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 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0205633N *I Aviation Improvements*							
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	1,692.748	118.010	126.371	132.486	-	132.486	-	-	-	-	-	-
0601: *Acft Handling & Service Equip*	42.988	8.944	1.417	3.245	-	3.245	-	-	-	-	-	-
0852: *Consolidated Auto Support System*	177.385	7.444	12.093	22.626	-	22.626	-	-	-	-	-	-
1041: *Aircraft Equipment Reliability/Maintainability Improvement Program (AERMIP)*	64.766	3.315	3.113	3.364	-	3.364	-	-	-	-	-	-
1355: *Propulsion and Power Component Improvement Program*	1,337.285	96.317	109.391	102.757	-	102.757	-	-	-	-	-	-
2269: *Expeditionary Airfield Improvements*	70.324	1.990	0.357	0.494	-	0.494	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Project 0601 - Common Ground Equipment is a Naval Aviation Project to apply new technology to common support equipment necessary to support multiple aircraft.

Project 0852: Consolidated Automated Support System is a standardized Automated Test Equipment with computer assisted, multi-function capabilities to support the maintenance of aircraft weapons systems and missiles.

Project 1041 - Aircraft Equipment Reliability/Maintainability Improvement Program is the only Navy program that provides engineering support for in-service out-of-production aircraft equipment, and provides increased readiness at reduced operational and support cost.

Project 1355 - Aircraft Engine Component Improvement Program develops reliability and maintainability and safety enhancements for in-service Navy aircraft engines, transmissions, propellers, starters, auxiliary power units, electrical generating systems, fuel systems, fuels, and lubricants.

Project 2269 - The Expeditionary Airfields (EAF) program designs, develops, tests and fields Airfield Light Systems to replace existing obsolete legacy EAF lighting system.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate funding in the current or subsequent fiscal year.

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 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0205633N *I Aviation Improvements*

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	125.461	133.953	130.174	-	130.174
Current President's Budget	118.010	126.371	132.486	-	132.486
Total Adjustments	-7.451	-7.582	2.312	-	2.312
• Congressional General Reductions	-	-1.609			
• Congressional Directed Reductions	-	-5.973			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-3.544	0.000			
• SBIR/STTR Transfer	-3.907	0.000			
• Program Adjustments	0.000	0.000	7.251	-	7.251
• Rate/Misc Adjustments	0.000	0.000	-4.939	-	-4.939

Change Summary Explanation

Cost:

The FY 2022 funding requestion was updated for the following adjustments:

- Reduction of $2.649M to account for the availability of prior year execution balances
- Reduction of $4.939M for various support and working capital fund rate changes.
- Increase of $6.400M in Project 0852 to support eCASS Modernization/Product Improvement Future Readiness Team Initiative for HTS offload to CASS (svgs) and targeted ATE modernization.
- Increase of $3.500M in Project 0852 for the FY22 procurement and delivery of five (5) EO4 engineering development models to include the EO4 carts, fixtures, and required technical and logistical data.

Schedule:

Project 0601: Carrier/Amphibious Assault Ship Crash Crane (CV/AACC) identified several significant design changes were incorporated via contract mod to reduce technical risk associated with maneuverability and lifting stability resulting in a six month schedule slip.

Project 0601: Aviation Maintenance Advancement Solutions (AMAS) - PEMA/SPECS Image development, Regression Testing, Unique TMS, Independent Validation & Verification were adjusted to meet cyber security mandate that updates will occur monthly instead of quarterly.

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 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0205633N *I Aviation Improvements*

Project 2269: Design maturity with the Lead System Integrator (LSI) for the Sustainment Lighting System (SLS) program was re-scoped in FY19 and out to focus on the development of a new Light Emitting Diode (LED) CAT I Visual Flight Rules (VFR) Approach Light System and a Night Vision Device (NVD) Compatible Runway Light System. Schedule milestones were updated for the following: LED CATI Instrumented Flight Rules (IFR)/Visual Flight Rules (VFR) Approach Light System: MS C moved from 1Q FY21 to 4Q FY21; Systems Engineering end date moved from 2Q FY21 to 4Q FY21. Night Vision Device (NVD) Compatible Runway Light System: IOC moved from 2Q FY23 to 4Q FY23; CDR moved from 1Q FY21 to 3Q FY21; TRR moved 2Q FY21 to 4Q FY21; DT&E start date moved from 2Q FY21 to 4Q FY21 and end date moved from 4Q FY21 to 1Q FY22; IT/OT start date moved from 1Q FY22 to 3Q FY22 and end date moved from 2Q FY22 to 4Q FY22; FRP moved from 4Q FY22 to 4Q FY23.

Technical:

Project 0601: Carrier/Amphibious Assault Ship Crash Crane (CV/AACC) contract modified to incorporate design changes that significantly reduces technical risks identified in the contractor's original proposal. The contract modification includes removing the active load management system, in favor of a fixed idler system, incorporating in-riggers on the L-Class variant, and fixing the rear steering axle to the crane's chassis. These technical changes mitigate the program's significant technical risks at a trade-off of approximately five months schedule.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy											Date: May 2021	
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0205633N / *Aviation Improvements*				Project (Number/Name) 0601 / *Acft Handling & Service Equip*			
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**
0601: *Acft Handling & Service Equip*	42.988	8.944	1.417	3.245	-	3.245	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Common Ground Equipment is a Naval Aviation project to apply new technology to common support equipment necessary to support multiple systems/aircraft within the Navy. The common support equipment items developed with this budget are briefed to the Air Force, Army and Coast Guard for possible use in joint procurement in the production phase.

Crash cranes are used for lifting and moving disabled aircraft on CVN and L-Class ship flight decks. The Carrier/Amphibious Assault Ship Crash Crane (CV/AACC) will be a diesel powered lift system performing crash and salvage functions on board CVN and L-class ships. The CV/AACC will replace the legacy A/S32A-35A, Carrier Vessel Crash Crane (CVCC) and the A/S32A-36A Amphibious Assault Crash Crane (AACC). The CV/AACC will support all aircraft on CVN and L-Class ships.

Recent transition has merged existing PEMA and SPECS project lines under Aviation Maintenance Advancement Solutions (AMAS). Funding supports the evaluation, testing and integration to develop Portable Electronic Maintenance Aids (PEMA) Commercial solution for portable device deployments across the Naval Aviation Enterprise. PEMA is a portable device utilized by maintainers with the implementation of digital maintenance capabilities (digital publications, Interactive Electronic Technical Manuals, Internet Protocol based data uploads, Binary digit data downloads, automated diagnostics, and planeside Naval Aviation Logistics Command/ Management Information System. PEMAs are mandatory display devices supporting modern day Automated Maintenance Environment implemented for weapon systems.

Future Readiness Initiative to Develop Standard PEMA Cyber Solution (SPECS) architecture for all Portable Electronic Maintenance Aids (PEMA)s to standardize software across NAE, leverage existing enterprise tools, and to correct cyber shortfalls identified by the Cyber Warfare Detachment (CWD). A Cyber Risk Assessment (CRA) identified vulnerabilities on the Portable Electronic Maintenance Aid system that could be exploited to threaten U.S. capabilities. A new software image and configuration management process has been identified to mitigate the top 60% of identified risk groups and 100% of penetration test findings from the CRA.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**
Title: Aviation Maintenance Advancement Solutions (AMAS)	2.553	1.016	3.045	0.000	3.045
Articles:	-	-	-	-	-
Description: Aviation Maintenance Advancement Solutions (AMAS) has formed by the merge of The Portable Electronic Maintenance Aid (PEMA)and Standard PEMA Cyber Solution (SPECS). Portable Electronic Maintenance Aid (PEMA) funding supports the evaluation, testing and integration to develop PEMA Commercial Off-the-Shelf (COTS) solution for portable device deployments across the Naval Aviation Enterprise. PEMAs					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0601 / *Acft Handling & Service Equip*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
are portable devices utilized by maintainers with the implementation of digital maintenance capabilities (digital publications, Interactive Electronic Technical Manuals, Internet Protocol based data uploads, Binary digit data downloads, automated diagnostics, and planeside Naval Aviation Logistic Command Management Information System. PEMAs are a mandatory display device supporting modern day Automated Maintenance Environment implemented for weapon systems. Cyber Risk Assessment (CRA) has identified cyber vulnerabilities that could be exploited to threaten US fighting forces. Implementation of mandatory Cyber Security (CS) requirements would decrease the CS attack surface. Develop Standard PEMA Cyber Solution (SPECS) architecture for all PEMAs to standardize software across NAE, leverage existing enterprise tools, and to correct cyber shortfalls identified by the Cyber Warfare Detachment (CWD) Cyber Risk Assessment (CRA). Implement CS enhancements to reduce risk from cyber-attack. ***FY 2021 Plans:*** Continue to develop standard PEMA Cyber Solution (SPECS) core software enhancements to correct cyber shortfalls and develop/integrate T/M/S unique applications to be hosted on a common image. Continue to evaluate, test and integrate evolving COTS solutions. Conduct test & evaluation of T/M/S peculiar software/ hardware requirements and network connectivity compliance across the GIG prior to deployment to the fleet by a yearly release cycle. ***FY 2022 Base Plans:*** Evaluate, test and integrate evolving COTS solutions. Conduct test & evaluation of T/M/S peculiar software/ hardware requirements and network connectivity compliance across the GIG prior to deployment to the fleet by a yearly release cycle. Develop standard PEMA Cyber Solution (SPECS) core software enhancements to correct cyber shortfalls and develop/integrate T/M/S unique applications to be hosted on a common image. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase due to development and test events to integrate the MV-22 and E-2D ALE Information Technology (IT) solutions into the NAVAIR Standard Portable Electronic Maintenance Aid Cyber Solution (SPECS) will take place in FY22. This will eliminate two IT solutions that Naval Aviation currently support and sustain.					
Title: Carrier/Amphibious Assault Ship Crash Crane (CV/AACC)	6.391	0.401	0.200	0.000	0.200
Articles:	2	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0601 / *Acft Handling & Service Equip*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Description: Carrier/Amphibious Assault Ship Crash Cranes (CV/AACC) are required to remove damaged aircraft from the flight deck. Legacy crash cranes were designed in the late 1980's, major systems are beginning to experience the obsolescence of spare parts and are in need of updating. R&D resources are needed to identify not only replacements, but new technologies, which can increase the reliability and maintainability of this flight ops critical piece of equipment. Systems updates would include the engine/generator and electrical updates to the motor drive/control system. An exploration of power sources other than diesel engines would be considered and a corrosion resistant boom. ***FY 2021 Plans:*** Review EDM test reports, correct critical deficiencies from test, develop production acceptance test and manufacturing plans. ***FY 2022 Base Plans:*** Complete DT-B1 testing, continue DT-C1 testing, and continue development of logistics deliverables. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Several test events on the Carrier Crash & Salvage Crane (CCSC) and Amphibious Crash and Salvage Crane (ACSC) EDMs originally planned for FY22 have been pulled into FY21 and therefore decreased the amount of funding required in FY22.					
Accomplishments/Planned Programs Subtotals	8.944	1.417	3.245	0.000	3.245

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• APN/0705: *Ground Support Equipment - CSE/ICP*	78.997	79.849	84.118	-	84.118	-	-	-	-	-	-
• OPN/4268: *Aviation Support Equipment - PEMA*	7.962	13.319	15.539	-	15.539	-	-	-	-	-	-

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0601 / *Acft Handling & Service Equip*

D. Acquisition Strategy

Common Ground Equipment: This is a non ACAT program. Field activities propose tentative projects. Internal panel merits and selects projects. Field activities develop projects and submit results. Operational Advisory Group process selects projects to transition to procurement.

Carrier/Amphibious Assault Ship Crash Crane (CV/AACC): Market research results indicated multiple companies have the potential to develop (modified COTS) and manufacture crash cranes that meet the specification requirements, inclusive of the lift requirements and unique shipboard environmental requirements including shock, vibration, Electromagnetic Interference (EMI) and ship motion characteristics. The program entered the acquisition process at Milestone B (MS-B). A best value, competitive, Firm Fixed Price (FFP) Indefinite Delivery, Indefinite Quantity (IDIQ) contract was awarded 7/2019.

The selected contractor will design, develop, manufacture, test, and deliver two (2) CCSCs and one (1) ACSC Engineering Development Model (EDM), along with all required technical data and logistics documentation. Following MS C approval, one (1) CCSC and one (1) ACSC LRIP will be procured to support DT-C1 testing and production. Following FRPDR approval, 25 additional production units consisting of 13 CCSCs and 12 ACSCs will be procured using priced delivery orders which will meet the total fleet inventory of 27 units.

Recent transition has merged existing PEMA and SPECS project lines under Aviation Maintenance Advancement Solutions (AMAS). The management approach includes the Program Management Office residing at NAVAIR with Milestone Decision Authority delegated to the Naval Air Systems Command Chief Information Officer. The evolutionary development approach will be used to execute requirements. Contracting for the prime integrator will be via competitively awarded Indefinite Delivery/ Indefinite Quantity contracts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205633N / *Aviation Improvements*	Project (Number/Name) 0601 / *Acft Handling & Service Equip*	

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 Hdw Dev - CV	C/FFP	Allied Systems Company : Sherwood, OR	3.508	4.787	Jan 2020	0.036	Jan 2021	0.000		-		0.000	-	-	-
Systems Engineering - CV	WR	NAWCAD : LAKEHURST, NJ	4.177	0.847	Nov 2019	0.151	Nov 2020	0.000		-		0.000	-	-	-
Systems Engineering - AMAS	C/IDIQ	TBD : TBD	1.335	1.400	Dec 2019	1.002	Dec 2020	1.980	Dec 2021	-		1.980	-	-	-
Prior year Prod Dev cost no longer funded in the FYDP	Various	Various : Various	19.692	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	28.712	7.034		1.189		1.980		-		1.980	-	-	N/A

Remarks

Systems Engineering - AMAS - Performing Activity is currently TBD because contract is put out for competition every four years for industry evaluation and testing for selection.

Support ($ 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
Prior year Support cost no longer funded in the FYDP	Various	Various : Various	8.857	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	8.857	0.000		0.000		0.000		-		0.000	-	-	N/A

Test and Evaluation ($ 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
C&G Test - CV	WR	NAWCAD : PAX RIVER, MD	0.317	0.757	Nov 2019	0.228	Nov 2020	0.200	Dec 2021	-		0.200	-	-	-
Operational T & E - AMAS	WR	NAWCAD : PAX RIVER, MD	1.966	0.425	Nov 2019	0.000		0.000		-		0.000	-	-	-
Operational T & E - AMAS	WR	FRC SE : Jacksonville, FL	2.217	0.728	Nov 2019	0.000		1.065	Nov 2021	-		1.065	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205633N / *Aviation Improvements*	Project (Number/Name) 0601 / *Acft Handling & Service Equip*	

Test and Evaluation ($ in Millions)

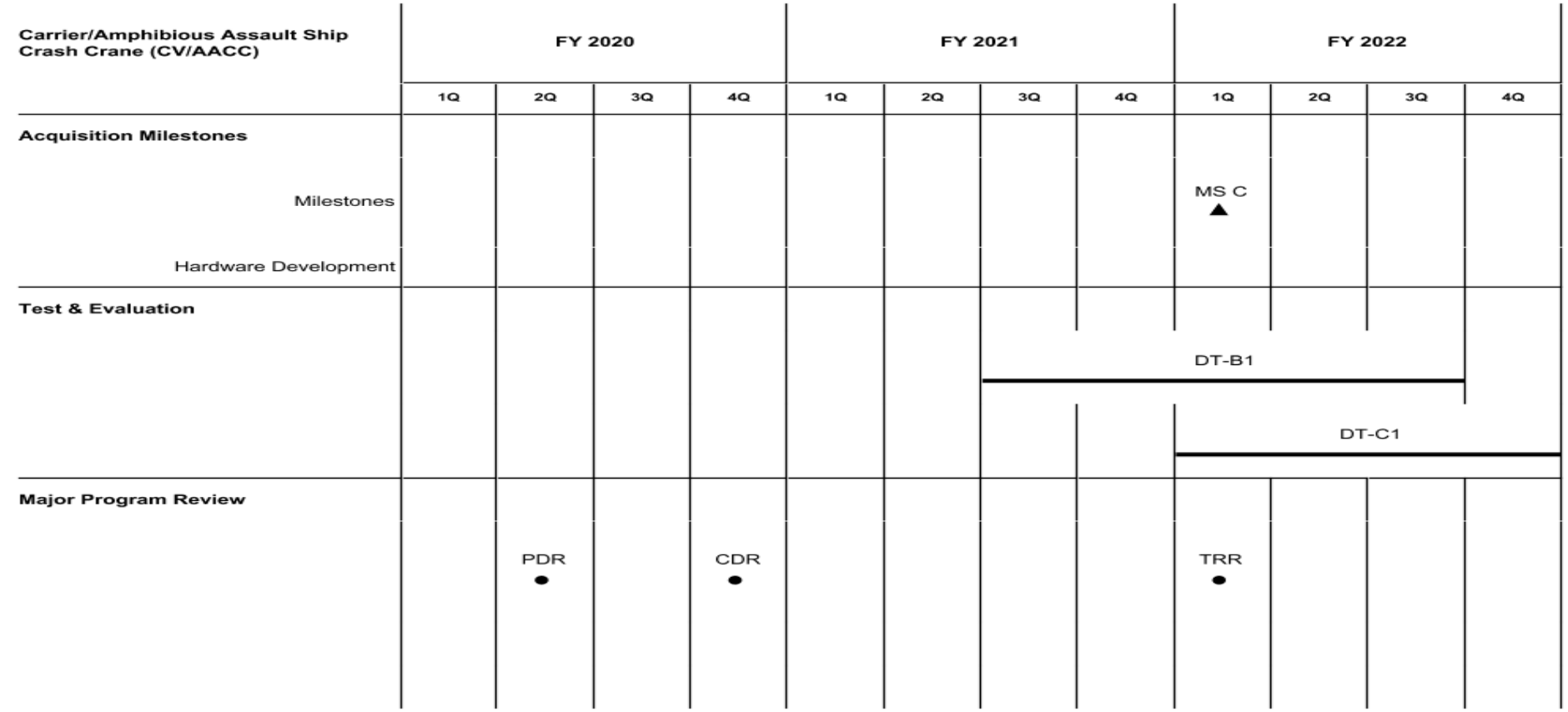
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior year T&E cost no longer funded in the FYDP	Various	Various : Various	0.919	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	5.419	1.910		0.228		1.265		-		1.265	-	-	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	42.988	8.944		1.417		3.245		-		3.245	-	-	N/A

Remarks

AMAS - Increase due to development and test events to integrate the MV-22 and E-2D ALE Information Technology (IT) solutions into the NAVAIR Standard Portable Electronic Maintenance Aid Cyber Solution (SPECS) will take place in FY22. This will eliminate two IT solutions that Naval Aviation currently support and sustain.

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0601 / *Acft Handling & Service Equip*



2022PB - 0205633N - 0601

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0601 / *Acft Handling & Service Equip*

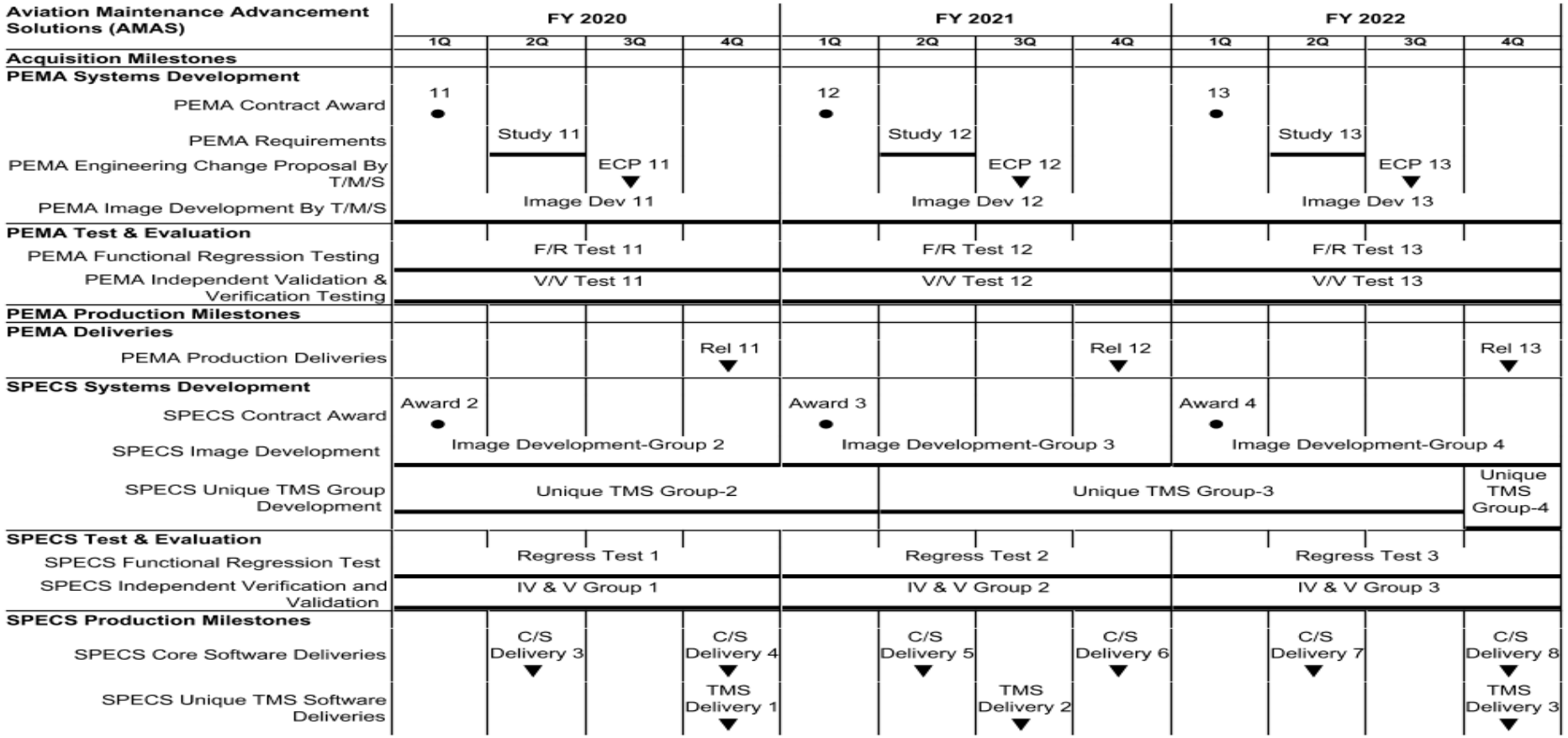


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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0601 / *Acft Handling & Service Equip*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Carrier/Amphibious Assault Ship Crash Crane (CV/AACC)				
Acquisition Milestones: Milestones: MILESTONE C	1	2022	1	2022
Test & Evaluation: DT-B1	3	2021	3	2022
Test & Evaluation: DT-C1	1	2022	4	2022
Major Program Review: PDR	2	2020	2	2020
Major Program Review: CDR	4	2020	4	2020
Major Program Review: TRR	1	2022	1	2022
Aviation Maintenance Advancement Solutions (AMAS)				
PEMA Systems Development: PEMA Contract Award: PEMA Contract Award 11	1	2020	1	2020
PEMA Systems Development: PEMA Contract Award: PEMA Contract Award 12	1	2021	1	2021
PEMA Systems Development: PEMA Contract Award: PEMA Contract Award 13	1	2022	1	2022
PEMA Systems Development: PEMA Requirements: PEMA Requirements Study Complete 11	2	2020	2	2020
PEMA Systems Development: PEMA Requirements: PEMA Requirements Study Complete 12	2	2021	2	2021
PEMA Systems Development: PEMA Requirements: PEMA Requirements Study Complete 13	2	2022	2	2022
PEMA Systems Development: PEMA Engineering Change Proposal By T/M/S: PEMA Engineering Change Proposal By T/M/S, ECP 11	3	2020	3	2020
PEMA Systems Development: PEMA Engineering Change Proposal By T/M/S: PEMA Engineering Change Proposal By T/M/S, ECP 12	3	2021	3	2021
PEMA Systems Development: PEMA Engineering Change Proposal By T/M/S: PEMA Engineering Change Proposal By T/M/S, ECP 13	3	2022	3	2022
PEMA Systems Development: PEMA Image Development By T/M/S: PEMA Image Development By T/M/S 11	1	2020	4	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0601 / *Acft Handling & Service Equip*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
PEMA Systems Development: PEMA Image Development By T/M/S: PEMA Image Development By T/M/S 12	1	2021	4	2021
PEMA Systems Development: PEMA Image Development By T/M/S: PEMA Image Development By T/M/S 13	1	2022	4	2022
PEMA Test & Evaluation: PEMA Functional Regression Testing: PEMA Functional/ Regression Testing 11	1	2020	4	2020
PEMA Test & Evaluation: PEMA Functional Regression Testing: PEMA Functional/ Regression Testing 12	1	2021	4	2021
PEMA Test & Evaluation: PEMA Functional Regression Testing: PEMA Functional/ Regression Testing 13	1	2022	4	2022
PEMA Test & Evaluation: PEMA Independent Validation & Verification Testing: PEMA Independent Validation & Verification Testing 11	1	2020	4	2020
PEMA Test & Evaluation: PEMA Independent Validation & Verification Testing: PEMA Independent Validation & Verification Testing 12	1	2021	4	2021
PEMA Test & Evaluation: PEMA Independent Validation & Verification Testing: PEMA Independent Validation & Verification Testing 13	1	2022	4	2022
PEMA Deliveries: PEMA Production Deliveries: PEMA Production Delivery, Release 11	4	2020	4	2020
PEMA Deliveries: PEMA Production Deliveries: PEMA Production Delivery, Release 12	4	2021	4	2021
PEMA Deliveries: PEMA Production Deliveries: PEMA Production Delivery, Release 13	4	2022	4	2022
SPECS Systems Development: SPECS Contract Award: SPECS Contract Award 2	1	2020	1	2020
SPECS Systems Development: SPECS Contract Award: SPECS Contract Award 3	1	2021	1	2021
SPECS Systems Development: SPECS Contract Award: SPECS Contract Award 4	1	2022	1	2022
SPECS Systems Development: SPECS Image Development: SPECS Image Development-Group 2	1	2020	4	2020
SPECS Systems Development: SPECS Image Development: SPECS Image Development-Group 3	1	2021	4	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0601 / *Acft Handling & Service Equip*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SPECS Systems Development: SPECS Image Development: SPECS Image Development-Group 4	1	2022	4	2022
SPECS Systems Development: SPECS Unique TMS Group Development: SPECS Unique TMS Group-2	1	2020	1	2021
SPECS Systems Development: SPECS Unique TMS Group Development: SPECS Unique TMS Group-3	2	2021	3	2022
SPECS Systems Development: SPECS Unique TMS Group Development: SPECS Unique TMS Group-4	4	2022	4	2022
SPECS Test & Evaluation: SPECS Functional Regression Test: SPECS Group 1	1	2020	4	2020
SPECS Test & Evaluation: SPECS Functional Regression Test: SPECS Group 2	1	2021	4	2021
SPECS Test & Evaluation: SPECS Functional Regression Test: SPECS Group 3	1	2022	4	2022
SPECS Test & Evaluation: SPECS Independent Verification and Validation: SPECS Group 1	1	2020	4	2020
SPECS Test & Evaluation: SPECS Independent Verification and Validation: SPECS Group 2	1	2021	4	2021
SPECS Test & Evaluation: SPECS Independent Verification and Validation: SPECS Group 3	1	2022	4	2022
SPECS Production Milestones: SPECS Core Software Deliveries: SPECS Deliveries 3	2	2020	2	2020
SPECS Production Milestones: SPECS Core Software Deliveries: SPECS Deliveries 4	4	2020	4	2020
SPECS Production Milestones: SPECS Core Software Deliveries: SPECS Deliveries 5	2	2021	2	2021
SPECS Production Milestones: SPECS Core Software Deliveries: SPECS Deliveries 6	4	2021	4	2021
SPECS Production Milestones: SPECS Core Software Deliveries: SPECS Deliveries 7	2	2022	2	2022
SPECS Production Milestones: SPECS Core Software Deliveries: SPECS Deliveries 8	4	2022	4	2022
SPECS Production Milestones: SPECS Unique TMS Software Deliveries: SPECS Deliveries 1	4	2020	4	2020
SPECS Production Milestones: SPECS Unique TMS Software Deliveries: SPECS Deliveries 2	3	2021	3	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0601 / *Acft Handling & Service Equip*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SPECS Production Milestones: SPECS Unique TMS Software Deliveries: SPECS Deliveries 3	4	2022	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy									Date: May 2021			
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0205633N / *Aviation Improvements*				Project (Number/Name) 0852 / *Consolidated Auto Support System*			
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**
0852: *Consolidated Auto Support System*	177.385	7.444	12.093	22.626	-	22.626	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The electronic Consolidated Automated Support System (eCASS) project is the system design and development of the latest generation of the US Navy's CASS family of automatic test systems. The legacy CASS system was designed and developed in the 1980's and commenced fielding in 1992. As such, it is reaching the end of its useful life due to obsolescence issues. eCASS is the replacement system for legacy CASS systems, which provides Naval aircraft avionics component maintenance and repair support at Intermediate and Depot maintenance facilities both shore-based and afloat. As a CASS replacement program, the eCASS program objectives remain the same as that of CASS. Specifically: (1) increase material readiness; (2) reduce life cycle costs; (3) improve tester sustainability at depot and intermediate maintenance levels; (4) reduce proliferation of unique test equipment, and (5) provide test capability for existing and emerging avionics/electronics aircraft weapon systems.

The Test Technology development project includes analysis, application, maturation, integration and testing of emerging electronic, mechanical, and optical test technologies for potential military utility for emerging requirements or obsolescence resolution in support of Naval avionics testing and repair. Specifically included are next-generation electro-optics, synthetic instruments, high-speed bus technologies, inertial device technologies, and various other elements of modernization for the Consolidated Automated Support System (CASS) family of automated test equipment, including associated Test Program Sets (TPSs) and ancillary equipment.

eCASS Modernization project includes efforts to address modernization and required obsolescence analysis and updates for eCASS as an Automatic Test System (ATS). The ATS encompasses both software and hardware updates. Modernization required to support emerging T/M/S technologies such as next-generation electro-optics, synthetic instruments, high-speed bus technologies, inertial device technologies needed for ATS support. Efforts cover eCASS, ancillary and any required Test Program Sets (TPSs) and ancillary equipment.

The Third Generation Electro-Optical (EO3) Technology Development project consists of the design and development of technology solutions, including a near-infrared camera solution to replace the existing obsolete EO3 console camera, for use in 65 fielded Navy test systems at both shore-based and afloat sites. The EO3 console subsystem is hosted by the US Navy Consolidated Automated Support System (CASS/eCASS) family of automatic test systems and is used to test, diagnose and repair the H-60 Multi-spectral Targeting System (MTS) and F/A-18 Advanced Targeting Forward Looking Infrared (ATFLIR) weapon systems. The objective of the EO3 Technology Development project is to extend the useful life of fielded EO3 systems in order to sustain H-60 MTS and F/A-18 ATFLIR weapon system readiness until the EO4 replacement system can be designed, developed, produced, and fielded.

The Fourth Generation Electro-Optical (EO4) development project consists of the design and development of the latest generation electro-optic test console for use with the electronic CASS (eCASS) automatic test system. The EO4 system will replace the legacy Third Generation Electro-Optical (EO3) system, which is facing imminent obsolescence, in providing test, repair, and maintenance capability for Naval and Marine Corps electro-optic weapon systems at both shore-based and afloat sites. As an EO3 replacement program, the EO4 program objectives remain the same as EO3. Specifically: (1) provide test capability for existing and emerging electro-optic

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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weapon systems and components; (2) increase ready basic aircraft (RBA) metrics (operational availability); (3) reduce life-cycle costs; (4) improve sustainability at intermediate and depot levels of maintenance; and (5) reduce proliferation of unique test equipment.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Test Technology Development	1.845	2.345	4.451	0.000	4.451
Articles:	-	-	-	-	-
Description: Develops, integrates, and evolves enhanced test capabilities and technologies for insertion into the Consolidated Automated Support System (CASS) family of test systems. As weapon system electronics evolve, new test capabilities are required to support advanced systems. Existing test capabilities must be extended in range, accuracy, time and frequency domains in order to sustain the required test accuracy ratios for weapon systems support (the automatic test system must be four times as accurate as the asset being tested). ***FY 2021 Plans:*** Continue evaluation of advanced technologies to support Joint Strike Fighter test requirements. Analyze incremental enhancements for Rack 2 of eCASS automatic test systems. ***FY 2022 Base Plans:*** Continue evaluation of advanced technologies to support additional test requirements. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase is required due to emerging capability requirements for additional Type/Model/Series support on CASS Family of Testers.					
Title: eCASS Modernization/Product Improvement	0.000	0.000	6.067	0.000	6.067
Articles:	-	-	-	-	-
Description: eCASS Modernization project includes efforts to address modernization and required obsolescence analysis and updates for eCASS as an Automatic Test System (ATS). The ATS encompasses both software and hardware updates. Modernization required to support emerging T/M/S technologies such as next-generation electro-optics, synthetic instruments, high-speed bus technologies, inertial device technologies needed for ATS support. Efforts cover eCASS, ancillary and any required Test Program Sets (TPSs) and ancillary equipment. ***FY 2021 Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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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
N/A ***FY 2022 Base Plans:*** eCASS modernization efforts to address emerging avionics requirements for various T/M/S to include F-35, E-2D, F/A-18 E/F. This includes addressing legacy Test Program Sets and Ancillary requirements. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase from FY 2021 to FY2022 is the funding of Future Readiness Team Initiative for HTS offload to CASS(svgs) and targeted ATE modernization.					
Title: EO4 Development	5.599	9.748	12.108	0.000	12.108
Articles:	-	-	5	-	5
Description: Design, develop, integrate, and test a Fourth Generation Electro-Optics (EO4) test system to replace the legacy EO3 test system. EO4 systems will provide the capability to test and diagnose an array of electro-optic weapons systems on F/A-18, H-60, JSF, and other aircraft platforms to support visual imaging, target identification and tracking, range finding, night-vision, and other electro-optic weapon system capabilities. ***FY 2021 Plans:*** Finalize the preliminary design review (PDR) and resolve any PDR action items. Complete the EO4 technical data package (TDP) and subsequently conduct the critical design review (CDR) to establish the initial product baseline. Place orders for 5 engineering development models. ***FY 2022 Base Plans:*** The selected contractor will deliver five (5) EO4 engineering development models to include the EO4 carts and or fixtures, along with all required technical data and logistics documentation. Conduct the critical design review (CDR) to establish the initial product baseline. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** -Fourth-Generation Electro Optic (EO4) Development budget requirements increased from FY21 to FY22 due to projected annual rate increases to direct labor categories including but are not limited to, engineering, maintenance/support, tooling, quality control, manufacturing, and integration. The increase also accounts for the					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0852 / *Consolidated Auto Support System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
selected contractor delivery of five (5) EO4 engineering development models to include the EO4 carts and or fixtures, along with all required technical data and logistics documentation. -Fourth-Generation Electro Optic (EO4)Decrease due to Congressional Mark.					
Accomplishments/Planned Programs Subtotals	7.444	12.093	22.626	0.000	22.626

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• APN/0705: *Common Ground Equipment-CASS/ATE*	109.599	118.057	124.075	-	124.075	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

Formal test technology reviews with industry are conducted annually (cooperative Joint Services initiative) to define maturity of needed technologies. Further studies are conducted as needed. Procurement strategy is determined by market survey and cooperative opportunities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0852 / *Consolidated Auto Support System*

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 Hdw Dev - Test Technology	C/CPFF	Various : Various	6.974	0.893	Dec 2019	1.170	Dec 2020	1.460	Dec 2021	-		1.460	-	-	-
Primary Hdw Dev - EO3	SS/CPFF	Northrop Grumman : Rolling Meadows, IL	3.844	0.000		0.000		0.000		-		0.000	-	-	-
Primary Hdw Dev - EO4	C/CPIF	TBD : TBD	0.000	3.500	Aug 2020	7.494	Feb 2021	9.219	Feb 2022	-		9.219	-	-	-
Prior Year Prod Dev no longer funded in the FYDP	Various	Various : Various	132.305	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	143.123	4.393		8.664		10.679		-		10.679	-	-	N/A

Support ($ 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
Test Technology Support	WR	Various : Various	2.623	0.902	Dec 2019	0.523	Dec 2020	2.891	Dec 2021	-		2.891	-	-	-
EO3 Support	WR	NAWC AD : Lakehurst, NJ	0.777	0.000		0.000		0.000		-		0.000	-	-	-
eCASS Modernization	WR	Various : Various	0.000	0.000		0.000		6.067	Dec 2021	-		6.067	-	-	-
EO4 Support	WR	NAWC AD : Lakehurst, NJ	0.000	2.023	Oct 2019	2.792	Dec 2020	2.781	Dec 2021	-		2.781	-	-	-
Prior Year Support no longer funded in the FYDP	Various	Various : Various	27.703	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	31.103	2.925		3.315		11.739		-		11.739	-	-	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
Test Tech Travel	WR	Various : Various	0.398	0.050	Nov 2019	0.037	Nov 2020	0.100	Nov 2021	-		0.100	-	-	-
EO3 Travel	WR	Various : Various	0.102	0.000		0.000		0.000		-		0.000	-	-	-
EO4 Travel	WR	Various : Various	0.000	0.076	Nov 2019	0.077	Nov 2020	0.108	Nov 2021	-		0.108	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0852 / *Consolidated Auto Support System*

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
Prior Year Mgmt no longer funded in the FYDP	Various	Various : Various	2.659	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	3.159	0.126		0.114		0.208		-		0.208	-	-	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	177.385	7.444		12.093		22.626		-		22.626	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0852 / *Consolidated Auto Support System*

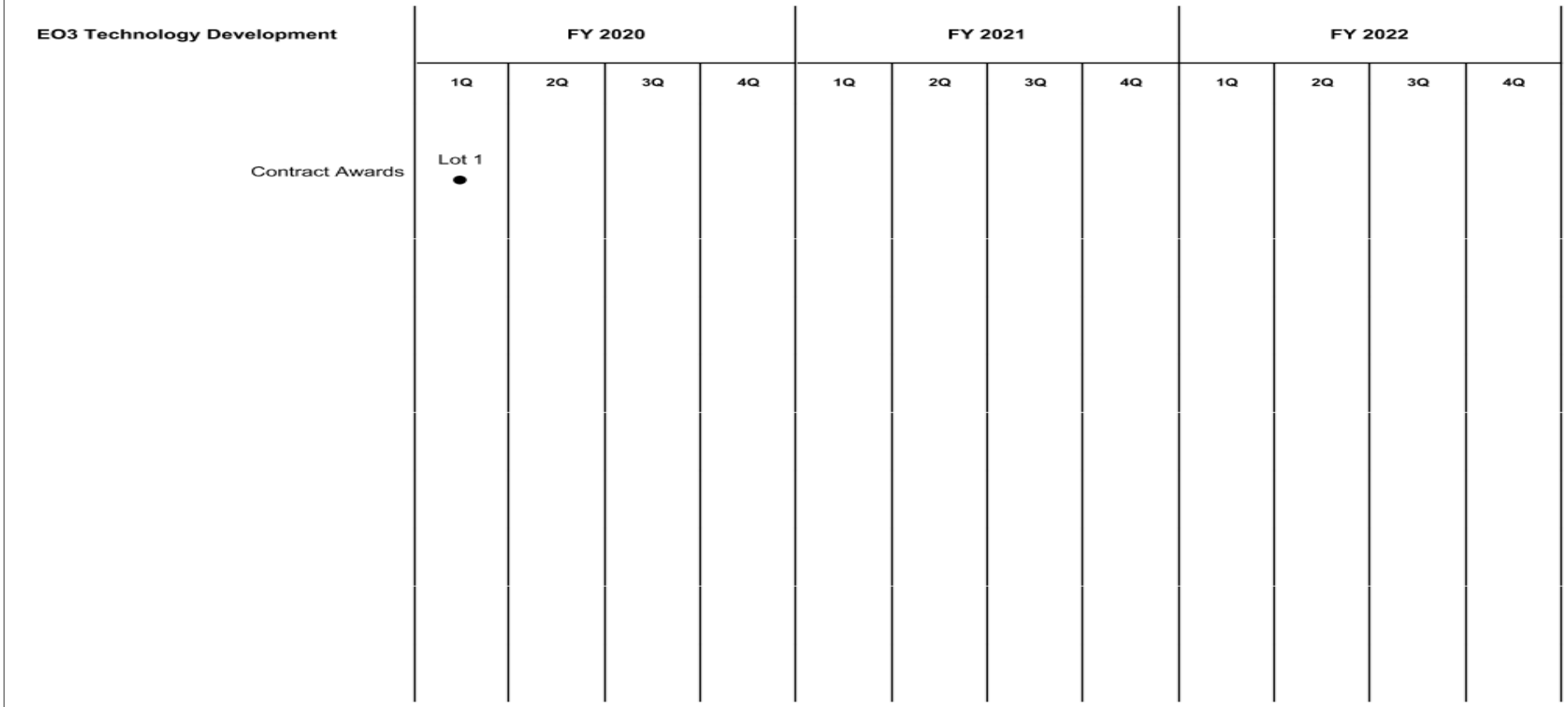

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0852 / *Consolidated Auto Support System*

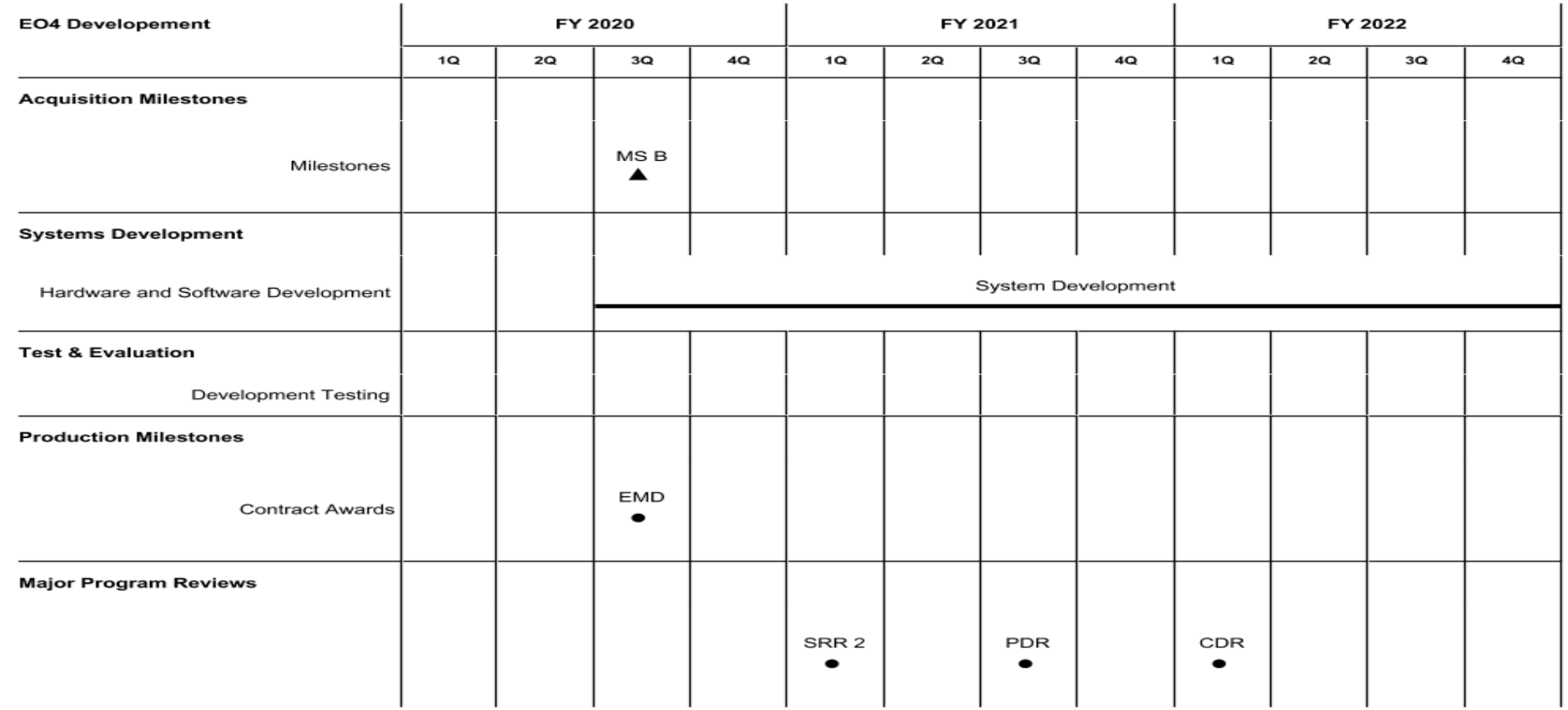

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 0852 / *Consolidated Auto Support System*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
EO3 Technology Development				
Contract Awards: Lot 1 - 10 Units-APN	1	2020	1	2020
EO4 Developement				
Acquisition Milestones: Milestones: Milestone B	3	2020	3	2020
Systems Development: Hardware and Software Development: System Development	3	2020	4	2022
Production Milestones: Contract Awards: EMD	3	2020	3	2020
Major Program Reviews: SRR 2	1	2021	1	2021
Major Program Reviews: PDR	3	2021	3	2021
Major Program Reviews: CDR	1	2022	1	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205633N / *Aviation Improvements*	Project (Number/Name) 1041 / *Aircraft Equipment Reliability/ Maintainability Improvement Program (AERMIP)*	

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
1041: *Aircraft Equipment Reliability/Maintainability Improvement Program (AERMIP)*	64.766	3.315	3.113	3.364	-	3.364	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Aircraft Equipment Reliability/Maintainability Improvement Program (AERMIP) is the only Navy program which provides Research, Development, Test & Evaluation engineering support specifically for in-service, out-of-production aircraft equipment. AERMIP increases readiness through reliability, maintainability, and safety improvements to existing systems and equipment installed in Naval aircraft. It also provides a transition vehicle to deploy Total Ownership Cost reduction initiatives through flight-test support and Fleet Test & Evaluation. It meets affordable readiness objectives by providing a cost-effective solution to obsolescence problems encountered when service lives are extended. AERMIP promotes commonality and standardization across aircraft platform lines and among the services through extension of application and use of non-developmental items. AERMIP also decreases life cycle costs through reduced operational and support costs. AERMIP facilitates the Operational, Safety and Improvement Program by applying proven low-risk solutions to current fleet problems. AERMIP also funds high-priority flight testing which is not associated with any acquisition or development program under the Flight Test General task.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Avionics and Wiring	0.400	0.395	0.387	0.000	0.387
Articles:	-	-	-	-	-
FY 2021 Plans: Test and evaluate equipment for effectiveness of wiring diagnostics and prognostics. Address avionics related reliability/maintainability issues impacting multiple aircraft platforms while continuing to investigate high value return on investment initiatives. Qualify additional material or pieces of equipment and the procedures or processes required for implementation.					
FY 2022 Base Plans: Test and evaluate equipment for effectiveness of wiring diagnostics and prognostics. Address avionics related reliability/maintainability issues impacting multiple aircraft platforms while continuing to investigate high value					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1041 / *Aircraft Equipment Reliability/ Maintainability Improvement Program (AERMIP)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
return on investment initiatives. Qualify additional material or pieces of equipment and the procedures or processes required for implementation. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease of $0.008 from FY2021 to FY2022 due to decrease in organic labor requirements.					
Title: Air Vehicle	2.018	1.872	2.052	0.000	2.052
Articles:	-	-	-	-	-
FY 2021 Plans: Based on advancement in technology, test and qualify new materials or equipment and the procedures/process required for their implementation to improve operational reliability, while containing cost growth. Continue to test and qualify improved corrosion preventative compounds. Address subsystem related reliability/maintainability issues impacting multiple aircraft platforms while continuing to investigate high value return on investment initiatives. Maintain efforts to qualify improved methods of structural component repair. ***FY 2022 Base Plans:*** Based on advancement in technology, test and qualify new materials or equipment and the procedures/process required for their implementation to improve operational reliability, while containing cost growth. Continue to test and qualify improved corrosion preventative compounds. Address subsystem related reliability/maintainability issues impacting multiple aircraft platforms while continuing to investigate high value return on investment initiatives. Maintain efforts to qualify improved methods of structural component repair. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase of $0.18 from FY2021 to FY2022 to support an increase in organic labor requirements.					
Title: Systems Engineering Revitalization	0.897	0.846	0.925	0.000	0.925
Articles:	-	-	-	-	-
FY 2021 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1041 / *Aircraft Equipment Reliability/ Maintainability Improvement Program (AERMIP)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Continue research in relevant technical areas for refining use of system models for linkages to physics based models for PLM systems. Continue the transition to model based systems engineering methodology. Refine processes and procedures for developing and extending systems models. Continue development of standard model libraries and stereotypes for reuse across system models. ***FY 2022 Base Plans:*** Continue research in relevant technical areas for refining use of system models for linkages to physics based models for PLM systems, data visualization of model data to inform high level assessments and stakeholder decisions and automated translation of document data straight into models. Continue the transition to model based systems engineering methodology. Refine processes and procedures for developing and extending systems models. Continue development of standard model libraries and stereotypes for reuse across system models. Continue research on linking models to risk management systems. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase of $0.079 from FY2021 to FY2022 to support an increase in organic labor requirements.					
Accomplishments/Planned Programs Subtotals	3.315	3.113	3.364	0.000	3.364

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

This is a non-ACAT program. Procurement strategy is determined by market survey and cooperative opportunities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1041 / *Aircraft Equipment Reliability/ Maintainability Improvement Program (AERMIP)*	

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
Sys Eng - Avionics/Wiring	WR	NAWCAD : Patuxent River, MD	9.574	0.245	Oct 2019	0.245	Oct 2020	0.288	Oct 2021	-		0.288	-	-	-
Sys Eng - Avionics/Wiring	C/FFP	Various : Various	2.860	0.080	Jan 2020	0.060	Jan 2021	0.059	Jan 2022	-		0.059	-	-	-
Sys Eng - Avionics/Wiring	WR	FRC-E : Cherry Point, NC	0.130	0.020	Nov 2019	0.010	Nov 2020	0.010	Nov 2021	-		0.010	-	-	-
Sys Eng - Avionics/Wiring	WR	FRC-SE : Jacksonville, FL	0.030	0.010	Nov 2019	0.010	Nov 2020	0.010	Nov 2021	-		0.010	-	-	-
Sys Eng - Avionics/Wiring	WR	FRC-SW : San Diego, CA	0.030	0.010	Nov 2019	0.020	Nov 2020	0.015	Nov 2021	-		0.015	-	-	-
Sys Eng - Air Vehicle	WR	NAWCAD : Patuxent River, MD	13.166	1.007	Nov 2019	0.797	Oct 2020	0.904	Oct 2021	-		0.904	-	-	-
Sys Eng - Air Vehicle	WR	FRC-SW : San Diego, CA	2.581	0.300	Nov 2019	0.400	Nov 2020	0.425	Nov 2021	-		0.425	-	-	-
Sys Eng - Air Vehicle	WR	FRC-E : Cherry Point, NC	2.186	0.150	Nov 2019	0.150	Nov 2020	0.150	Nov 2021	-		0.150	-	-	-
Sys Eng - Air Vehicle	WR	FRC-SE : Jacksonville, FL	1.256	0.100	Nov 2019	0.225	Nov 2020	0.247	Nov 2021	-		0.247	-	-	-
Sys Eng - Air Vehicle	C/FFP	Various : Various	3.152	0.250	Dec 2019	0.150	Jan 2021	0.150	Dec 2021	-		0.150	-	-	-
Sys Eng - SE Revitalization	WR	NAWCAD : Patuxent River, MD	1.021	0.019	Dec 2019	0.006	Oct 2020	0.007	Oct 2021	-		0.007	-	-	-
Sys Eng - SE Revitalization	C/FFP	Engility Corp. : Chantilly, VA	5.584	0.234	Feb 2020	0.280	Feb 2021	0.301	Feb 2022	-		0.301	-	-	-
Sys Eng - SE Revitalization	C/CPFF	Stevens Inst of Technology : Hoboken, NJ	3.244	0.690	Feb 2020	0.560	Feb 2021	0.598	Feb 2022	-		0.598	-	-	-
Prior Year Sys Eng NAE/ Prod Dev no longer funded in the FYDP	Various	Various : Various	2.813	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	47.627	3.115		2.913		3.164		-		3.164	-	-	N/A

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

Remarks

All prior year lines have been consolidated

Support ($ 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
Prior Year Support cost no longer funded in the FYDP	Various	Various : Various	12.480	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	12.480	0.000		0.000		0.000		-		0.000	-	-	N/A

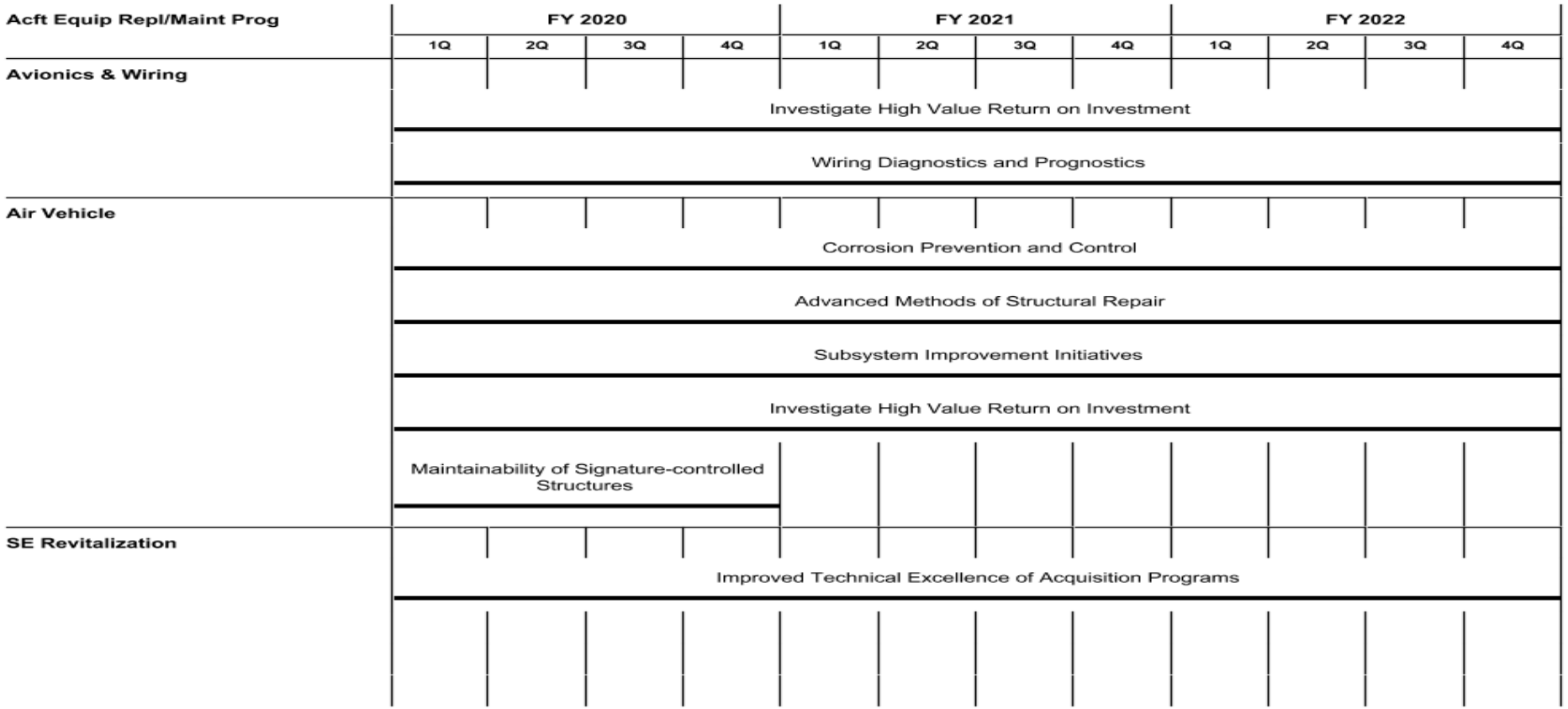
Management Services ($ in Millions)

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
Program Management Support	WR	NAWCAD : Patuxent River, MD	2.688	0.200	Oct 2019	0.200	Oct 2020	0.200	Oct 2021	-		0.200	-	-	-
Prior Year Mgmt cost no longer funded in the FYDP	Various	Various : Various	1.971	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	4.659	0.200		0.200		0.200		-		0.200	-	-	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	64.766	3.315		3.113		3.364		-		3.364	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1041 / *Aircraft Equipment Reliability/ Maintainability Improvement Program (AERMIP)*



2022PB - 0205633N - 1041

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1041 / *Aircraft Equipment Reliability/ Maintainability Improvement Program (AERMIP)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Acft Equip Repl/Maint Prog				
Avionics & Wiring: Investigate High Value Return on Avionics & Wiring Investment	1	2020	4	2022
Avionics & Wiring: Wiring Diagnostics and Prognostics	1	2020	4	2022
Air Vehicle: Corrosion Prevention and Control	1	2020	4	2022
Air Vehicle: Advanced Methods of Structural Repair	1	2020	4	2022
Air Vehicle: Subsystem Improvement Initiatives	1	2020	4	2022
Air Vehicle: Investigate High Value Return on Air Vehicle Investment	1	2020	4	2022
Air Vehicle: Maintainability of Signature-controlled Structures	1	2020	4	2020
SE Revitalization: Improved Technical Excellence of Acquisition Programs	1	2020	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy												Date: May 2021
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0205633N / *Aviation Improvements*				Project (Number/Name) 1355 / *Propulsion and Power Component Improvement Program*			
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
1355: *Propulsion and Power Component Improvement Program*	1,337.285	96.317	109.391	102.757	-	102.757	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Propulsion and Power (P&P) Component Improvement Program (CIP) provides the only source of critical design and development engineering support to resolve safety, reliability and maintainability deficiencies of in-service Navy and Marine Corps aircraft propulsion systems. The highest priority issues P&P CIP addresses concern safety-of-flight deficiencies, which account for approximately 80% of P&P CIP efforts. The program also corrects service-revealed deficiencies, improves Operational Readiness and Reliability and Maintainability, and reduces platform Life Cycle Cost. Budgets are allocated across platform-specific teams and multi-platform product support teams based upon long term strategies to achieve safety and affordable readiness goals; the R-3 exhibit details annual portions of those long-term strategies. P&P CIP tasks have reduced the rate of in-flight aborts, safety incidents, non-mission capable rates, scheduled and unscheduled engine removals, maintenance work hours, and overall cost of ownership. This is accomplished through the maintenance and validation of specification performance, testing to qualify engineering changes, verifying life limits, and improving the inherent reliability of the propulsion and power systems as an integral part of Reliability Centered Maintenance initiatives. Historically, the missions, tactics, and environmental exposure of military aircraft systems change to meet new threats or operational demands, and often result in unforeseen problems, which if not corrected, can cause critical safety/readiness degradation, such as those experienced during OPERATIONS DESERT SHIELD/DESERT STORM, ENDURING FREEDOM, and IRAQI FREEDOM due to sand erosion. In addition, new problems arise through actual fleet deployment and usage of the aircraft. System development programs, while geared to resolve as many problems as possible before deployment, cannot duplicate actual operations or account for the vast array of environmental and usage variables, particularly when aircraft missions vary from those that the aircraft was designed to perform. Therefore, it has been found that P&P CIP can provide an immediate engineering response to these flight-critical problems and accelerated engine testing can avoid potential problems. P&P CIP starts after development and Navy acceptance of the first production article and addresses usage and life problems not covered by warranties. P&P CIP addresses engines, transmissions, propellers, starters, auxiliary power units, electrical generating systems, aircraft wiring, and fuel and lubricant systems. These efforts continue over the system's life, gradually decreasing to a minimum level sufficient to maintain the reliability, and decrease the operating costs, of older inventory. P&P CIP is a highly leveraged and cooperative tri-service program with Foreign Military Sales participation.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**
Title: P3, E2, C2, C130 (T56)	10.200	9.200	6.250	0.000	6.250
Articles:	-	-	-	-	-
FY 2021 Plans: Continue joint projects with the USAF on the T56 Series III engine on the analysis, design and qualification of improvements to address Service Revealed Deficiencies and preform repair engineering development to					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
system components including bearings, seals and drives, the compressor, combustor, turbine, control system, static structures, and gearboxes. For the T56 Series IV engine perform analysis, design and qualification work related to address Service Revealed Deficiencies and safety, readiness and cost drivers on system components and execute projects on engine performance standardization, rub tolerant turbine blades, fuel nozzle anti-coke coating, step up gearbox oil leakage and updated software for the propulsion control and monitoring unit. Develop, design and test improvements to system components including the compressor, combustor, turbine, controls and diagnostic systems, static structures, gearboxes, bearings, seals, drives, engine fuel and lubrication systems and auxiliary power, and electrical power systems. ***FY 2022 Base Plans:*** Continue joint projects with the USAF on the T56 Series III engine on the analysis, design and qualification of improvements to address Service Revealed Deficiencies and preform repair engineering development to system components including bearings, seals and drives, the compressor, combustor, turbine, control system, static structures, and gearboxes. For the T56 Series IV engine perform analysis, design and qualification work related to address Service Revealed Deficiencies and safety, readiness and cost drivers on system components and execute projects on engine performance standardization, rub tolerant turbine blades, fuel nozzle anti-coke coating, step up gearbox oil leakage and updated software for the propulsion control and monitoring unit. Develop, design and test improvements to system components including the compressor, combustor, turbine, controls and diagnostic systems, static structures, gearboxes, bearings, seals, drives, engine fuel and lubrication systems and auxiliary power, and electrical power systems. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease of $2.95M from FY2021 to FY2022 due to reduced investment in legacy T56 powered platforms					
Title: E2/C2/C130/P3 (Props)	3.500	3.700	3.700	0.000	3.700
Articles:	-	-	-	-	-
FY 2021 Plans: Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on system components for the 54H60, R391 and NP2000 propeller systems. Develop, design and test 54H60, R391 and NP2000 Propeller system improvements to the control, pitch actuation and hydraulic systems, blades, pumps, housings, seals and static structure to improve safety, reliability, maintainability, affordability, durability and Readiness. Execute engineering efforts on repair and					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
reliability engineering, universal closed loop bench test system, fleet metric database development and management and perform analysis, design and testing on the NP2000 modern pump housing and onboard propeller balance monitoring systems. ***FY 2022 Base Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on system components for the 54H60, R391 and NP2000 propeller systems. Develop, design and test 54H60, R391 and NP2000 Propeller system improvements to the control, pitch actuation and hydraulic systems, blades, pumps, housings, seals and static structure to improve safety, reliability, maintainability, affordability, durability and Readiness. Execute engineering efforts on repair and reliability engineering, universal closed loop bench test system, fleet metric database development and management and perform analysis, design and testing on the NP2000 modern pump housing and onboard propeller balance monitoring systems. ***FY 2022 OCO Plans:*** N/A					
Title: SH-60B/F, HH-60H, MH-60R/S (T700)	5.200	6.495	6.495	0.000	6.495
Articles:	-	-	-	-	-
FY 2021 Plans: Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the T700 propulsion and power system components including the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, engine fuel and lubrication systems, auxiliary power and electrical power systems, and main and tail rotor drives systems. Perform analysis, design and testing on projects to improve the compression system and static structures tolerance to sand ingestion, update engine performance modeling and engine build optimization. Perform analysis, modeling design and testing on projects related to air vehicle drive system damage tolerance and reparability. Conduct lithium battery qualification testing. Perform engine and component testing to develop and qualify design improvements. ***FY 2022 Base Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the T700 propulsion and power system components including the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, engine fuel and lubrication systems, auxiliary power and electrical power systems, and main and tail rotor					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
drives systems. Perform analysis, design and testing on projects to improve the compression system and static structures tolerance to sand ingestion, update engine performance modeling and engine build optimization. Perform analysis, modeling design and testing on projects related to air vehicle drive system damage tolerance and reparability. Conduct lithium battery qualification testing. Perform engine and component testing to develop and qualify design improvements. ***FY 2022 OCO Plans:*** N/A					
Title: H-1 (T400/T700) ***Articles:*** ***FY 2021 Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the T700 propulsion and power system components including the compressor, combustor, turbines, controls, diagnostics, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power, electrical power systems and main and tail rotor drives systems. ***FY 2022 Base Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the T700 propulsion and power system components including the compressor, combustor, turbines, controls, diagnostics, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power, electrical power systems and main and tail rotor drives systems. ***FY 2022 OCO Plans:*** N/A	0.500 -	0.600 -	0.600 -	0.000 -	0.600 -
Title: AV-8B (F402) ***Articles:*** ***FY 2021 Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the F402 propulsion and power system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, engine fuel and lubrication systems, auxiliary power, electrical power and FOD detection systems. Continue working on risk management plan of supplying critical parts and refinement of life limit determinations	3.450 -	3.651 -	3.651 -	0.000 -	3.651 -

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
and identification of critical parts constraints to improve safety, reliability, maintainability, affordability, durability and Readiness. ***FY 2022 Base Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the F402 propulsion and power system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, engine fuel and lubrication systems, auxiliary power, electrical power and FOD detection systems. Continue working on risk management plan of supplying critical parts and refinement of life limit determinations and identification of critical parts constraints to improve safety, reliability, maintainability, affordability, durability and Readiness. ***FY 2022 OCO Plans:*** N/A					
Title: H-53/H-46/H-3 (T58/T64)	3.800	4.050	4.050	0.000	4.050
Articles:	-	-	-	-	-
FY 2021 Plans: Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the T64 propulsion and power system components including the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems and air vehicle drive system components to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform analysis, design and testing to develop inspection and repair criteria, optimized depot-level engine build specification procedures, and data reduction program implementation. Update engine mission usage and hardware life management plans. ***FY 2022 Base Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the T64 propulsion and power system components including the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems and air vehicle drive system components to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform analysis, design and					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
testing to develop inspection and repair criteria, optimized depot-level engine build specification procedures, and data reduction program implementation. Update engine mission usage and hardware life management plans. ***FY 2022 OCO Plans:*** N/A					
Title: F-18 C/D/E/F (F414/F404) ***Articles:***	18.111 -	18.111 -	17.160 -	0.000 -	17.160 -
FY 2021 Plans: Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on propulsion and power system components for the F414 and F404 turbofan engines including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems, augmenter and exhaust systems to improve reliability, maintainability, affordability, durability. Perform engine and component test programs including rotor spin tests and accelerated simulated mission endurance testing. ***FY 2022 Base Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on propulsion and power system components for the F414 and F404 turbofan engines including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems, augmenter and exhaust systems to improve reliability, maintainability, affordability, durability. Perform engine and component test programs including rotor spin tests and accelerated simulated mission endurance testing. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease of $0.951 from FY21 to FY22 due to reduced investment for legacy hornet program.					
Title: T-45 (F405) ***Articles:***	2.450 -	2.600 -	2.600 -	0.000 -	2.600 -
FY 2021 Plans: Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies, safety, readiness and cost drivers on the F405 propulsion and power system components including fan, compressor,					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform analysis, design and testing on projects to update rotating engine part lives and mitigation approaches to address propulsion and power system component obsolescence issues and engine performance degradation. ***FY 2022 Base Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies, safety, readiness and cost drivers on the F405 propulsion and power system components including fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform analysis, design and testing on projects to update rotating engine part lives and mitigation approaches to address propulsion and power system component obsolescence issues and engine performance degradation. ***FY 2022 OCO Plans:*** N/A					
Title: V-22 Propulsion	6.000	6.400	6.400	0.000	6.400
Articles:	-	-	-	-	-
FY 2021 Plans: Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the AE1107C propulsion and power system components the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems and prop rotor drive systems to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform analysis, design and testing on projects to mitigate rapid power loss and engine surge, and improve engine durability and operability, update engine part lives and management plan with updated mission mix, execute prop rotor input quill clutch system redesign and improve power assurance check accuracy to improve mission planning. Perform engine analytical condition inspections, air vehicle drive system damage tolerance assessment and turbine rig and full scale engine testing. ***FY 2022 Base Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost drivers on the AE1107C propulsion and power system components the compressor,					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems and prop rotor drive systems to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform analysis, design and testing on projects to mitigate rapid power loss and engine surge, and improve engine durability and operability, update engine part lives and management plan with updated mission mix, execute prop rotor input quill clutch system redesign and improve power assurance check accuracy to improve mission planning. Perform engine analytical condition inspections, air vehicle drive system damage tolerance assessment and turbine rig and full scale engine testing. ***FY 2022 OCO Plans:*** N/A					
Title: Adversary (J85) (F100) ***Articles:***	2.240 -	2.350 -	2.350 -	0.000 -	2.350 -
FY 2021 Plans: Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and Readiness and cost drivers on the J85 and F100 propulsion and power system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems, augmenter and exhaust systems to improve safety, reliability, maintainability, affordability, durability. Continue joint projects with the USAF to perform analysis, design and testing on projects to validate the life assessment of J85 critical rotating hardware, address parts obsolescence issues, evaluate hardware inspection data, and perform stress modeling to update life limits, implement upgraded engine performance monitoring system, and implement improved turbine thermocouple probe and harness redesign. ***FY 2022 Base Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and Readiness and cost drivers on the J85 and F100 propulsion and power system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems, augmenter and exhaust systems to improve safety, reliability, maintainability, affordability, durability. Continue joint projects with the USAF to perform analysis, design and testing on projects to validate the life assessment of J85 critical rotating hardware, address parts obsolescence issues, evaluate hardware inspection data, and perform stress modeling to update					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
life limits, implement upgraded engine performance monitoring system, and implement improved turbine thermocouple probe and harness redesign. ***FY 2022 OCO Plans:*** N/A					
Title: Joint Strike Fighter (F135 Engine) ***Articles:*** ***FY 2021 Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost and reliability drivers on propulsion and power system components of the F135 engine and STOVL lift system in accordance with F-35 Program Instruction 1540.05 F135 CIP Management Guide for the F135 Propulsion System Component Improvement Program. Develop, design and test improvements to system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems, augmenter, exhaust and STOVL Lift system to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform engine testing and STOVL propulsion system testing at government and contractor test facilities. ***FY 2022 Base Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost and reliability drivers on propulsion and power system components of the F135 engine and STOVL lift system in accordance with F-35 Program Instruction 1540.05 F135 CIP Management Guide for the F135 Propulsion System Component Improvement Program. Develop, design and test improvements to system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems, augmenter, exhaust and STOVL Lift system to improve safety, reliability, maintainability, affordability, durability and Readiness. Perform engine testing and STOVL propulsion system testing at government and contractor test facilities. ***FY 2022 OCO Plans:*** N/A	23.208 -	33.665 -	33.665 -	0.000 -	33.665 -
Title: P-8A (CFM56 Engine) ***Articles:***	0.600 -	0.650 -	0.650 -	0.000 -	0.650 -

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
FY 2021 Plans: Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost and reliability drivers on propulsion and power system components of the CFM56 system including the fan, compressor, combustors, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems to improve safety, reliability, maintainability, affordability, and durability. ***FY 2022 Base Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost and reliability drivers on propulsion and power system components of the CFM56 system including the fan, compressor, combustors, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems to improve safety, reliability, maintainability, affordability, and durability. ***FY 2022 OCO Plans:*** N/A					
Title: H-53K Propulsion (T408)	7.850	9.000	9.000	0.000	9.000
Articles:	-	-	-	-	-
FY 2021 Plans: Perform engineering analysis, design and test efforts to address identified deficiencies and safety readiness and cost and reliability drivers on the T408 propulsion and power system components including the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems and main and tail rotor drive systems to improve safety, reliability, maintainability, affordability, durability. Acquire an engine test vehicle to qualify design changes developed under the component improvement program and perform component level and uninstalled engine testing. ***FY 2022 Base Plans:*** Perform engineering analysis, design and test efforts to address identified deficiencies and safety readiness and cost and reliability drivers on the T408 propulsion and power system components including the compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems and main and tail rotor drive systems to improve safety, reliability, maintainability, affordability, durability. Acquire an engine test vehicle to qualify design					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
changes developed under the component improvement program and perform component level and uninstalled engine testing. ***FY 2022 OCO Plans:*** N/A					
Title: Multi-Platform Product Support Teams	7.158	6.039	3.306	0.000	3.306
Articles:	-	-	-	-	-
FY 2021 Plans: Continue projects to provide support to multiple platforms to analyze fleet component removal driver and reliability metrics to focus CIP investments to maximize return on investment, improve performance analysis, structural integrity modeling and simulation tools, and developmental test and evaluation facilities and procedures for propulsion and power system including engines, drive systems, fuels and lubricants, auxiliary power and electrical power systems. Includes funding for Government Furnished Fuel for research and development test and evaluation programs to evaluate and qualify component design improvements to improve safety, readiness, reliability, maintainability and durability.					
FY 2022 Base Plans: Continue projects to provide support to multiple platforms to analyze fleet component removal driver and reliability metrics to focus CIP investments to maximize return on investment, improve performance analysis, structural integrity modeling and simulation tools, and developmental test and evaluation facilities and procedures for propulsion and power system including engines, drive systems, fuels and lubricants, auxiliary power and electrical power systems. Includes funding for Government Furnished Fuel for research and development test and evaluation programs to evaluate and qualify component design improvements to improve safety, readiness, reliability, maintainability and durability.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Decrease of $2.733 from FY21 to FY22 due to Several Product Support Team efforts aligned to individual programs consistent with NAVAIR MAO structure.					
Title: MQ-4C (AE3007 Engine)	1.400	1.500	1.500	0.000	1.500
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
FY 2021 Plans: Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost and reliability drivers on the AE3007 propulsion and power system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems to improve safety, reliability, maintainability, affordability, and durability. ***FY 2022 Base Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost and reliability drivers on the AE3007 propulsion and power system components including the fan, compressor, combustor, turbines, control and diagnostic systems, static structures, gearboxes, bearings, seals, drives, fuel and lubrication systems, auxiliary power and electrical power systems to improve safety, reliability, maintainability, affordability, and durability. ***FY 2022 OCO Plans:*** N/A					
Title: UAV Programs (Various)	0.650	1.380	1.380	0.000	1.380
Articles:	-	-	-	-	-
FY 2021 Plans: Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost and reliability drivers on the propulsion and power systems for small and medium size Unmanned Air Vehicles (UAVs) including the RQ-21 Small Tactical Unmanned Aerial System (STUAS) and the MQ-8B and MQ-8C Fire Scout variants. Develop, design and test improvements to system components including the engine components, control and diagnostic systems, static structures, bearings, seals, drives, fuel and lubrication systems, ignition and electrical power systems, exhaust system and the propeller to improve safety, reliability, maintainability, affordability, and durability. ***FY 2022 Base Plans:*** Perform engineering analysis, design and test efforts to address Service Revealed Deficiencies and safety, readiness and cost and reliability drivers on the propulsion and power systems for small and medium size Unmanned Air Vehicles (UAVs) including the RQ-21 Small Tactical Unmanned Aerial System (STUAS) and the MQ-8B and MQ-8C Fire Scout variants. Develop, design and test improvements to system components including the engine components, control and diagnostic systems, static structures, bearings, seals, drives, fuel					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
and lubrication systems, ignition and electrical power systems, exhaust system and the propeller to improve safety, reliability, maintainability, affordability, and durability. ***FY 2022 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	96.317	109.391	102.757	0.000	102.757

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

This is a NON-ACAT program. Procurement strategy is determined by market survey and cooperative opportunities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205633N / *Aviation Improvements*	Project (Number/Name) 1355 / *Propulsion and Power Component Improvement Program*	

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
Sys Eng T56 Engine Program	WR	NAWCAD : Patuxent River, MD	51.220	4.100	Oct 2019	3.700	Oct 2020	2.750	Oct 2021	-		2.750	-	-	-
Sys Eng T56 Engine Program	SS/CPFF	Rolls Royce : Indianapolis, IN	67.841	5.400	Jan 2020	5.000	Jan 2021	3.050	Jan 2022	-		3.050	-	-	-
Sys Eng T56 Engine Program	WR	FRC-E : Cherry Point, NC	3.935	0.500	Oct 2019	0.300	Oct 2020	0.270	Oct 2021	-		0.270	-	-	-
Sys Eng T56 Engine Program	WR	FRC-SE : Jacksonville, FL	0.996	0.100	Oct 2019	0.100	Oct 2020	0.090	Oct 2021	-		0.090	-	-	-
Sys Eng T56 Engine Program	WR	FRC-SW : North Island, CA	0.278	0.100	Oct 2019	0.100	Oct 2020	0.090	Oct 2021	-		0.090	-	-	-
Sys Eng Props Program	SS/CPFF	Hamilton Sundstrand : Windsor Locks, CT	33.533	3.500	Jan 2020	3.700	Jan 2021	2.700	Jan 2022	-		2.700	-	-	-
Sys Eng Props Program	SS/CPFF	Dowty Propellers : Gloucester UK	0.000	0.000		0.000		1.000	Jan 2022	-		1.000	-	-	-
Sys Eng T700 Engine Program	WR	NAWCAD : Patuxent River, MD	22.427	2.500	Oct 2019	3.600	Oct 2020	3.600	Oct 2021	-		3.600	-	-	-
Sys Eng T700 Engine Program	SS/CPFF	General Electric : Lynn, MA	40.721	3.200	Jan 2020	3.500	Jan 2021	3.500	Jan 2022	-		3.500	-	-	-
Sys Eng F402 Engine Program	WR	NAWCAD : Patuxent River, MD	24.507	1.700	Oct 2019	1.800	Oct 2020	1.800	Oct 2021	-		1.800	-	-	-
Sys Eng F402 Engine Program	WR	FRC-E : Cherry Point, NC	1.237	0.150	Oct 2019	0.151	Oct 2020	0.152	Oct 2021	-		0.152	-	-	-
Sys Eng F402 Engine Program	SS/CPFF	Rolls Royce : Bristol, England, UK	80.960	1.600	Jan 2020	1.700	Jan 2021	1.700	Jan 2022	-		1.700	-	-	-
Sys Eng T58/T64 Engine Program	WR	NAWCAD : Patuxent River, MD	41.580	2.100	Oct 2019	2.200	Oct 2020	2.200	Oct 2021	-		2.200	-	-	-
Sys Eng T58/T64 Engine Program	SS/CPFF	General Electric : Lynn, MA	91.500	1.700	Jan 2020	1.850	Jan 2021	1.850	Jan 2022	-		1.850	-	-	-
Sys Eng F414/F404 Engine Program	WR	NAWCAD : Patuxent River, MD	57.684	3.800	Oct 2019	4.110	Oct 2020	4.110	Oct 2021	-		4.110	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

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
Sys Eng F414/F404 Engine Program	SS/CPFF	General Electric : Lynn, MA	192.624	14.061	Jan 2020	13.751	Jan 2021	12.892	Jan 2022	-		12.892	-	-	-
Sys Eng F414/F404 Engine Program	WR	FRC-SE : Jacksonville, FL	1.473	0.250	Nov 2019	0.250	Nov 2020	0.250	Nov 2021	-		0.250	-	-	-
Sys Eng F405 Engine Program	WR	NAWCAD : Patuxent River, MD	14.835	1.400	Oct 2019	1.500	Oct 2020	1.500	Oct 2021	-		1.500	-	-	-
Sys Eng F405 Engine Program	SS/CPFF	Rolls Royce : Bristol, England, UK	39.979	1.050	Jan 2020	1.100	Jan 2021	1.100	Jan 2022	-		1.100	-	-	-
Sys Eng V-22 Propulsion Program	WR	NAWCAD : Patuxent River, MD	3.738	2.000	Oct 2019	2.100	Oct 2020	2.100	Oct 2021	-		2.100	-	-	-
Sys Eng V-22 Propulsion Program	SS/FFP	Bell- Boeing : Ft. Worth, TX	11.144	2.000	Jan 2020	2.100	Jan 2021	2.100	Jan 2022	-		2.100	-	-	-
Sys Eng V-22 Propulsion Program	SS/CPFF	Rolls Royce : Indianapolis, IN	7.085	2.000	Jan 2020	2.200	Jan 2021	2.200	Jan 2022	-		2.200	-	-	-
Sys Eng Adversary J85 Engine Program	WR	FRC-SE : Jacksonville, FL	0.183	0.100	Nov 2019	0.100	Nov 2020	0.100	Nov 2021	-		0.100	-	-	-
Sys Eng Adversary J85 Engine Program	WR	NAWCAD : Patuxent River, MD	6.560	1.500	Oct 2019	1.600	Oct 2020	1.600	Oct 2021	-		1.600	-	-	-
Sys Eng Adversary J85 Engine Program	SS/CPFF	General Electric : Lynn, MA	4.256	0.640	Jan 2020	0.650	Jan 2021	0.650	Jan 2022	-		0.650	-	-	-
Sys Eng JSF Engine Program	WR	NAWCAD : Patuxent River, MD	9.260	1.300	Oct 2019	1.400	Oct 2020	1.400	Oct 2021	-		1.400	-	-	-
Sys Eng JSF Engine Program	SS/FFP	UTC Pratt & Whitney : East Hartford, CT	106.917	21.908	Jan 2020	32.265	Jan 2021	32.500	Jan 2022	-		32.500	-	-	-
Sys Eng P-8A Engine Program	WR	NAWCAD : Patuxent River, MD	2.900	0.600	Oct 2019	0.650	Oct 2020	0.650	Oct 2021	-		0.650	-	-	-
Sys Eng Lab Fld Activity-1.0 or more	WR	NAWCAD : Patuxent River, MD	225.948	4.748	Oct 2019	3.789	Oct 2020	1.758	Oct 2021	-		1.758	-	-	-
Sys Eng Other In-House Spt	Various	Various : Various	21.047	0.250	Nov 2019	0.550	Nov 2020	0.400	Nov 2021	-		0.400	-	-	-
GFE*	Reqn	DES/DLA : Various	15.394	1.600	Jan 2020	1.700	Jan 2021	0.920	Jan 2022	-		0.920	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

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
Sys Eng H-53K Propulsion	WR	NAWCAD : Patuxent River, MD	1.700	1.850	Oct 2019	2.000	Oct 2020	2.000	Oct 2021	-		2.000	-	-	-
Sys Eng H-53K Propulsion	SS/CPFF	General Electric : Lynn, MA	6.000	6.000	Jan 2020	7.000	Jan 2021	7.000	Jan 2022	-		7.000	-	-	-
MQ-4C	WR	NAWCAD : Patuxent River, MD	0.000	0.400	Oct 2019	0.500	Oct 2020	0.500	Oct 2021	-		0.500	-	-	-
MQ-4C	SS/CPFF	Rolls Royce : Indianapolis, IN	0.000	1.000	Mar 2020	1.000	Mar 2021	1.000	Mar 2022	-		1.000	-	-	-
Sys Eng UAV Engine Program	SS/FFP	Bell-Boeing : Bingen, WA	0.000	0.400	Mar 2020	0.500	Mar 2021	0.500	Mar 2022	-		0.500	-	-	-
Sys Eng UAV Engine Program	WR	NAWCAD : Patuxent River, MD	0.000	0.250	Oct 2019	0.300	Oct 2020	0.300	Oct 2021	-		0.300	-	-	-
Prior Year Prod Dev costs no longer funded in the FYDP	Various	Various : Various	131.162	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	1,320.624	95.757		108.816		102.282		-		102.282	-	-	N/A

Remarks

GFE includes expected cost of fuel necessary to support engine development and qualification testing.
Total may be off due to rounding.
All prior year lines have been consolidated.

Support ($ 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
Development Support	Various	Various : Various	8.400	0.100	Oct 2019	0.100	Oct 2020	0.100	Oct 2021	-		0.100	-	-	-
Development Support	WR	NSWC : Crane, IN	0.460	0.200	Oct 2019	0.100	Oct 2020	0.100	Oct 2021	-		0.100	-	-	-
Prior Year Development Supt cost no longer	Various	Various : Various	1.278	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	10.138	0.300		0.200		0.200		-		0.200	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

Test and Evaluation ($ 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
Development Test & Evaluation	Various	Various : Various	3.542	0.100	Oct 2019	0.200	Oct 2020	0.100	Oct 2021	-		0.100	-	-	-
Development Test & Evaluation	WR	NSWC : Crane, IN	0.648	0.100	Oct 2019	0.100	Oct 2020	0.100	Oct 2021	-		0.100	-	-	-
		Subtotal	4.190	0.200		0.300		0.200		-		0.200	-	-	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
Travel	Various	NAVAIR : Patuxent River, MD	0.886	0.060	Oct 2019	0.075	Oct 2020	0.075	Oct 2021	-		0.075	-	-	-
Prior Year Mgmt cost no longer funded in the FYDP	Various	Various : Various	1.447	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	2.333	0.060		0.075		0.075		-		0.075	-	-	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	1,337.285	96.317		109.391		102.757		-		102.757	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

Component Improvement Program PU 1355

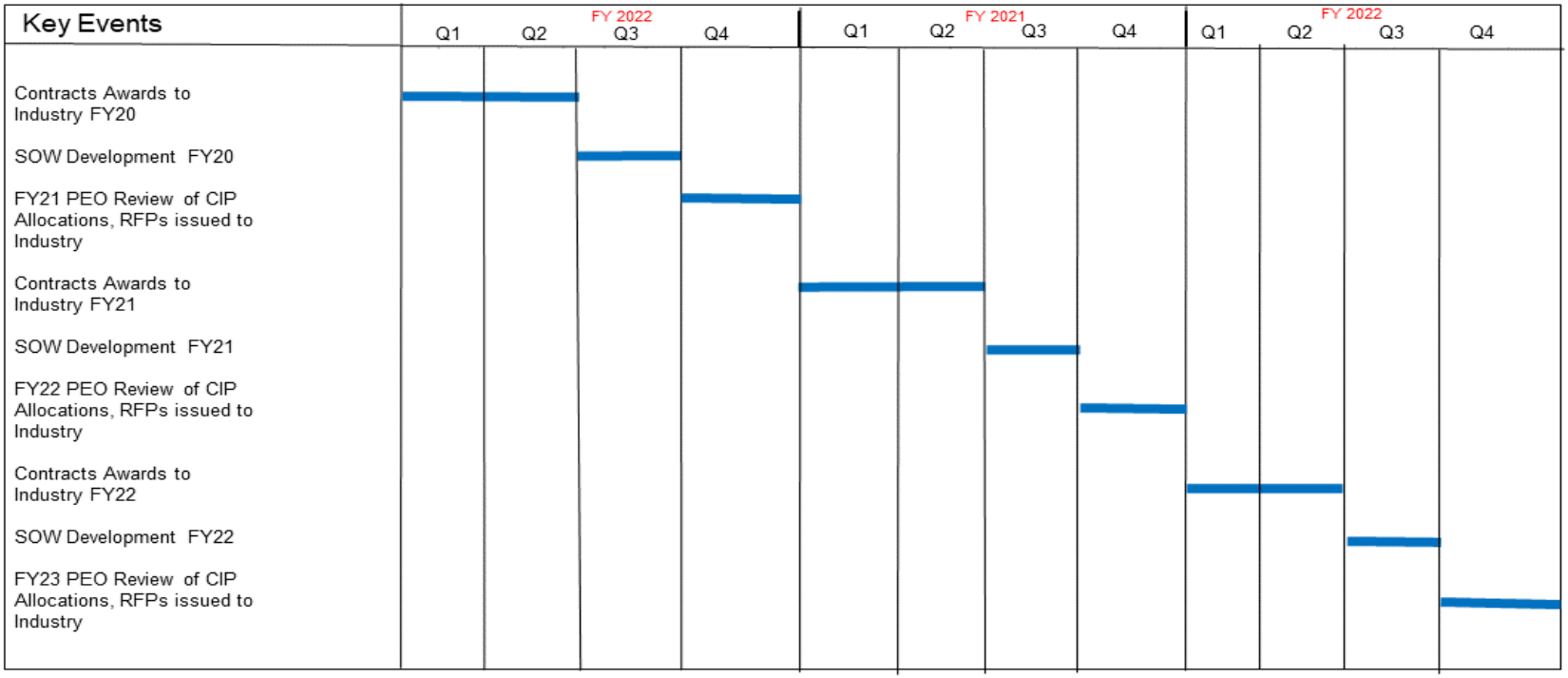


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 1355 / *Propulsion and Power Component Improvement Program*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1355				
Component Improvement Program: Systems Engineering	1	2020	4	2022
FY20 Contract Awards to Industry & Technical Reviews by Platform	1	2020	2	2020
SOW Development FY20	3	2020	3	2020
FY21 PEO Review of CIP Allocations, RFPs Issued to Industry	4	2020	4	2020
FY21 Contract Awards to Industry & Technical Reviews by Platform	1	2021	2	2021
SOW Development FY21	3	2021	3	2021
FY22 PEO Review of CIP Allocations, RFPs Issued to Industry	4	2021	4	2021
FY22 Contract Awards to Industry &Technical Reviews by Platform	1	2022	2	2022
SOW Development FY22	3	2022	3	2022
FY23 PEO Review of CIP Allocations, RFPs Issued to Industry	4	2022	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy											Date: May 2021	
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0205633N / *Aviation Improvements*				Project (Number/Name) 2269 / *Expeditionary Airfield Improvements*			
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**
2269: *Expeditionary Airfield Improvements*	70.324	1.990	0.357	0.494	-	0.494	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Expeditionary Airfields (EAF) program designs, develops and tests a Sustainment Lighting System (SLS); specifically the LED CAT I Instrumented Flight Rules (IFR)/Visual Flight Rules (VFR) Approach Light System and a Night Vision Device (NVD) Compatible Runway Light System, to replace the obsolete legacy EAF lighting system. This system will support EAF Marine Aircraft Wing Support Squadrons with the required EAF Approach Light System equipment to install Forward Operating Bases and Forward Arming and Refueling Points. With the deployment of this equipment, the Marine Aircraft Wing Support Squadrons can support all United States Marine Corps (USMC) aircraft allowing the Combatant Commanders the flexibility to deploy Aircraft Combat Elements to meet anticipated threats.

Design maturity with the Lead System Integrator (LSI) for the Sustainment Lighting System (SLS) program was re-scoped in FY19 and out to focus on the development of a new Light Emitting Diode (LED) CAT I Visual Flight Rules (VFR) Approach Light System and a Night Vision Device (NVD) Compatible Runway Light System.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Expeditionary Airfield Improvements	1.990	0.357	0.494	0.000	0.494
Articles:	-	-	-	-	-
Description: The EAF program designs, develops and tests a Sustainment Lighting System (SLS); specifically the LED CAT I Instrumented Flight Rules (IFR)/Visual Flight Rules (VFR) Approach Light System and a Night Vision Device (NVD) Compatible Runway Light System, to replace the obsolete legacy EAF lighting system. This system will provide EAF Marine Aircraft Wing Support Squadrons with the required EAF equipment to install Forward Operating Bases and Forward Arming and Refueling Points. With the deployment of this equipment the Marine Aircraft Wing Support Squadron can support all USMC aircraft allowing the Combatant Commanders the flexibility to deploy Aircraft Combat Elements to meet anticipated threats. This system will provide EAF Marine Aircraft Wing support Squadrons.					
FY 2021 Plans: Continue systems engineering efforts in support of the Sustainment Lighting System (SLS). Conduct a Production Readiness Review (PRR), and complete Milestone C for the SLS - LED CAT I Instrumented Flight Rules (IFR)/Visual Flight Rules (VFR) Approach Lighting System. Conduct a Critical Design Review, Test					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 2269 / *Expeditionary Airfield Improvements*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Readiness Review (TRR), and begin Developmental Testing (DT) for the Night Vision Device (NVD) Compatible Runway Lighting System ***FY 2022 Base Plans:*** Complete systems engineering efforts in support of the Sustainment Lighting System (SLS). Complete Developmental Testing (DT) and Integration/Operation Testing and conduct a Production Readiness Review (PRR) for the Night Vision Device (NVD) Compatible Runway Light System. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The increase from FY 2021 to FY 2022 is to complete the development of the Sustainment Lighting System (SLS); specifically the Night Vision Device (NVD) Compatible Runway Light System.					
Accomplishments/Planned Programs Subtotals	1.990	0.357	0.494	0.000	0.494

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• OPN/4213: *ASE-Expeditionary Airfields*	187.926	236.655	178.647	-	178.647	-	-	-	-	-	-

Remarks

EAF is a portion of the 4213 budget.

D. Acquisition Strategy

Expeditionary Airfields (EAF) Sustainment Lighting System was initially an ACAT III program. As a result of the re-scope it has been re-designated as an ACAT IV M program in January 2018. The program is focused on a combination of a required capability to conduct operations in an expeditionary environment and the industrial base for airfield lighting.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 2269 / *Expeditionary Airfield Improvements*

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
Systems Engineering	WR	NAWCAD : Lakehurst, NJ	34.038	1.294	Nov 2019	0.209	Nov 2020	0.369	Nov 2021	-		0.369	-	-	-
Prior year Prod Dev no longer funded in the FYDP	Various	Various : Various	22.016	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	56.054	1.294		0.209		0.369		-		0.369	-	-	N/A

Remarks

The increase from FY2021 to FY2022 is to complete the Systems Engineering that supports the Sustainment Lighting System (SLS) efforts.

Support ($ 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
Integrated Logistics	WR	NAWCAD : Lakehurst, NJ	3.512	0.447	Nov 2019	0.052	Nov 2020	0.040	Nov 2021	-		0.040	-	-	-
Prior Year Support no longer funded in the FYDP	Various	Various : Various	3.637	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	7.149	0.447		0.052		0.040		-		0.040	-	-	N/A

Remarks

The decrease from FY2021 to FY2022 is to complete the Logistics efforts that support the Sustainment Lighting System (SLS) efforts.

Test and Evaluation ($ 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
Test and Evaluation	WR	NAWCAD : Lakehurst, NJ	5.038	0.161	Nov 2019	0.085	Nov 2020	0.085	Nov 2021	-		0.085	-	-	-
Opeval Test Support	WR	COMOPTEVFOR : Norfolk, VA	0.405	0.046	Nov 2019	0.000		0.000		-		0.000	-	-	-
		Subtotal	5.443	0.207		0.085		0.085		-		0.085	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205633N / *Aviation Improvements*	Project (Number/Name) 2269 / *Expeditionary Airfield Improvements*	

Test and Evaluation ($ 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

Remarks

The increase from FY2020 to FY2021 is to complete the test and evaluation that supports the Sustainment Lighting System (SLS).

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
Management Support Services	C/CPFF	Various : Various	1.678	0.042	Dec 2019	0.011	Nov 2020	0.000		-		0.000	-	-	-
		Subtotal	1.678	0.042		0.011		0.000		-		0.000	-	-	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	70.324	1.990		0.357		0.494		-		0.494	-	-	N/A

Remarks

Prior Year includes $4.9 million of Congressional Add funding.

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 2269 / *Expeditionary Airfield Improvements*

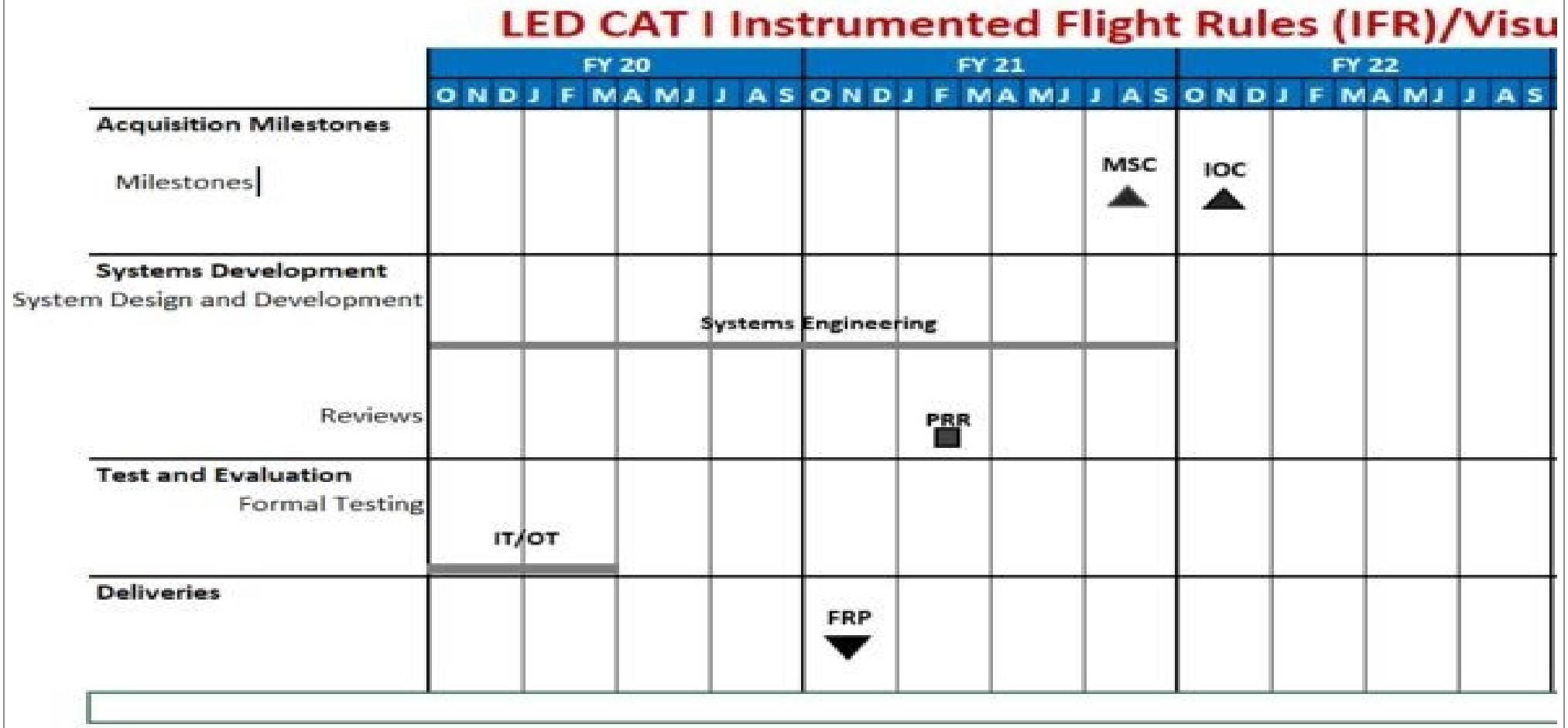


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 2269 / *Expeditionary Airfield Improvements*

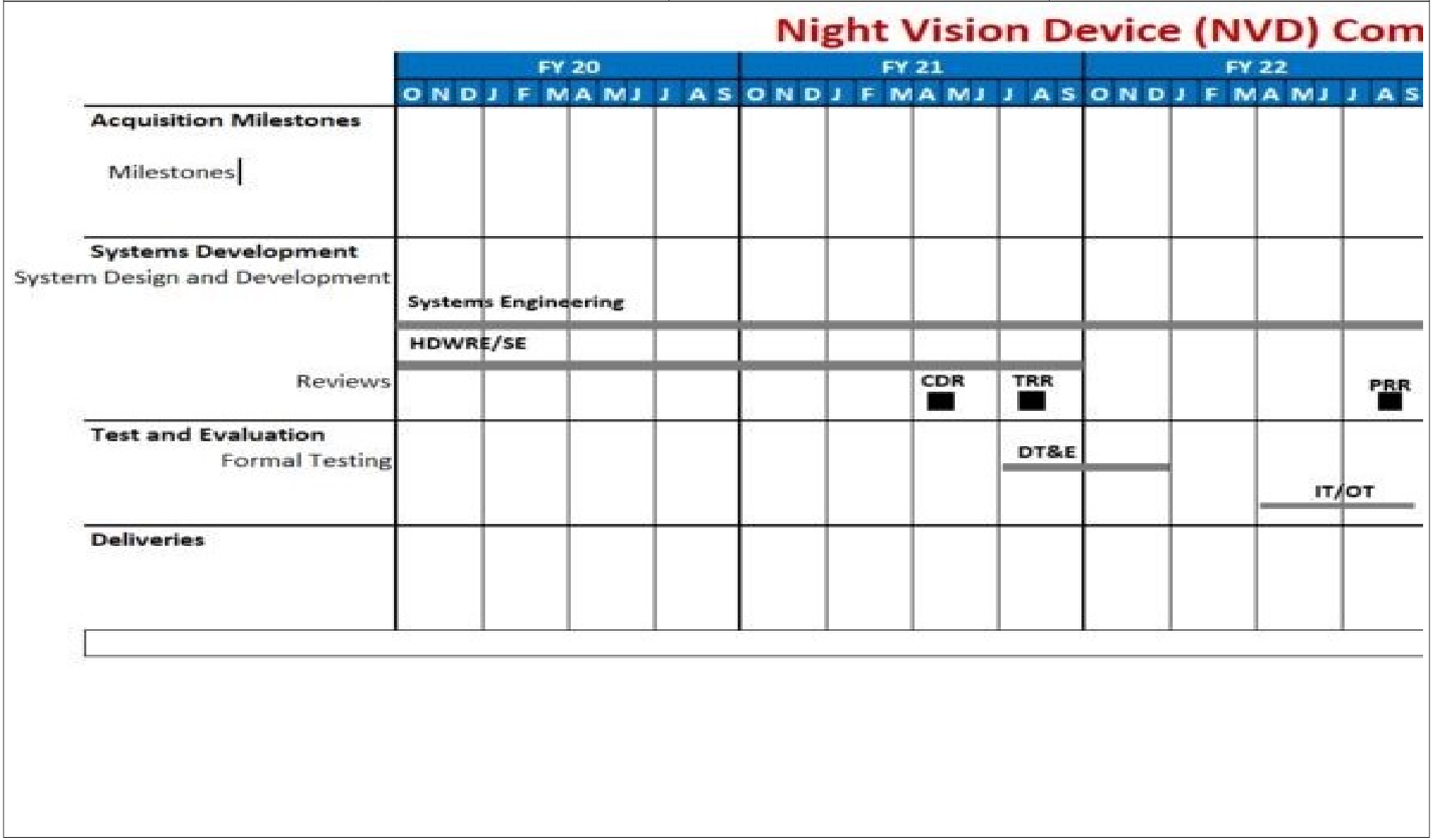


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205633N / *Aviation Improvements*	**Project (Number/Name)** 2269 / *Expeditionary Airfield Improvements*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
LED CAT I Instrumented Flight Rules (IFR)/Visual Flight Rules (VFR) Approach Light System				
Acquisition Milestones: Milestones: Milestone C	4	2021	4	2021
Acquisition Milestones: Milestones: IOC	1	2022	1	2022
Systems Development: System Design and Development: Systems Engineering	1	2020	4	2021
Systems Development: Reviews: Production Readiness Review	2	2021	2	2021
Test and Evaluation: Formal Testing: IntegrationTesting/Operational Testing	1	2020	2	2020
Deliveries: Delivery: Lot 1	1	2021	1	2021
Night Vision Device (NVD) Compatible Runway Light System				
Systems Development: System Design and Development: Systems Engineering	1	2020	4	2022
Systems Development: System Design and Development: Hardware/Software Development	1	2020	4	2021
Reviews: Critical Design Review	3	2021	3	2021
Reviews: Test Readiness Review	4	2021	4	2021
Reviews: Production Readiness Review	4	2022	4	2022
Test and Evaluation: Formal Testing: Tech Eval/Dev T&E	4	2021	1	2022
Test and Evaluation: Formal Testing: IntegrationTesting/Operational Testing	3	2022	4	2022