware) development in Nuclear Magnetic Resonance	1	2020	4	2022
Physical Mechanical standards (hardware) development in Oxygen Cleaning	1	2022	4	2022
Fiber Optic Return Loss Standards	1	2020	4	2021
Analytical Metrology (processes) Reliability Engineering Process Development for Initial Intervals	1	2020	4	2022
Schedule Detail	2	2021	2	2022