Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Navy											Date: March 2024	
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 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	34.570	3.618	4.039	5.120	-	5.120	4.611	4.703	4.797	4.893	Continuing	Continuing
1857: *Calibration Standards*	34.570	3.618	4.039	5.120	-	5.120	4.611	4.703	4.797	4.893	Continuing	Continuing

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

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.

JUSTIFICATION FOR BUDGET ACTIVITY:
FY 2024 Base Plans:
($1.166) 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 Power calibration standards in support of Navy's ability to detect adversarial threats and to counteract adversarial electronic countermeasures.
($0.958) Continue development (2) calibration hardware standard in Chemical/Biological technology for measuring Residual Solvent Vapors in support of Divers Life Support Systems (DLSS). Continue development of (1) Chemical/Biological Biodetector (bio-aerosol detector) Calibration Standard in support of Navy shipboard and shore activities Joint Biological Technical Detection System (JBTDS) for real-time bioaerosols monitoring to defend against biological agent threats.
($0.806) Continue development of (1) Measurement Uncertainty Automation (Phase III) measurement in support of component equipment operational readiness. Continue development of (1) 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.
($0.418) Continue the development and transition of NIST Traceable PNA E-Cal Calibrations for NPSL of (1) Microwave/millimeter-wave calibration hardware standard 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.

($0.691) Continue development of Fiber Optic Return Loss Standards Phase II 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) calibration standard for LiDAR 3D Scanners to support shipboard operational readiness while reducing cost and turnaround time for critical ship building areas; such as installation, design, planning, maintenance and damage assessments.

FY 2025 Base Plans:
($0.384) Begin development of (1) Physical/Mechanical Quantum Based Measurement Standards in support of Temperature Metrology systems referenced thermometer based on dual TCVCO architecture.
($0.857) Continue development of Fiber Optic Return Loss Standards Phase II 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. Begin Development of (2) Electro/Optical calibration standards focusing on Night Vision Telescope Auto Focus Capability in support of aircraft Safety of Flight night operations and 3D Printer Measurement Standards and Processes for Automated Parts Qualification in support of Operational readiness.
($0.490) Continue the development of (1) Microwave/millimeter-wave calibration hardware standard 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.
($1.872) 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 Power calibration standards in support of Navy's ability to detect adversarial threats and to counteract adversarial electronic countermeasures. Begin development of (1) Quantum Based measurement standard in support of DC Voltage TMDE Inventory systems.
($0.639) Continue development of (1) calibration hardware standards in Chemical/Biological technology for measuring Residual Solvent Vapors in support of Divers Life Support Systems (DLSS).
($0.878) Continue development of (1) 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. Begin development of (1) Analytical Metrology METBENCH - RACE Phase V Calibration standard in support of Optical Character and Scale Recognition Capabilities.

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	3.766	4.039	4.765	-	4.765
Current President's Budget	3.618	4.039	5.120	-	5.120
Total Adjustments	-0.148	0.000	0.355	-	0.355
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.148	0.000			
• Program Adjustments	0.000	0.000	0.355	-	0.355

• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000

Change Summary Explanation

1857:

This affects manpower resources and the ability to move the work effort forward to meet Fleet capability expectations. New capability from projects will be pushed beyond FY24 making it difficult to support urgent emerging operational initiatives that are significantly changing in the Fleet Support environment. The Quantum Based Measurement Standards project in support of Temperature Metrology systems will be delayed and pushed into another year of development and transition. The Analytical Metrology Analytical Metrology standard Analytical Metrology Capabilities for Interval Analysis using Multivariable Calibration Intervals project will be delayed and start in FY25 vice FY24. In addition, both the Electro Optics for Advanced Military Technology Measurement Standards Requirements and the Analytical standard for Joint Interval Analysis will be affected in the out year planning. This will cause a backlog of standards requirements development capabilities essential to meet critical Navy service requirements and sustainment, which can no longer be commercially supported. Reduction in Project capability transition will affect Fleet operational and combat readiness capability, safety of flight operations, shipboard operational readiness, and Treaty Compliance. All of which impacts initiatives to maintain technical superiority.

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.

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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Navy	Date: March 2024
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*

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

In FY23 funding for SBIR ($148K) was taken out during the 3rd quarter. Also, funding was approved for FY25 (PB24 IS#19063 to develop metrology methods to be used by 3D printers.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy											Date: March 2024	
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 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
1857: *Calibration Standards*	34.570	3.618	4.039	5.120	-	5.120	4.611	4.703	4.797	4.893	Continuing	Continuing
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.

JUSTIFICATION FOR BUDGET ACTIVITY:
FY 2024 Base Plans:
($1.166) 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 Power calibration standards in support of Navy's ability to detect adversarial threats and to counteract adversarial electronic countermeasures.
($0.958) Continue development and transition (2) calibration hardware standard in Chemical/Biological technology for measuring Residual Solvent Vapors in support of Divers Life Support Systems (DLSS). Continue development of (1) Chemical/Biological Bio-detector (bio-aerosol detector) Calibration Standard in support of Navy shipboard and shore activities Joint Biological Technical Detection System (JBTDS) for real-time bioaerosols monitoring to defend against biological agent threats.
($0.806) Continue development of (1) Measurement Uncertainty Automation (Phase III) measurement in support of component equipment operational readiness. Continue development of (1) 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.
($0.418) Continue the development and transition of VNA Verification Kit Uncertainty Reduction of (1) Microwave/millimeter-wave calibration hardware standard 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.
($0.691) Continue development of Fiber Optic Return Loss Standards Phase II 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) calibration standard for LiDAR 3D Scanners to support shipboard operational readiness while reducing cost and turnaround time for critical ship building areas, such as installation, design, planning, maintenance and damage assessments.

FY 2025 Base Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604215N / *Standards Development*	**Project (Number/Name)** 1857 / *Calibration Standards*

($0.384) Begin development of (1) Physical/Mechanical Quantum Based Measurement Standards in support of Temperature Metrology systems referenced thermometer based on dual TCVCO architecture.
($0.857) Continue development of Fiber Optic Return Loss Standards Phase II 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. Begin Development of (2) Electro/Optical calibration standards focusing on Night Vision Telescope Auto Focus Capability in support of aircraft Safety of Flight night operations and 3D Printer Measurement Standards and Processes for Automated Parts Qualification in support of Operational readiness.
($0.490) Continue the development of (1) Microwave/millimeter-wave calibration hardware standard 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.
($1.872) 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 Power calibration standards in support of Navy's ability to detect adversarial threats and to counteract adversarial electronic countermeasures. Begin development of (1) Quantum Based measurement standard in support of DC Voltage TMDE Inventory systems.
($0.639) Continue development of (1) calibration hardware standards in Chemical/Biological technology for measuring Residual Solvent Vapors in support of Divers Life Support Systems (DLSS).
($0.878) Continue development of (1) 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. Begin development of (1) Analytical Metrology METBENCH - RACE Phase V Calibration standard in support of Optical Character and Scale Recognition Capabilities.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Title: Calibration Standards	3.618	4.039	5.120	0.000	5.120
Articles:	-	-	-	-	-
FY 2024 Plans: ($1.166) 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 Power calibration standards in support of Navy's ability to detect adversarial threats and to counteract adversarial electronic countermeasures. ($0.958) Continue development and transition (2) calibration hardware standard in Chemical/Biological technology for measuring Residual Solvent Vapors in support of Divers Life Support Systems (DLSS). Continue development of (1) Chemical/Biological Biodetector (bio-aerosol detector) Calibration Standard in support of Navy shipboard and shore activities Joint Biological Technical Detection System (JBTDS) for real-time bioaerosols monitoring to defend against biological agent threats. ($0.806) Continue development of (1) Measurement Uncertainty Automation (Phase III) measurement in support of component equipment operational readiness. Continue development of (1) calibration standards in analytical					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
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. ($0.418) Continue the development and transition of VNA Verification Kit Uncertainty Reduction of (1) Microwave/millimeter-wave calibration hardware standard 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. ($0.691) Continue development of Fiber Optic Return Loss Standards Phase II 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) calibration standard for LiDAR 3D Scanners to support shipboard operational readiness while reducing cost and turnaround time for critical ship building areas; such as installation, design, planning, maintenance and damage assessments.					
FY 2025 Base Plans: ($0.384) Begin development of (1) Physical/Mechanical Quantum Based Measurement Standards in support of Temperature Metrology systems referenced thermometer based on dual TCVCO architecture. ($0.857) Continue development of Fiber Optic Return Loss Standards Phase II 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. Begin Development of (2) Electro/Optical calibration standards focusing on Night Vision Telescope Auto Focus Capability in support of aircraft Safety of Flight night operations and 3D Printer Measurement Standards and Processes for Automated Parts Qualification in support of Operational readiness. ($0.490) Continue the development of (1) Microwave/millimeter-wave calibration hardware standard 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. ($1.872) 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 Power calibration standards in support of Navy's ability to detect adversarial threats and to counteract adversarial electronic countermeasures. Begin development of (1) Quantum Based measurement standard in support of DC Voltage TMDE Inventory systems. ($0.639) Continue development of (1) calibration hardware standards in Chemical/Biological technology for measuring Residual Solvent Vapors in support of Divers Life Support Systems (DLSS). ($0.878) Continue development of (1) calibration standards in analytical and benchtop metrology focusing in support of metrology benchtop automated physical mechanical calibration methods support equipment					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
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 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
operational readiness for both for shore, air and sea-based operations. Begin development of (1) Analytical Metrology METBENCH - RACE Phase V Calibration standard in support of Optical Character and Scale Recognition Capabilities. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Increase funding from FY24 to FY25 is due to approved funding for 3-D printer measurement standards developed and inflation increases over the years. Therefore, the increase is small but for a specific project planned for FY25. Also, capability and the Quantum Based Measurement Standards project in support of Temperature Metrology systems that were previously pushed out due a of lacking funding will begin in FY25.					
Accomplishments/Planned Programs Subtotals	3.618	4.039	5.120	0.000	5.120

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 2025 Navy		Date: March 2024
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 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	NSWC Corona : Corona, CA	6.675	0.331	Jul 2023	0.145	Aug 2024	0.079	Aug 2025	-		0.079	Continuing	Continuing	Continuing
		Subtotal	6.675	0.331		0.145		0.079		-		0.079	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support	WR	NSWC Corona : Corona, CA	7.543	1.301	Apr 2023	1.513	Mar 2024	1.791	Sep 2025	-		1.791	0.000	12.148	-
Government Engineering Support	WR	NSWC Corona : Corona, CA	19.176	1.971	Mar 2023	2.366	Mar 2024	3.235	Mar 2025	-		3.235	0.000	26.748	-
Travel	WR	NSWC Corona : Corona, CA	1.176	0.015	Mar 2023	0.015	Mar 2024	0.015	Mar 2025	-		0.015	0.000	1.221	-
		Subtotal	27.895	3.287		3.894		5.041		-		5.041	0.000	40.117	N/A

	Prior Years	FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	34.570	3.618		4.039		5.120		-		5.120	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604215N / *Standards Development*	**Project (Number/Name)** 1857 / *Calibration Standards*

Schedule Profile	FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028				FY 2029			
Proj 1857	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
Management and Coordination	<	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	>
Cybersecurity													<	–	–	–	–	–	–	–	–	–	–	–	–	–	–	>
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	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	▼												
Chemical/Biological standard (hardware) Verification of Solvent Removal of Critical Applications Instruments	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	▼												
Electro-Optical standard (hardware) National Low Level Laser Radiometer Calibration Facility	–	–	–	▼																								
Electro-Optical standard (hardware) RPPM Transfer Training	–	–	–	▼																								
Electro-Optical standard (hardware) High Energy Laser Beam Profiler	–	–	–	▼																								
Electrical/Electronic standard (hardware) Coaxial Microcalorimeter Power Standards	–	–	–	–	–	–	–	–	–	–	–	▼																
Physical/Mechanical standard (hardware) Cost Effective Calibration of Analox SUB MKIIP	–	–	–	▼																								
Analytical Metrology standard Measurement Uncertainty Automation (Phase III)	–	–	–	–	–	–	–	▼																				
Microwave/Millimeter-wave standard (hardware) NIST Traceable PNA E-Cal Calibrations for NPSL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	▼				
Analytical Metrology standard Metrology Bench Top (METBENCH) - RACE Phase IV (Development of Physical Mechanical Automated Calibration Methods)	–	–	–	–	–	–	–	–	–	–	–	▼																
Chemical/Biological standard (hardware) JCAD calibrator and install	–	–	▼																									
Electro-Optical standard (hardware) LiDAR 3D Scanner Calibration Support	–	–	–	–	–	–	–	▼																				
Chemical/Biological standard (hardware) Biodetector (bio-aerosol detector) Calibration	▲	–	–		–	–	–	▼																				
Electro-Optical standard (hardware) Night Vision Telescope Auto Focus Capability									▲	–	–	–	–	–	–	▼												
Analytical Metrology standard METBENCH - RACE Phase V (Extend Calibration Spectrum and Optical Character and Scale Recognition Capabilities)									▲	–	–	–	–	–	–	▼												
Electrical/Electronic standard (hardware) Quantum Based Measurement Standards: Voltage Metrology									▲	–	–	–	–	–	–	▼												
Physical/Mechanical standard (hardware) Quantum Based Measurement Standards: Temperature Metrology									▲	–	–	–	–	–	–	–	–	–	–	–	–	–	–	▼				
Electro-Optical standard (hardware) 3D Printer Measurement Standards and Processes for Automated Parts Qualification									▲	–	–	–	–	–	–	–	–	–	–	–	–	–	–	▼				
Analytical Metrology standard Analytical Metrology Capabilities for Interval Analysis using Multivariable Calibration Intervals													▲	–	–	–	–	–	–	▼								
Microwave/Millimeter-wave standard (hardware) RF Power Transfer Standards													▲	–	–	–	–	–	–	–	–	–	–	–	–	–	–	▼
Analytical Metrology standard Analytical Metrology Capabilities for Interval Analysis Estimation using Bayesian Binomial Methods																	▲	–	–	▼								
Microwave/Millimeter-wave standard (hardware) High Power Microwave/High Power RF (HPM/HPRF)																	▲	–	–	–	–	–	–	–	–	–	–	▼
Physical/Mechanical standard (hardware) Hypersonic System Measurement Standards																	▲	–	–	–	–	–	–	▼				
Chemical/Biological standard (hardware) Environmental Safe and Cost Effective Cleaning of Oxygen Gauges																	▲	–	–	–	–	–	–	–	–	–	–	–
Electro-Optical standard (hardware) Advanced Military Technology Measurement Standards Requirements																	▲	–	–	–	–	–	–	–	–	–	–	–
Physical/Mechanical standard (hardware) Transfer Standards for High-Vacuum Metrology																					▲	–	–	–	–	–	–	–
Analytical Metrology standard Identification of Relevant Error Distributions																									▲	–	–	–
Analytical Metrology standard Joint Calibration Interval Analysis Methodology																									▲	–	–	–
Physical/Mechanical standard (hardware) Quantum Based Measurement Standards: Pressure Metrology																									▲	–	–	–
Physical/Mechanical standard (hardware) Resonant Silicon Gages as a Precision Pressure Standard																									▲	–	–	–

Color code (different colors – Orange last year – Green this year – Blue reprioritized – Black no change

Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
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				
Management and Coordination	1	2023	4	2029
Cybersecurity	1	2026	4	2029
Chemical/Biological standard (hardware) Two Solvent Method for Oxygen Systems	1	2023	4	2024
Electro-Optical standard (hardware) Fiber Optic Return Loss Standards Phase II (Multimode)	1	2023	4	2026
Electrical/Electronic standard (hardware) Nuclear Magnetic Resonance Replacement Standard	1	2023	4	2026
Chemical/Biological standard (hardware) Verification of Solvent Removal of Critical Applications Instruments	1	2023	3	2026
Electro-Optical standard (hardware) National Low Level Laser Radiometer Calibration Facility	1	2023	4	2023
Electro-Optical standard (hardware) RPPM Transfer Training	1	2023	4	2023
Electro-Optical standard (hardware) High Energy Laser Beam Profiler	1	2023	4	2023
Electrical/Electronic standard (hardware) Coaxial Microcalorimeter Power Standards	3	2023	4	2025
Physical/Mechanical standard (hardware) Cost Effective Calibration of Analox SUB MKIIP	1	2023	4	2023
Analytical Metrology standard Measurement Uncertainty Automation (Phase III)	1	2023	4	2024
Microwave/Millimeter-wave standard (hardware) NIST Traceable PNA E-Cal Calibrations for NPSL	1	2023	4	2028
Analytical Metrology standard Metrology Bench Top (METBENCH) - RACE Phase IV (Development of Physical Mechanical Automated Calibration Methods)	1	2023	4	2025
Chemical/Biological standard (hardware) JCAD calibrator and install	1	2023	3	2023
Electro-Optical standard (hardware) LiDAR 3D Scanner Calibration Support	1	2023	4	2024
Chemical/Biological standard (hardware) Biodetector (bio-aerosol detector) Calibration	2	2023	2	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604215N / *Standards Development*	**Project (Number/Name)** 1857 / *Calibration Standards*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Electro-Optical standard (hardware) Night Vision Telescope Auto Focus Capability	1	2025	1	2025
Analytical Metrology standard METBENCH - RACE Phase V (Extend Calibration Spectrum and Optical Character and Scale Recognition Capabilities)	1	2025	1	2025
Electrical/Electronic standard (hardware) Quantum Based Measurement Standards: Voltage Metrology	1	2025	1	2025
Physical/Mechanical standard (hardware) Quantum Based Measurement Standards: Temperature Metrology	1	2025	1	2025
Analytical Metrology standard Analytical Metrology Capabilities for Interval Analysis using Multivariable Calibration Intervals	1	2025	1	2025
Microwave/Millimeter-wave standard (hardware) RF Power Transfer Standards	1	2026	1	2026
Electro-Optical standard (hardware) 3D Printer Measurement Standards and Processes for Automated Parts Qualification	1	2026	1	2026
Analytical Metrology standard Analytical Metrology Capabilities for Interval Analysis Estimation using Bayesian Binomial Methods	1	2027	1	2027
Microwave/Millimeter-wave standard (hardware) High Power Microwave/High Power RF (HPM/HPRF)	1	2027	1	2027
Physical/Mechanical standard (hardware) Hypersonic System Measurement Standards	1	2027	1	2027
Chemical/Biological standard (hardware) Environmental Safe and Cost Effective Cleaning of Oxygen Gauges	1	2027	1	2027
Electro-Optical standard (hardware) Advanced Military Technology Measurement Standards Requirements	1	2027	1	2027
Physical/Mechanical standard (hardware) Transfer Standards for High-Vacuum Metrology	1	2028	1	2028
Analytical Metrology standard Identification of Relevant Error Distributions	1	2029	1	2029
Analytical Metrology standard Joint Calibration Interval Analysis Methodology	1	2029	1	2029
Physical/Mechanical standard (hardware) Quantum Based Measurement Standards: Pressure Metrology	1	2029	1	2029
Physical/Mechanical standard (hardware) Resonant Silicon Gages as a Precision Pressure Standard	1	2029	1	2029