Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Navy	Date: March 2024
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604112N *I GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	705.894	112.504	118.182	96.670	-	96.670	113.761	112.807	58.679	59.733	Continuing	Continuing
2208: *CVN 21*	551.920	95.800	117.401	86.877	-	86.877	93.905	95.360	55.820	56.993	Continuing	Continuing
4004: *EMALS*	153.974	16.704	0.781	9.793	-	9.793	19.856	17.447	2.859	2.740	Continuing	Continuing

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): 223

A. Mission Description and Budget Item Justification

This Navy program addresses unique technologies on Ford Class carriers. The program includes:

- (2208) - Development of ship hull, mechanical, propulsion, electrical, aviation, and combat support systems, subsystems and components to significantly improve aircraft carrier affordability, manpower requirements, survivability, and operational capabilities, and to meet the requirements of existing and pending regulations and statutes critical to the operation of existing and future aircraft carriers.

- (4004) - The Electromagnetic Aircraft Launch System (EMALS) is an advanced technology system developed as part of, and integrated on new FORD Class Carrier ships, beginning with CVN78. EMALS provides better control of applied forces, both peak and transient dynamic loads, improved reliability and maintainability, increased operational availability, and reduced operator and maintainer workload. The EMALS program will undergo future system improvements to address safety, obsolescence, and reliability.

This Program Element (PE) and associated projects represent a continuation of efforts previously funded under PE 0603512N projects 2208 and 4004 in FY 2014 and earlier and PE 0604567N projects 3179, 3180, and 4007 in FY 2023 and earlier.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Navy	Date: March 2024
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604112N *I GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	116.498	118.182	78.504	-	78.504
Current President's Budget	112.504	118.182	96.670	-	96.670
Total Adjustments	-3.994	0.000	18.166	-	18.166
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.994	0.000			
• Program Adjustments	0.000	0.000	17.237	-	17.237
• Rate/Misc Adjustments	0.000	0.000	0.929	-	0.929

Change Summary Explanation

2208 CVN 21 Cost:
FY2025 PROJ PU 2208: Added additional funds for Integrated Digital Shipbuilding (iDS) (+$18.0M)
FY2025 PROJ PU 2208: Other Rate and Miscellaneous Adjustments (-$0.115M)

4004 EMALS Cost:
FY2025 PROJ PU 4004: Added additional funds for Future Readiness (+$.560M)
FY2025 PROJ PU 4004: Other Rate and Miscellaneous Adjustments (-$0.279M)
EMALS increase from FY2024 to FY2025 is due to beginning the development of Electrical Isolation capability, development of Advancing Additive at Large Scale to Address Readiness and Sustainment (AALSTARS) in support of select EMALS components, and development of Block Switch Controller (BSC) Complex Programmable Logic Device (CPLD)

Technical: N/A

Schedule:
- Added Development: AALSTARS Additive Manufacturing 1Q FY2025 through 4Q FY2028
- Added Development: Engineering Change Proposal (ECP) Primary hardware (HW) Development 1Q FY2025 through 4Q FY2029
- Moved Development: EMALS Depot Planning/Logistics Dev end date from 1Q FY2024 to 3Q FY2024

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	Project (Number/Name) 2208 / *CVN 21*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
2208: *CVN 21*	551.920	95.800	117.401	86.877	-	86.877	93.905	95.360	55.820	56.993	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 223

A. Mission Description and Budget Item Justification

This project provides the development of aircraft carrier specific technologies, the infusion of the ship technology base into existing and future aircraft carriers, and the potential realization of subsystem design capabilities not currently feasible. All systems developed in this project support current or emerging requirements and other promising systems technologies for insertion into existing and new aircraft carrier designs. The emphasis is directed toward developing ship hull, mechanical, propulsion, electrical, aviation, and warfare systems to significantly improve aircraft carrier affordability, manpower requirements, survivability, and operational capabilities required to meet existing and pending regulations and statutes critical to the operation of future aircraft carriers. This project also encompasses those tasks required to support CVN 78 Class procurement, including, but not limited to engineering support, programmatic and program support, logistics support, modeling and simulation, test and evaluation, manpower and program related studies, and design support systems, such as the Integrated Digital Environment (IDE).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Title: CVN 78 Class Digital Transformation	86.243	46.247	33.258	0.000	33.258
Articles:	-	-	-	-	-
Description: CVN 78 Class Digital Transformation - to develop, refine, and implement digital structures such as the FORD class product model, Integrated Digital Shipbuilding (iDS), and cloud based product exchanges.					
FY 2024 Plans: Continue CVN 80/81 FY24 Integrated Digital Shipbuilding (iDS) implementation plan and execute the installment schedule per the contract. This effort will enable HII-NNS to achieve 2-ship-buy savings and drive the modernization of the shipbuilding base. iDS Products are directly tied to construction needs and are issued to the individual trades which utilize them on the deck plate to support the CVN 80/81 build on the waterfront. Failure to fully fund installment clause would result in a change to the contract as funding requirements would not be met. Huntington Ingalls Industries, Inc.-Newport News Shipbuilding (HII-NNS) is continually looking at ways to increase efficiency of developing iDS products through upgrades to their Product Lifecycle Management (PLM) toolsets, Model Based Enterprise methodology, and other resource planning software.					
FY 2025 Base Plans: Continue CVN 80/81 FY24 Integrated Digital Shipbuilding (iDS) implementation plan and execute the installment schedule per the contract. This effort will enable HII-NNS to achieve 2 ship-buy savings and drive the					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	**Project (Number/Name)** 2208 / *CVN 21*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
modernization of the shipbuilding base. iDS Products are directly tied to construction needs and are issued to the individual trades which utilize them on the deck plate to support the CVN 80/81 build on the waterfront. Failure to fully fund installment clause and variance would result in a change to the contract as funding requirements would not be met. HII-NNS is continually looking at ways to increase efficiency of developing iDS products through upgrades to their Product Lifecycle Management (PLM) toolsets, Model Based Enterprise methodology, and other resource planning software. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Funding required to meet contractual installment obligations is lower due to the installment structure of the CVN 80/81 contract and the amount to be obligated each year. Additionally, the amount of iDS products developed per year is dependent on the build schedule of the hull.					
Title: CVN 78 Class Test & Evaluation (T&E) ***Articles:*** ***Description:*** Test and Evaluation includes test planning, system modeling and simulation, incorporating laboratory and land based facilities support, conducting test events, and evaluating and documenting test results. Title 10, US Code, Section 2366 also requires survivability assessment; for the CVN 78 Class this entails testing, analysis, and documentation. T&E results in refinement of future FORD Class capabilities and survivability, system analysis, verification and validation of requirements, and fulfilling statutory requirements. ***FY 2024 Plans:*** Continue Operational Testing (OT) on CVN 78. Conduct platform combat systems testing against high-speed surface targets. Plan and execute CVN 78 platform cyber survivability test event. Continue reliability, availability, and maintainability (RAM) studies on CVN 78 class. Execute Total Ship Survivability Trial (TSST) to assess and improve ship systems recoverability against simulated damage from realistic threats. Begin development of CVN 79 Developmental cyber test models. Fund information support plan development for CVN 79 to support interoperability testing. Continue survivability modeling improvements, analyses and documentation and the final Survivability Analysis Report (SAR). Continue to collect reliability data on new and legacy systems. ***FY 2025 Base Plans:*** Due to changes in the operational schedule of CVN 78, Operational Testing (OT) was not completed in FY 2024. Continuing OT to verify Sea Strike Sea Basing Aviation Model (SSAM) and execute for Sortie Generation	9.557 -	24.967 -	18.500 -	0.000 -	18.500 -

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	**Project (Number/Name)** 2208 / *CVN 21*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Rate (SGR) Surge and Sustain Demo test event during the scheduled CVN 78 Composite Training Unit Exercise (COMPTUEX). Continuing reliability, availability, and maintainability (RAM) studies on CVN 78 class. Complete Total Ship Survivability Trial (TSST) reporting to assess and improve ship systems recoverability against simulated damage from realistic threats. Complete survivability modeling improvements, analyses and documentation and the final SAR. Continue to collect reliability data on new and legacy systems. Continue the development of CVN 79 Developmental (DT) cyber testing models and begin planning to conduct cyber survivability OT on CVN 79 after delivery in FY25. Perform platform integration testing of CVN 79 with new air wing of the future capabilities. Prepare for the CVN 79 platform combat systems test event. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** The decrease in FY 2025 is a consequence of progressing through the test program. FY 2025 is the final year for the LFT&E effort, consisting primarily of reporting efforts. The majority of OT will also be complete, with the SGR demo being the last OT event scheduled for the CVN 78 platform.					
Title: CVN 78 Class Transformation and Affordability	0.000	14.362	10.567	0.000	10.567
Articles:	-	-	-	-	-
Description: Investments in technology insertion to assist in stabilizing the supply chain, reducing the cost of production, improving industrial capacity, increasing supplier throughput, reducing schedule risk, improving material quality and performance specifications. These investments provide opportunities to incorporate affordability into the design, engineering, manufacturing and overhead of future Aircraft Carriers. ***FY 2024 Plans:*** Provide support for cyber related penetration testing for shipboard systems. Support for topside activities. Design and development of new Land Based Testing Facility (LBTF) to support Programmable Logic Controllers (PLCs) for propulsion system monitoring. Development of cost saving initiatives, process improvements, business case analyses, and design for affordability initiatives to continue to drive affordability into the carrier program. ***FY 2025 Base Plans:*** Provide support for Ford Class affordability and future technology transformation initiatives which includes Air Wing of the Future, Additive Manufacturing activities, studies in support of new and updated Government Furnished Equipment (GFE) systems, Advanced Weapons Elevator (AWE) production improvements and control system software commonality to future reduce total ownership cost. Continue the development of cost saving					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	**Project (Number/Name)** 2208 / *CVN 21*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
initiatives, process improvements, business case analyses, and design for affordability initiatives to continue to drive affordability into the carrier program. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** The decrease in FY 2025 is due to reduced analysis required for the class, as the second ship (CVN 79) is scheduled to be delivered in FY 2025, and system design improvements are implemented.					
Title: CVN 78 Class Systems Analysis & Total Ship Integration	0.000	31.825	24.552	0.000	24.552
Articles:	-	-	-	-	-
Description: Integrate mission systems into platform design, while also addressing fact-of-life configuration changes from obsolescence, advances in technology, late and/or poor quality material, and other adverse program impacts to mitigate cost, schedule or performance risk. This includes divestments in legacy technologies and materials, which offset forward pricing rates in procurement, and feasibility and tradeoff studies that enhance naval capability and reduce total ownership cost. ***FY 2024 Plans:*** Continue to perform technical analysis and engineering calculations in support of validating Technical Performance Measures (TPMs), System/Component, Environmental Safety and Health Qualification, and Human Factors Engineering, Ship/System/Component Survivability and Vulnerability Qualification, System/Component Shock and Vibration Qualification, and other miscellaneous system related calculations. Continue to address design and construction issues, and technically resolve class system integration issues based on the results of CVN 78 testing and initial operations. Refine system integration and testing strategies for implementation testing by evaluating improvements needed to capitalize on CVN 78 lessons learned. Manage and resolve fact-of-life obsolescence changes on government-furnished equipment and contractor-furnished equipment systems to support construction. Continue conducting and supporting feasibility and tradeoff studies on new and modified shipboard systems and equipment. ***FY 2025 Base Plans:*** Continue to perform technical analysis and engineering calculations in support of System/Component, Environmental Safety and Health Qualification, and Human Factors Engineering, Ship/System/Component Survivability and Vulnerability Qualification, System/Component Shock and Vibration Qualification. Continue to address design and construction issues, and technically resolve class system integration issues based					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	**Project (Number/Name)** 2208 / *CVN 21*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
on the results of CVN 78/79 testing and initial operations. Refine system integration and testing strategies for implementation testing by evaluating improvements needed to capitalize on CVN 78/79 lessons learned. Manage and resolve fact-of-life obsolescence changes on GFE and contractor furnished equipment (CFE) systems to support construction. Development of strategies and design improvements to address late material. Continue conducting and supporting feasibility and tradeoff studies on new and modified shipboard systems and equipment. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** The decrease in FY 2025 is due to reduced analysis required for the class, as the second ship (CVN 79) is scheduled to be delivered in FY 2025, and system design improvements are implemented.					
Accomplishments/Planned Programs Subtotals	95.800	117.401	86.877	0.000	86.877

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• RDTEN / 0604567N: *Project Units 3108, 3179, 4007*	44.536	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	571.608
• SCN / 2001: *Carrier Replacement Program*	1,465.880	1,115.296	1,186.873	-	1,186.873	1,135.378	1,582.108	2,574.201	2,744.200	Continuing	Continuing
• SCN / 2004: *CVN 81*	1,052.024	800.492	721.045	-	721.045	2,052.709	2,569.131	2,068.582	0.000	0.000	14,015.634
• SCN / 5300: *Completion of PY Shipbldg Progr*	461.700	624.600	236.000	-	236.000	0.000	0.000	0.000	0.000	0.000	3,079.160
• OPN / 5664: *Surface Training Equipment*	2.468	2.430	2.474	-	2.474	2.649	2.701	2.759	2.816	Continuing	Continuing
• OMN / 1B2B: *CVN 78 Ford Class Training and Sustainment*	5.457	6.064	6.129	-	6.129	6.222	6.258	6.230	6.360	Continuing	Continuing
• OMN / 1B5B: *Ford Class PCU Housing*	4.421	15.587	13.584	-	13.584	0.800	10.600	10.812	11.039	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	**Project (Number/Name)** 2208 / *CVN 21*

D. Acquisition Strategy

The CVN 78 Class of aircraft carriers is designed to replace USS ENTERPRISE and the ships of the NIMITZ Class. The CVN 78 Class features a new nuclear propulsion and electrical generation/distribution system, Electro Magnetic Aircraft Launch System (EMALS), Advanced Arresting Gear (AAG) system, all electric auxiliaries, warfare system improvements, survivability enhancements, improved weapons handling, and improved aircraft servicing. These design features will result in lower manpower and total ownership costs as compared to the NIMITZ Class. Additionally, the following war fighting benefits will be realized: increased sortie generation rate, improved ship self-defense capability, increased launch and recovery capability/flexibility, increased operational availability, and increased flexibility to support future upgrades.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	Project (Number/Name) 2208 / *CVN 21*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Digital Shipbuilding	C/CPAF	HII : VA	146.965	86.243	Nov 2022	46.247	Nov 2023	33.258	Nov 2024	-		33.258	Continuing	Continuing	Continuing
Class Transformation and Affordability	Various	NSWC PHILADELPHIA : PA	0.000	0.000		10.150	Nov 2023	7.354	Nov 2024	-		7.354	Continuing	Continuing	Continuing
Class Transformation and Affordability	Various	VARIOUS : VARIOUS	0.000	0.000		4.212	Nov 2023	3.213	Nov 2024	-		3.213	Continuing	Continuing	Continuing
Systems Analysis & Total Ship Integration	C/CPFF	MAN TECH : DC	0.000	0.000		2.225	Nov 2023	1.697	Nov 2024	-		1.697	Continuing	Continuing	Continuing
Systems Analysis & Total Ship Integration	WR	NAWC PATUXENT RIVER : MD	0.000	0.000		1.250	Nov 2023	1.268	Nov 2024	-		1.268	Continuing	Continuing	Continuing
Systems Analysis & Total Ship Integration	C/CPFF	CACI : DC	0.000	0.000		5.500	Nov 2023	4.196	Nov 2024	-		4.196	0.000	9.696	-
Systems Analysis & Total Ship Integration	C/CPAF	HII : VA	0.000	0.000		20.262	Nov 2023	15.417	Nov 2024	-		15.417	Continuing	Continuing	Continuing
Systems Analysis & Total Ship Integration	Various	VARIOUS : VARIOUS	0.000	0.000		2.588	Nov 2023	1.974	Nov 2024	-		1.974	Continuing	Continuing	Continuing
Prior Year AD&D No Longer Funded in the FYDP	Various	VARIOUS : VARIOUS	154.139	0.000		0.000		0.000		-		0.000	0.000	154.139	-
		Subtotal	301.104	86.243		92.434		68.377		-		68.377	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation (DT&E)	C/CPAF	HII : VA	12.188	0.000		0.762	Nov 2023	0.565	Nov 2024	-		0.565	0.000	13.515	-
Developmental Test & Evaluation (DT&E)	WR	NAWC PATUXENT RIVER : MD	4.327	0.000		0.405	Nov 2023	0.300	Nov 2024	-		0.300	0.000	5.032	-
Developmental Test & Evaluation (DT&E)	WR	NSWC DAHLGREN : VA	18.809	2.274	Nov 2022	4.922	Nov 2023	3.648	Nov 2024	-		3.648	0.000	29.653	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	Project (Number/Name) 2208 / *CVN 21*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation (DT&E)	WR	NSWC CARDEROCK : MD	3.647	0.481	Nov 2022	0.981	Nov 2023	0.727	Nov 2024	-		0.727	0.000	5.836	-
Developmental Test & Evaluation (DT&E)	Various	MISCELLANEOUS : VARIOUS	8.233	0.380	Nov 2022	1.902	Nov 2023	1.409	Nov 2024	-		1.409	0.000	11.924	-
Developmental Test & Evaluation (DT&E)	WR	NAWC LAKEHURST : NJ	14.099	1.421	Nov 2022	2.302	Nov 2023	1.706	Nov 2024	-		1.706	0.000	19.528	-
Operational Test & Evaluation (OT&E)	WR	COMOPTEVFOR : VA	33.356	3.397	Nov 2022	6.567	Nov 2023	4.866	Nov 2024	-		4.866	Continuing	Continuing	Continuing
Operational Test & Evaluation (OT&E)	WR	NAWC PATUXENT RIVER : MD	0.213	0.254	Nov 2022	0.000		0.000		-		0.000	0.000	0.467	-
Operational Test & Evaluation (OT&E)	Various	MISCELLANEOUS : VARIOUS	0.000	0.500	Nov 2022	0.000	Nov 2023	0.851	Nov 2024	-		0.851	Continuing	Continuing	Continuing
Operational Test & Evaluation (OT&E)	WR	NSWC PHILADELPHIA : PA	0.000	0.000	Nov 2022	0.774	Nov 2023	0.574	Nov 2024	-		0.574	Continuing	Continuing	Continuing
Operational Test & Evaluation (OT&E)	C/CPFF	MAN TECH : DC	0.000	0.300	Nov 2022	0.000		0.000		-		0.000	0.000	0.300	-
Operational Test & Evaluation (OT&E)	WR	NSWC CORONA : CA	0.000	0.012	Nov 2022	0.000		0.000		-		0.000	0.000	0.012	-
Live Fire Test & Evaluation (LFT&E)	Various	MISCELLANEOUS : VARIOUS	0.000	0.538	Nov 2022	1.149	Nov 2023	0.000	Nov 2024	-		0.000	0.000	1.687	-
Live Fire Test & Evaluation (LFT&E)	WR	NAWC PATUXENT RIVER : MD	6.274	0.000		0.308	Nov 2023	0.228	Nov 2024	-		0.228	0.000	6.810	-
Live Fire Test & Evaluation (LFT&E)	WR	NSWC DAHLGREN : VA	1.994	0.000		0.177	Nov 2023	0.131	Nov 2024	-		0.131	0.000	2.302	-
Live Fire Test & Evaluation (LFT&E)	WR	NSWC CARDEROCK : MD	39.000	0.000		3.020	Nov 2023	2.238	Nov 2024	-		2.238	0.000	44.258	-
Live Fire Test & Evaluation (LFT&E)	WR	NSWC PHILADELPHIA : PA	12.838	0.000		0.724	Nov 2023	0.536	Nov 2024	-		0.536	0.000	14.098	-
Live Fire Test & Evaluation (LFT&E)	C/CPAF	HII : VA	28.529	0.000		0.974	Nov 2023	0.721	Nov 2024	-		0.721	0.000	30.224	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	Project (Number/Name) 2208 / *CVN 21*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Developmental Test & Evaluation Not Funded FYDP (PYDT&E)	WR	VARIOUS : VARIOUS	50.697	0.000		0.000		0.000		-		0.000	0.000	50.697	-
Prior Year Live Fire Test & Evaluation Not Funded FYDP (PYLFT&E)	Various	VARIOUS : VARIOUS	16.612	0.000		0.000		0.000		-		0.000	0.000	16.612	-
		Subtotal	250.816	9.557		24.967		18.500		-		18.500	Continuing	Continuing	N/A

	Prior Years	FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	551.920	95.800		117.401		86.877		-		86.877	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	**Project (Number/Name)** 2208 / *CVN 21*

Gerald R. Ford Class Carriers

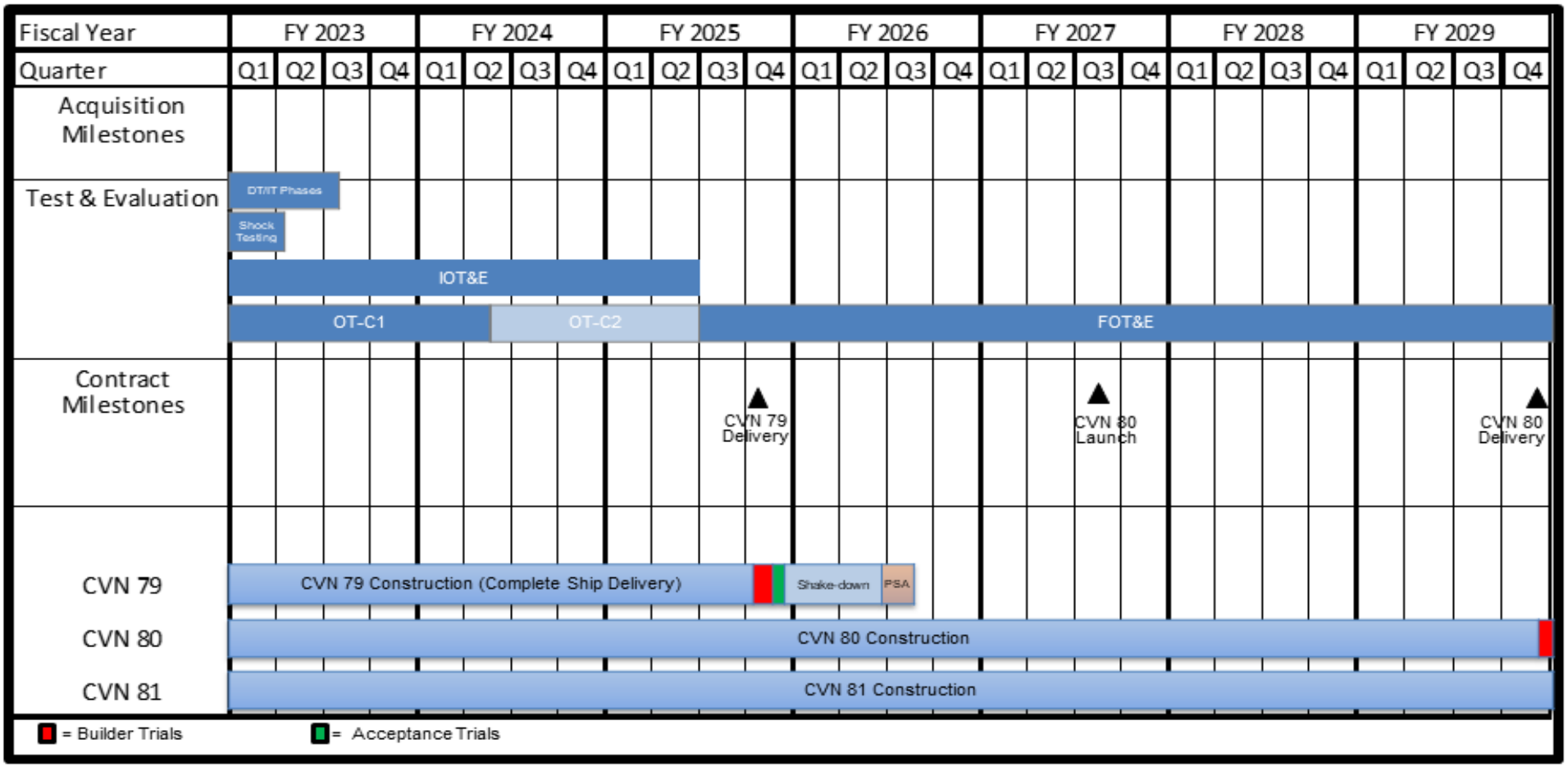

Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	**Project (Number/Name)** 2208 / *CVN 21*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2208				
CVN 21	1	2023	4	2029

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	Project (Number/Name) 4004 / *EMALS*	

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
4004: *EMALS*	153.974	16.704	0.781	9.793	-	9.793	19.856	17.447	2.859	2.740	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 223

A. Mission Description and Budget Item Justification

The Electromagnetic Aircraft Launch System (EMALS) is an advanced technology system developed as part of, and integrated on new FORD Class Carrier ships, beginning with CVN 78. EMALS provides better control of applied forces, both peak and transient dynamic loads, improved reliability and maintainability, increased operational availability, and reduced operator and maintainer workload.

The EMALS program will undergo future system improvements to address safety, obsolescence, and reliability, to include but not limited to Automated software testing, Electrical Isolation, Advancing Additive at Large Scale to Address Readiness and Sustainment (AALSTARS), Block Switch Controller (BSC) Complex Programmable Logic Device (CPLD), and other emergent requirements.

Automated software testing development provides for rapid, repeatable tests, resulting in higher quality software. Automated testing enables rapid diagnosis of system faults and decrease troubleshooting response time for the fleet. EMALS is a software intensive system and highly dependent on reliable software operation. The readiness and mission benefits include the ability to provide the fleet with affordable, quality, well-tested software capable of launching and recovering aircraft on Ford-Class carriers.

Development of Electrical Isolation provides for EMALS capabilities to continue launch operations while being able to isolate catapults for regular maintenance, in turn improving maintenance cycle times. This provides readiness and mission benefits to enable continued operations and increases system mission capability.

Implementing the AALSTARS initiative will demonstrate alternative manufacturing methods of select EMALS components. This will reduce manufacturing lead time and costs for highly complex, long lead time items.

Developing BSC CPLD provides additional space on a critical control card to allow for future firmware and logic updates in order to ensure timely functionality and to support future changes. This also addresses a known obsolescence issue.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Title: EMALS System Improvements	16.704	0.781	9.793	0.000	9.793
Articles:	-	-	-	-	-
Description: EMALS System Improvements					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	**Project (Number/Name)** 4004 / *EMALS*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
FY 2024 Plans: Begin Primary Software Development for Automated Software Testing. ***FY 2025 Base Plans:*** To continue Primary Software Development for Automated Software Testing. To begin Primary Hardware (HW) and Software (SW) Development for Electrical Isolation; the development of additive manufacturing capability on select EMALS components via the Advancing Additive at Large Scale to Address Readiness and Sustainment (AALSTARS) project; and the development of Block Switch Controller (BSC) Complex Programmable Logic Device (CPLD). ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Increase from FY2024 to FY2025 is due to beginning the development of Electrical Isolation capability, development of AALSTARS in support of select EMALS components, and development of Block Switch Controller (BSC) Complex Programmable Logic Device (CPLD).					
Accomplishments/Planned Programs Subtotals	16.704	0.781	9.793	0.000	9.793

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• RDTEN / 0604567N: *Project Units 3108, 3179, 4007*	44.536	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	571.608
• SCN / 2001: *Carrier Replacement Program*	1,465.880	1,115.296	1,186.873	-	1,186.873	1,135.378	1,582.108	2,574.201	2,744.200	Continuing	Continuing
• OMN / 1B2B: *CVN 78 Ford Class Training and Sustainment (12BJ0)*	5.457	6.064	6.129	-	6.129	6.222	6.258	6.230	6.360	Continuing	Continuing
• OPN / 5664: *Surface Training Equipment*	2.468	2.430	2.474	-	2.474	2.649	2.701	2.759	2.816	Continuing	Continuing
• OPN / 4213: *Aircraft Support Equipment*	272.044	162.273	123.170	-	123.170	101.293	101.848	101.554	104.266	Continuing	Continuing
• SCN / 2004: *CVN 81*	1,052.024	800.492	721.045	-	721.045	2,052.709	2,569.131	2,068.582	0.000	0.000	14,015.634

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	**Project (Number/Name)** 4004 / *EMALS*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• SCN / 5300: *Completion of PY Shipbldg Progr*	461.700	624.600	236.000	-	236.000	0.000	0.000	0.000	0.000	0.000	3,079.160
• OMN / 1B5B: *Ford Class PCU Housing*	4.421	15.587	13.584	-	13.584	0.800	10.600	10.812	11.039	Continuing	Continuing
• OPN / 4219: *Electromagnetic Aircraft Launch System (EMALS)*	18.594	17.836	14.702	-	14.702	18.345	18.195	17.955	18.291	23.665	147.583

Remarks

OPN 4213 includes a portion of line item funding for EMALS through FY23.

D. Acquisition Strategy

The CVN 78 is the first ship of the CVN 78 Class of aircraft carriers designed to replace the ships of the NIMITZ Class. The CVN 78 will feature a new nuclear propulsion and electrical generation/distribution system, new electromagnetic aircraft launching system (EMALS), advanced arresting gear (AAG) system, all electric auxiliaries, warfare system improvements, survivability enhancements, improved weapons handling, and improved aircraft servicing. These design features will result in lower manpower and total ownership costs as compared to the NIMITZ Class. Additionally, the following war fighting benefits will be realized: increased sortie generation rate, improved ship self-defense capability, increased launch and recovery capability/flexibility, increased operational availability, and increased flexibility to support future upgrades.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	**Project (Number/Name)** 4004 / *EMALS*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Cost No Longer Funded in FYDP	Various	Various : Various	72.826	0.000		0.000		0.000		-		0.000	0.000	72.826	24.589
Primary SW Development - Automated Software Testing	WR	NAWCAD Lakehurst : Lakehurst, NJ	0.000	0.000		0.781	Nov 2023	0.744	Nov 2024	-		0.744	Continuing	Continuing	Continuing
Primary HW Development - Electrical Isolation	C/CPFF	General Atomics : San Diego, CA	0.000	0.000		0.000		4.945	Dec 2024	-		4.945	Continuing	Continuing	Continuing
Primary HW Development - AALSTARS	WR	NAWCAD Lakehurst : Lakehurst, NJ	0.000	0.000		0.000		0.560	Nov 2024	-		0.560	0.000	0.560	-
Primary HW Development - BSC CPLD Upgrade	C/CPFF	General Atomics : San Diego, CA	0.000	0.000		0.000		1.100	Dec 2024	-		1.100	Continuing	Continuing	Continuing
		Subtotal	72.826	0.000		0.781		7.349		-		7.349	Continuing	Continuing	N/A

Remarks

FY 2025 Primary HW Dev increase is to begin development of Electrical Isolation capability, development of AALSTARS in support of select EMALS components, and development of Block Switch Controller (BSC) Complex Programmable Logic Device (CPLD).

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Training Support	WR	NAWCAD TSD : Orlando, FL	1.477	0.000		0.000		0.000		-		0.000	0.000	1.477	-
Depot Logistics Development	C/CPFF	General Atomics : San Diego, CA	24.340	2.440	Nov 2022	0.000		0.000		-		0.000	0.000	26.780	25.231
Government Eng Support	WR	NAWCAD Lakehurst : Lakehurst, NJ	4.921	3.704	Nov 2022	0.000		2.184	Nov 2024	-		2.184	Continuing	Continuing	Continuing
Integrated Logistics Support	WR	NAWCAD Lakehurst : Lakehurst, NJ	0.000	0.000		0.000		0.135	Nov 2024	-		0.135	0.000	0.135	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	Project (Number/Name) 4004 / *EMALS*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Depot Logistics Development (Overhaul Capability)	C/CPFF	General Atomics : San Diego, CA	4.111	9.285	Nov 2022	0.000		0.000		-		0.000	0.000	13.396	-
Training Support	C/FFP	General Atomics : San Diego, CA	0.000	0.367	Nov 2022	0.000		0.000		-		0.000	0.000	0.367	-
Prior Year Cost No Longer Funded in FYDP	Various	Various : Various	1.319	0.000		0.000		0.000		-		0.000	0.000	1.319	-
		Subtotal	36.168	15.796		0.000		2.319		-		2.319	Continuing	Continuing	N/A

Remarks

FY 2025 increase to Government Eng is to support Electrical Isolation, AALSTARS and BSC CPLD development efforts.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Developmental Test & Evaluation Not Funded FYDP (PYDT&E)	Various	Various : Various	44.980	0.000		0.000		0.000		-		0.000	0.000	44.980	-
		Subtotal	44.980	0.000		0.000		0.000		-		0.000	0.000	44.980	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CSS Engineering Support	Various	Various : Various	0.000	0.908	Jan 2023	0.000		0.000		-		0.000	0.000	0.908	-
Program Management Support	WR	NAWCAD Lakehurst : Lakehurst, NJ	0.000	0.000		0.000		0.125	Nov 2024	-		0.125	0.000	0.125	-
		Subtotal	0.000	0.908		0.000		0.125		-		0.125	0.000	1.033	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	Project (Number/Name) 4004 / *EMALS*	

	Prior Years	FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	153.974	16.704		0.781		9.793		-		9.793	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	**Project (Number/Name)** 4004 / *EMALS*

PB25 EMALS

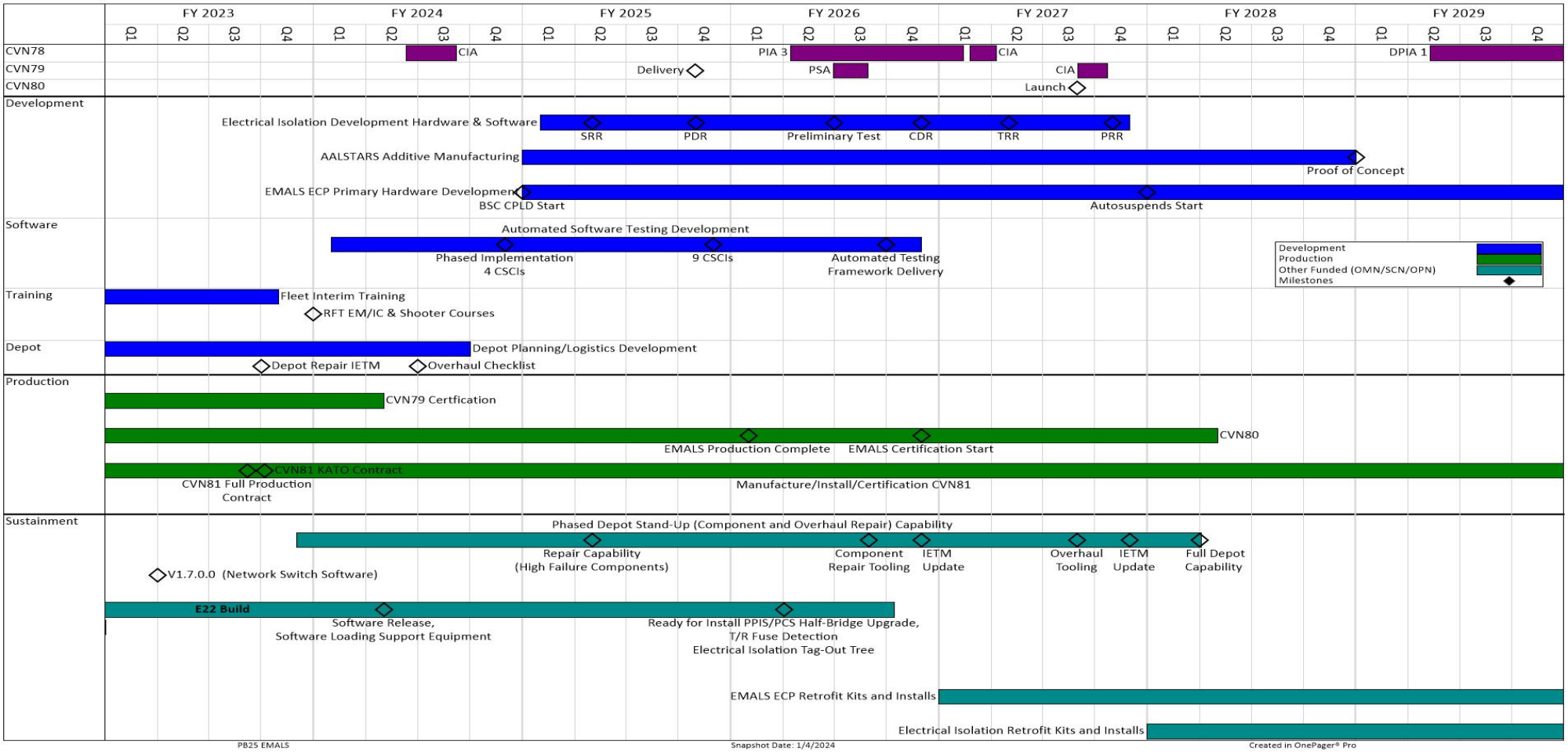

Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604112N / *GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80*	**Project (Number/Name)** 4004 / *EMALS*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 4004				
Development: Electrical Isolation Development HW & SW	1	2025	4	2027
Development: AALSTARS Additive Manufacturing	1	2025	4	2028
Development: ECP Primary HW Development	1	2025	4	2029
Development: Automated Software Testing Development	1	2024	4	2026
Development: EMALS Depot Planning/Logistics Dev	1	2023	3	2024
Training: EMALS Interim Training	1	2023	4	2023