

UNCLASSIFIED

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

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604112N / <i>GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80</i>
---	--

COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	365.610	106.381	104.433	121.509	-	121.509	-	-	-	-	-	-
2208: <i>CVN 21</i>	247.990	86.049	96.240	109.056	-	109.056	-	-	-	-	-	-
4004: <i>EMALS</i>	117.620	20.332	4.193	12.453	-	12.453	-	-	-	-	-	-
9999: <i>Congressional Adds</i>	0.000	0.000	4.000	0.000	-	0.000	-	-	-	-	-	-

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

A. Mission Description and Budget Item Justification

The FY 2022 funding request was reduced by \$0.361 million to account for the availability of prior year execution balances.

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) - Development of an advanced technology aircraft launch system in support of the CVN 78 Class design and construction schedule. The Electro Magnetic Aircraft Launch System (EMALS) will replace the current steam catapult on CVN 78 Class ships. EMALS provides better control of applied forces, both peak and transient dynamic, improved reliability and maintainability, increased operational availability and reduced operator and maintainer workload.

- (9999) - Development of a CVN electronic personnel qualification standards system (EPQS).

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.

UNCLASSIFIED

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

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604112N / <i>GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80</i>
---	--

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	105.756	107.895	98.817	-	98.817
Current President's Budget	106.381	104.433	121.509	-	121.509
Total Adjustments	0.625	-3.462	22.692	-	22.692
• Congressional General Reductions	-	-0.462			
• Congressional Directed Reductions	-	-7.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	4.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	3.400	0.000			
• SBIR/STTR Transfer	-2.775	0.000			
• Program Adjustments	0.000	0.000	24.639	-	24.639
• Rate/Misc Adjustments	0.000	0.000	-1.947	-	-1.947

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: 9999: *Congressional Adds*

Congressional Add: *Electronic Personnel Qualification Standards System*

Congressional Add Subtotals for Project: 9999

Congressional Add Totals for all Projects

	FY 2020	FY 2021
	0.000	4.000
Congressional Add Subtotals for Project: 9999	0.000	4.000
Congressional Add Totals for all Projects	0.000	4.000

Change Summary Explanation

Schedule:

4004 EMALS

Technical: N/A

Cost: The increase from FY2021 to FY2022 supports the stand up of the EMALS Depot Facility (Phase 1).

Schedule: Updates include the following:

- CVN78/CVN79/CVN80: Events were updated to reflect the most current Post Delivery Test & Trials (PDT&T) ship schedule.

EMALS Milestone: - MS D was removed from the schedule.

Correction of Deficiency (COD) NRE/Software Development:

- Moved from 2Q FY2021 to 1Q FY2022

Fleet Interim Training end date moved from 4Q FY2021 to 4Q FY2022

Training Curriculum Development CNATT Approval end date is 2Q FT2021

Depot Planning

Depot Facility Standup start date moved from ending in 1Q FY 2022 to 4Q FY 2022

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604112N / <i>GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80</i>	
<p>Phased Depot Stand-Up (Component and Overhaul) starts 2Q 2022 Included AAG production schedules and Builds plan for CVN79/CVN80/CVN81 Included Sustainment for Engineering Change Proposal and E22 Build</p> <p>Cost: 2208 CVN Addition of Full Ship Shock Trials (FSST) Analysis, Reports and Repairs (+12.000M) Program Adjustments (-1.761M)</p> <p>4004 EMALS The \$13.000M increase from FY 2021 to FY 2022 supports the stand up of the EMALS Depot Facility (Phase 1).</p>		

UNCLASSIFIED

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80	Project (Number/Name) 2208 / CVN 21
--	--	---

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
2208: CVN 21	247.990	86.049	96.240	109.056	-	109.056	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 223

A. Mission Description and Budget Item Justification

This project provides for 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. This project transitions the most promising technologies from the Navy technology base, other government laboratories, and the private sector into specific advanced development efforts. All systems developed in this project have the potential to support emerging requirements and other promising systems technologies for insertion into new aircraft carrier designs. The emphasis is directed toward developing ship hull, mechanical, propulsion, electrical, aviation, warfare systems, and combat support systems, sub-systems 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 future aircraft carriers. This project also encompasses those tasks required to support CVN 78 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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: CVN 78 Class Advanced Technology Design & Development	14.767	1.425	3.000	0.000	3.000
Articles:	-	-	-	-	-
Description: CVN 78 Class Advanced Technology Design & Development - Continue development and transition of technologies to support CVN 78 Class Key Performance Parameters (KPPs): maintain sortie generation rate, reductions in manpower, and further recovery of weight and stability service life margins. Continue design activities to integrate the new technologies, such as the new propulsion plant and Electromagnetic Aircraft Launch System into the ship. Complete shock qualification for components of all CVN 78 systems.					
FY 2021 Plans: Cyber-security: Continue the development and maintenance of certification and accreditation packages for system support. Continue to update and maintain the CVN 78 Network Topology. Continue planning for Operational Cybersecurity testing. Continue developing physical and logical disconnect procedures for Contractor Furnished Equipment (CFE) and Government Furnished Equipment (GFE) systems under various					

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 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)					
operating conditions. Begin planning the NAVSEA Red Team cyber survivability assessment of cybersecurity attributes against mission areas.					
FY 2022 Base Plans: Cyber-security: Continue developing CVN 78 cyber-security processes, requirements and solutions. Continue development efforts necessary to implement the Defense in Depth Functional Implementation Architecture standard, increasing CVN 78's survivability in a cyber-contested environment. Develop and maintain system authorization packages for Risk Management Framework (RMF).					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Increase from FY 21 to FY 22 is due to the increased efforts to improve cybersecurity across the Navy.					
Title: CVN 21 - Test & Evaluation (T&E)					
Articles:					
	13.782	6.915	41.056	0.000	41.056
	-	-	-	-	-
FY 2021 Plans: Continue Post-Delivery Test & Trials (PDT&T), Consolidated Test Working Group (CTWG), and Carrier Integrated Test Team (CITT) efforts in support of the completion of DT/IT-5 testing. FY 21 activities will include: execution of the Combat Systems Operational Rehearsal Event (CSORE) Phase I, planning of CSORE Phase II, updating the CVN 78 ship characteristics for use in the Probability of Rain Annihilation (PRA) testbed, collect data on torpedo evasion runs conducted during Acoustic Trials, and begin platform-level Electronic Warfare assessments. Continue planning of Operational Testing, to include Operational Test Phase C1 (OT-C1) and OT-C2 test events. Continue to collect reliability data on new and legacy systems. Continue to monitor corrective actions and track installation and performance on ship. Begin planning for the Joint Mission Interoperability Test (JMIT).					
FY 2022 Base Plans: Continue CTWG, and CITT efforts in support of the completion of DT/IT-5 testing. FY 22 activities will include: execution of the Combat Systems Operational Rehearsal Event (CSORE) Phase II, completion of the CVN 78 ship model updates for use in the Probability of Rain Annihilation (PRA) testbed, and continue platform-level Electronic Warfare assessments. Begin the first phase of Operational Testing, Operational Test Phase C1 (OT-C1). Continue planning for the second phase of Operational Testing, OT-C2. Continue to collect reliability data					

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>on new and legacy systems. Continue to monitor corrective actions and track installation and performance on ship. Conduct the Joint Mission Interoperability Test (JMIT).</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Growth is a result of the completion of final PDT&T period and entering Operational Testing in FY22. Specifically, this includes the execution of the Combat Systems Operational Rehearsal Event (CSORE) Phase II, which will be the final Combat Systems DT event prior to Operational Testing. FY22 will also begin planning of the JITC interoperability certification in FY23, which will be used to assess the platform's Net-Ready Key Performance Parameter. Funding is required for targets, SME support, data collection, analysis, and reporting of operational test events aboard CVN 78.</p>					
<p>Title: Integrated Digital Shipbuilding (iDS)</p> <p align="right">Articles:</p> <p>Description: Transformation to Integrated Digital Shipbuilding (iDS).</p> <p>FY 2021 Plans: Continue CVN 80/81 FY21 Integrated Digital Shipbuilding implementation plan and execute \$54M of the total contract by the Navy. This effort will continue each year through FY 2027 to enable HII-NNS to achieve 2-ship-buy savings. These efforts are directly tied to the construction trade products needed to support the build sequence in the shops and on the waterfront. Failure to fully fund installment clause would result in a change to the contract as funding requirements would not be met. Continue to apply upgrades to the shipbuilders Product Lifecycle Management (PLM) methodology, Product Data Management (PDM), and Software toolsets to support developing interfaces, new business processes, shipyard systems, and overall shipbuilding efficiency increase. Continue to support engineering efforts to define and add product manufacturing information into the Product Model to allow design disclosure to the Navy and digital disclosure of work instructions and related technical references on tablet computers for the mechanics to use in the construction of CVN 80/81. Continue planning efforts to develop visual work instructions for manufacturing and constructions Trades. Continue to develop visual build management plans and Critical Chain Project Plans (CCPP) that will enable development of efficiently sequenced build plans.</p> <p>FY 2022 Base Plans:</p>	40.000	47.000	53.000	0.000	53.000
	-	-	-	-	-

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>Continue CVN 80/81 FY22 Integrated Digital Shipbuilding implementation plan and execute \$53M of the total contract by the Navy. This effort will continue each year through FY 2027 to enable HII-NNS to achieve 2-ship-buy savings. These efforts are directly tied to the construction trade products needed to support the build sequence in the shops and on the waterfront. Failure to fully fund installment clause would result in a change to the contract as funding requirements would not be met. Continue to apply upgrades to the shipbuilders Product Lifecycle Management (PLM) methodology, Product Data Management (PDM), and Software toolsets to support developing interfaces, new business processes, shipyard systems, and overall shipbuilding efficiency increase. Continue to support engineering efforts to define and add product manufacturing information into the Product Model to allow design disclosure to the Navy and digital disclosure of work instructions and related technical references on tablet computers for the mechanics to use in the construction of CVN 80/81. Continue planning efforts to develop visual work instructions for manufacturing and constructions Trades. Continue to develop visual build management plans and Critical Chain Project Plans (CCPP) that will enable development of efficiently sequenced build plans.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: The increase from FY21 to FY22 is due to a ramp up in digital products to support construction activities on CVN 80/81. This FY22 rate increase was expected in the base contract award in 2019 and aligns with the contractually invoked installment funding profile.</p>					
<p>Title: CVN 78 Full Ship Shock Trial (FSST)</p> <p align="right">Articles:</p> <p>FY 2021 Plans: Execute the FSST. Begin data reduction, analysis and report. Begin needed repairs.</p> <p>FY 2022 Base Plans: Complete reduction and analysis of data collected during FSST. Complete CVN 78 FSST results summary and finalize the CVN 78 FSST Report. Complete all needed FSST-related ship repairs.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>	17.500	40.900	12.000	0.000	12.000
	-	-	-	-	-

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
The decrease from FY21 to FY22v is due to the execution of FSST occurring in FY21. Remaining efforts supported in FY22 are data analysis, reports, and repairs.					
Accomplishments/Planned Programs Subtotals	86.049	96.240	109.056	0.000	109.056

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• RD TEN / 0604567N: Project Units 3108, 3179, 4007	40.891	41.841	44.327	-	44.327	-	-	-	-	-	-
• SCN / 2001: Carrier Replacement Program	1,848.682	958.933	1,068.705	-	1,068.705	-	-	-	-	-	-
• OMN / 1B2B: CVN 78 Ford Class Training and Sustainment (12BJ0)	6.871	5.026	5.513	-	5.513	-	-	-	-	-	-
• OPN / 5664: Surface Training Equipment	1.412	4.457	2.475	-	2.475	-	-	-	-	-	-
• SCN / 5300: Completion of PY Shipbldg Progr	0.000	71.000	291.000	-	291.000	-	-	-	-	-	-
• SCN / 2004: CVN 81	427.818	1,606.432	1,299.764	-	1,299.764	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The CVN 78 is the first ship of the CVN 78 Class of aircraft carriers designed to replace USS ENTERPRISE and the ships of the NIMITZ Class. The CVN 78 will feature a new nuclear propulsion and electrical generation/distribution 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.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 4				PE 0604112N / GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80				2208 / CVN 21							
Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced Design & Development	C/CPAF	HII : VA	30.347	1.919	Oct 2019	0.000		0.230	Nov 2021	-		0.230	-	-	-
Advanced Design & Development	WR	NSWC CARDEROCK : MD	4.951	0.000		0.000		0.000		-		0.000	-	-	-
Advanced Design & Development	WR	NAWC PATUXENT RIVER : MD	5.925	0.000		0.000		0.000		-		0.000	-	-	-
Advanced Design & Development	WR	NSWC DAHLGREN : VA	7.781	0.000		0.000		1.300	Nov 2021	-		1.300	-	-	-
Advanced Design & Development	C/CPAF	RAYTHEON : VA	22.045	7.064	Oct 2019	0.000		0.000		-		0.000	-	-	-
Advanced Design & Development	C/CPFF	NAVSEA SEAPORT : VARIOUS	23.949	0.000		0.000		0.000		-		0.000	-	-	-
Advanced Design & Development	Various	MISCELLANEOUS : VARIOUS	2.877	0.740	Nov 2019	0.000		0.000		-		0.000	-	-	-
Advanced Design & Development	WR	NSWC PHILADELPHIA : PA	16.678	4.817	Oct 2019	1.012	Feb 2021	1.120	Nov 2021	-		1.120	-	-	-
Advanced Design & Development	WR	SPAWAR : VARIOUS	6.640	0.000		0.413	Feb 2021	0.000		-		0.000	-	-	-
Advanced Design & Development	WR	NSWC CORONA : CA	1.602	0.000		0.000		0.000		-		0.000	-	-	-
Advanced Design & Development	WR	NAWC LAKEHURST : NJ	1.338	0.000		0.000		0.000		-		0.000	-	-	-
Advanced Design & Development	WR	NSWC PORT HUENEME : CA	0.855	0.000		0.000		0.000		-		0.000	-	-	-
Advanced Design & Development	C/CPFF	BECHTEL : PA	6.400	0.000		0.000		0.000		-		0.000	-	-	-
Advanced Design & Development	C/CPFF	GRYPHON (SEI&T) : IN	0.352	0.000		0.000		0.350	Nov 2021	-		0.350	-	-	-
Integrated Digital Shipbuilding	C/CPAF	HII : VA	6.965	40.000	Oct 2019	47.000	Nov 2020	53.000	Nov 2021	-		53.000	-	-	-
Subtotal			138.705	54.540		48.425		56.000		-		56.000	-	-	N/A

UNCLASSIFIED

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80	Project (Number/Name) 2208 / CVN 21
--	--	---

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Development Test & Evaluation	C/CPAF	HII : VA	10.432	0.625	Nov 2019	0.000		1.131	Nov 2021	-		1.131	-	-	-
Development Test & Evaluation	WR	NAWC PATUXENT RIVER : MD	3.499	0.633	Oct 2019	0.021	Nov 2020	0.174	Nov 2021	-		0.174	-	-	-
Development Test & Evaluation	WR	NSWC DAHLGREN : VA	11.902	2.222	Oct 2019	0.943	Nov 2020	3.742	Nov 2021	-		3.742	-	-	-
Development Test & Evaluation	WR	NSWC CARDEROCK : MD	1.107	0.969	Oct 2019	0.472	Nov 2020	1.166	Nov 2021	-		1.166	-	-	-
Development Test & Evaluation	WR	SPAWAR : VARIOUS	8.421	0.000		0.000		0.000		-		0.000	-	-	-
Development Test & Evaluation	C/CPAF	RAYTHEON : VARIOUS	5.643	0.000		0.000		0.000		-		0.000	-	-	-
Development Test & Evaluation	Various	MISCELLANEOUS : VARIOUS	2.506	3.004	Oct 2019	0.838	Feb 2021	2.385	Nov 2021	-		2.385	-	-	-
Development Test & Evaluation	C/CPFF	NAVSEA SEAPORT : VARIOUS	3.215	0.851	Nov 2019	0.793	Feb 2021	0.000		-		0.000	-	-	-
Development Test & Evaluation	C/BA	NSWC PORT HUENEME : CA	0.885	1.773	Oct 2019	0.427	Feb 2021	10.199	Nov 2021	-		10.199	-	-	-
Development Test & Evaluation	C/BA	NSWC CORONA : CA	0.263	0.000		0.000		0.592	Nov 2021	-		0.592	-	-	-
Development Test & Evaluation	WR	NAWC LAKEHURST : NJ	10.881	0.922	Nov 2019	0.555	Feb 2021	1.741	Nov 2021	-		1.741	-	-	-
Development Test & Evaluation	WR	NSWC PHILADELPHIA : PA	4.794	1.753	Nov 2019	0.000		0.000		-		0.000	-	-	-
Operational Test & Evaluation	WR	COMOPTEVFOR : VA	11.275	2.257	Nov 2019	2.866	Nov 2020	19.926	Nov 2021	-		19.926	-	-	-
Operational Test & Evaluation	WR	NAWC PATUXENT RIVER : MD	0.213	0.000		0.000		0.000		-		0.000	-	-	-
Development Test & Evaluation	C/CPFF	GRYPHON (SEI&T) : IN	1.164	0.000		0.000		0.000		-		0.000	-	-	-

UNCLASSIFIED

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80	Project (Number/Name) 2208 / CVN 21
--	--	---

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Development Test & Evaluation	C/CPFF	GENERAL ATOMICS : CA	11.708	0.000		0.000		0.000		-		0.000	-	-	-
Full Ship Shock Trial	C/CPFF	BECHTEL : PA	6.500	1.132	Oct 2019	3.100	Nov 2020	0.400	Nov 2021	-		0.400	-	-	-
Full Ship Shock Trial	WR	NAWC PATUXENT RIVER : MD	0.635	1.445	Oct 2019	2.300	Nov 2020	0.330	Nov 2021	-		0.330	-	-	-
Full Ship Shock Trial	WR	NSWC DAHLGREN : VA	0.451	0.887	Oct 2019	2.780	Nov 2020	0.150	Nov 2021	-		0.150	-	-	-
Full Ship Shock Trial	WR	NSWC CARDEROCK : MD	11.692	9.534	Oct 2019	15.700	Nov 2020	1.116	Nov 2021	-		1.116	-	-	-
Full Ship Shock Trial	WR	NSWC PHILADELPHIA : PA	1.259	3.502	Oct 2019	5.000	Nov 2020	0.204	Nov 2021	-		0.204	-	-	-
Full Ship Shock Trial	C/CPAF	HII : VA	0.600	0.000		12.020	Nov 2020	9.800	Nov 2021	-		9.800	-	-	-
Full Ship Shock Trial	WR	SPAWAR : VARIOUS	0.240	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			109.285	31.509		47.815		53.056		-		53.056	-	-	N/A

Remarks

The Development Test & Evaluation increase supports the lead testing activity for the execution of the Combat Systems Operational Rehearsal Event (CSORE) Phase II. CSORE Phase II is scheduled for Q3FY22. Funds are required for: target procurement, Lear jet assets, jamming pods, support vessels, ammunition, SME support, data collection and analysis, and reporting.

The Operational Test & Evaluation increase supports the lead testing activity for operational testing. CVN 78 will enter the first phase of operational testing in FY22. The additional funds are needed for procurement of high-speed surface maneuvering targets, low/slow flyer targets, target support vessels, ammunition, and finalization of the data collection plan and test procedures.

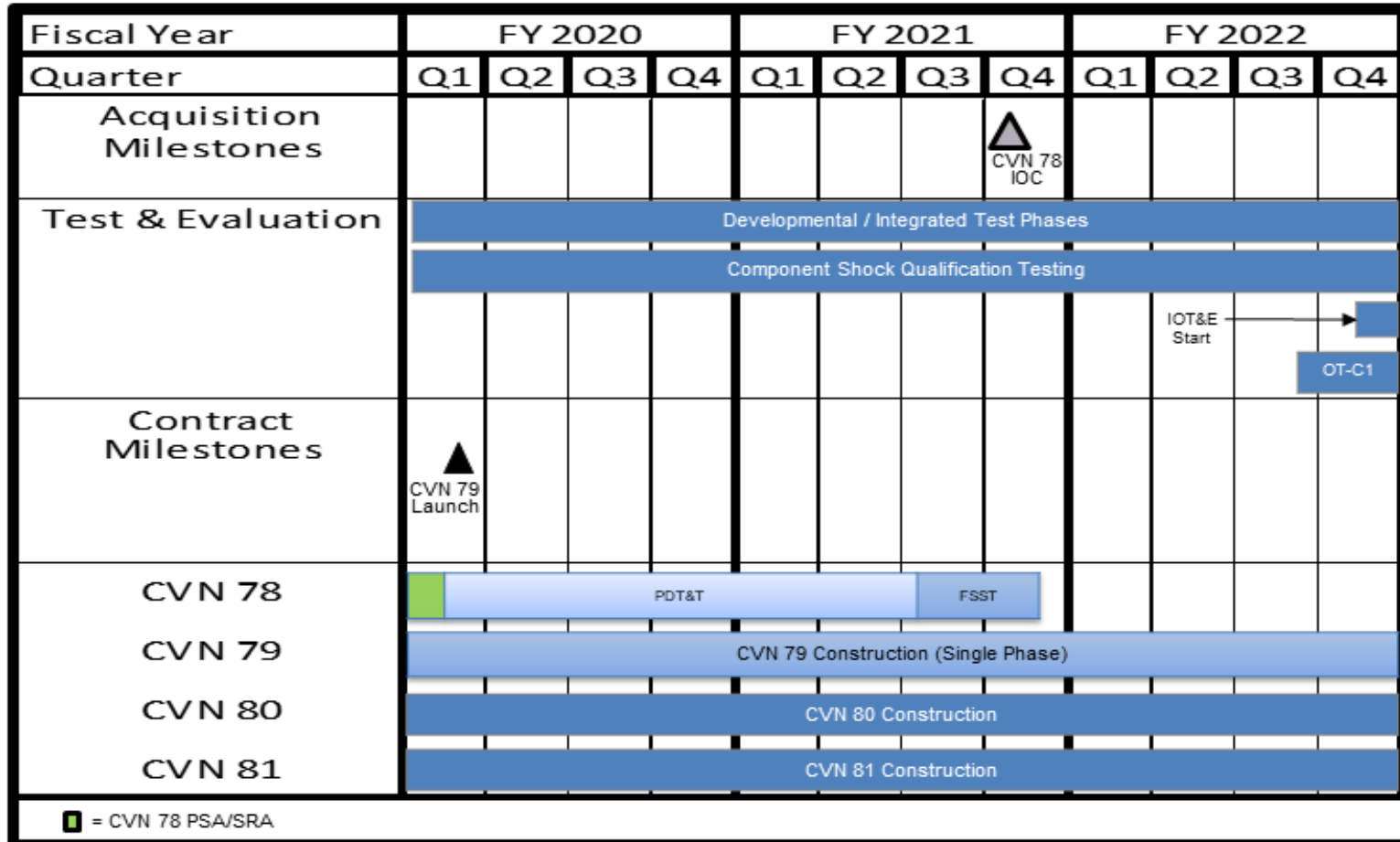
	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	247.990	86.049	96.240	109.056	-	109.056	-	-	N/A

Remarks

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80	Project (Number/Name) 2208 / CVN 21

Gerald R. Ford Class Carriers



UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / <i>GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80</i>	Project (Number/Name) 2208 / <i>CVN 21</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2208				
CVN 21	1	2020	4	2022

UNCLASSIFIED

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80	Project (Number/Name) 4004 / EMALS
--	--	--

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
4004: EMALS	117.620	20.332	4.193	12.453	-	12.453	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 223

A. Mission Description and Budget Item Justification

This project provides for the development of an advanced technology aircraft launch system in support of the CVN 78 design and construction schedule, as well as Engineering and Life Cycle System (E&LCS) design. The Electromagnetic Aircraft Launch System (EMALS) will be the aircraft catapult for CVN 78 Class ships. EMALS provides better control of applied forces, both peak and transient dynamic, improved reliability and maintainability, increased operational availability, and reduced operator and maintainer workload.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: EMALS	20.332	4.193	12.453	0.000	12.453
Articles:	-	-	-	-	-
Description: EMALS					
FY 2021 Plans: Continue EMALS Integrated Test & Evaluation (IT&E) land-based testing using deadloads for the correction of deficiencies. Stand up training facility and achieve Ready For Training. Continue development of the required processes and procedures to plan for Depot Level activities. Continue the planning and analysis necessary to standup EMALS Depot Level maintenance, overhaul and repair facility/facilities for EMALS components.					
FY 2022 Base Plans: Complete depot planning and analysis, and commence standup of EMALS Depot Level maintenance, overhaul and repair facility/facilities for EMALS components.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: The increase from FY 2021 to FY 2022 supports the standup of the EMALS Depot facility.					
Accomplishments/Planned Programs Subtotals	20.332	4.193	12.453	0.000	12.453

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80	Project (Number/Name) 4004 / EMALS

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RD TEN / 0604567N: <i>Project Units 3108, 3179, 4007</i>	40.891	41.841	44.327	-	44.327	-	-	-	-	-	-
• SCN / 2001: <i>Carrier Replacement Program</i>	1,062.000	1,029.933	1,359.705	-	1,359.705	-	-	-	-	-	-
• OMN / 1B2B: <i>CVN 78 Ford Class Training and Sustainment (12BJ0)</i>	6.871	5.026	5.513	-	5.513	-	-	-	-	-	-
• OPN / 5664: <i>Surface Training Equipment</i>	1.412	4.457	2.475	-	2.475	-	-	-	-	-	-
• OPN / 4213: <i>Aircraft Support Equipment</i>	187.926	236.655	178.647	-	178.647	-	-	-	-	-	-
• SCN / 2004: <i>CVN 81</i>	1,214.500	1,606.432	1,299.764	-	1,299.764	-	-	-	-	-	-
• SCN: <i>Completion of PY Shipbldg Progr</i>	0.000	71.000	74.000	-	74.000	-	-	-	-	-	-

Remarks

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

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.

UNCLASSIFIED

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80	Project (Number/Name) 4004 / EMALS
--	--	--

Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Primary HW Development - SDD	C/CPFF	General Atomics : San Diego, CA	40.875	0.000		0.000		0.000		-		0.000	-	-	-
Primary HW Development	WR	NAWCAD Lakehurst : Lakehurst, NJ	7.362	0.000		0.000		0.000		-		0.000	-	-	-
Prior Year Cost No Longer Funded in FYDP	Various	Various : Various	24.589	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			72.826	0.000		0.000		0.000		-		0.000	-	-	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Government Engineering Support	WR	Various : Various	0.216	0.000		0.000		0.000		-		0.000	-	-	-
Training Support	WR	NAWCAD TSD : Orlando, FL	0.974	0.220	Jan 2020	0.202	Nov 2020	0.000		-		0.000	-	-	-
Training Support	WR	NAVFAC : Norfolk, VA	1.103	0.000		0.000		0.000		-		0.000	-	-	-
Depot Logistics Development	C/CPFF	General Atomics : San Diego, CA	7.700	10.369	Jan 2020	2.913	Jan 2021	0.000		-		0.000	-	-	-
Government Eng Support	WR	NAWCAD Lakehurst : Lakehurst, NJ	1.116	1.111	Jan 2020	1.078	Nov 2020	1.646	Nov 2021	-		1.646	-	-	-
Depot Stand-Up Support	C/CPFF	General Atomics : San Diego, CA	0.000	0.000		0.000		10.807	Nov 2021	-		10.807	-	-	-
Subtotal			11.109	11.700		4.193		12.453		-		12.453	-	-	N/A

Remarks
The increase from FY 2021 to FY 2022 is due to the completion of the EMALS depot planning/logistics development and the start of the Depot Standup in FY22.

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy

Date: May 2021

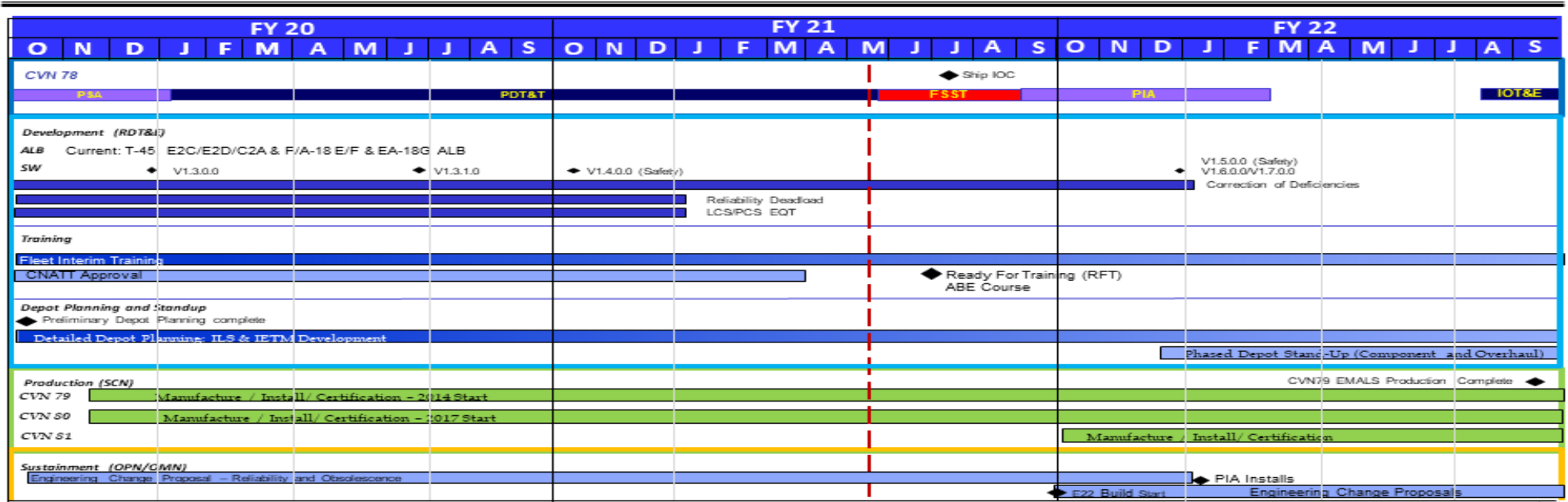
Appropriation/Budget Activity
1319 / 4

R-1 Program Element (Number/Name)
PE 0604112N / GERALD R FORD CI NUC
AIRCRAFT CARRIER CVN 78-80

Project (Number/Name)
4004 / EMALS



EMALS PB22 Program Schedule



UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80	Project (Number/Name) 4004 / EMALS

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 4004				
Training: EMALS Training Development	1	2020	3	2021
Depot Development: EMALS Depot Level Planning	1	2020	1	2022
Depot Development: EMALS Depot Standup	1	2022	4	2022
Test and Evaluation: EMALS Integrated Test & Evaluation (IT&E)	1	2020	2	2021
Test and Evaluation: EMALS Reliability Deadloads	2	2020	2	2021
Test and Evaluation: EMALS Launch Control Subsystem (LCS) Environmental Qualification Testing (EQT)	2	2020	2	2021

UNCLASSIFIED

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80	Project (Number/Name) 9999 / Congressional Adds
--	--	---

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
9999: Congressional Adds	0.000	0.000	4.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides for development of a CVN electronic personnel qualification standards system (EPQS).

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2020	FY 2021
Congressional Add: Electronic Personnel Qualification Standards System	0.000	4.000
FY 2020 Accomplishments: N/A		
FY 2021 Plans: Develop a digital twin of a single hull and develop game-based PQS training. Assist and support CVN digital transformation. Identify data sources and cloud environment solutions.		
Congressional Adds Subtotals	0.000	4.000

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
• RD TEN / 0604567N: Project Units 3108, 3179, 4007	40.891	41.841	44.327	-	44.327	-	-	-	-	-	-
• SCN / 2001: Carrier Replacement Program	1,848.682	958.933	1,068.705	-	1,068.705	-	-	-	-	-	-
• OMN / 1B2B: CVN 78 Ford Class Training and Sustainment (12BJ0)	6.871	5.026	5.513	-	5.513	-	-	-	-	-	-
• OPN / 5664: Surface Training Equipment	1.412	4.457	2.475	-	2.475	-	-	-	-	-	-
• SCN / 5300: Completion of PY Shipbldg Progr	0.000	71.000	291.000	-	291.000	-	-	-	-	-	-
• SCN / 2004: CVN 81	427.818	1,606.432	1,299.764	-	1,299.764	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

N/A

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy

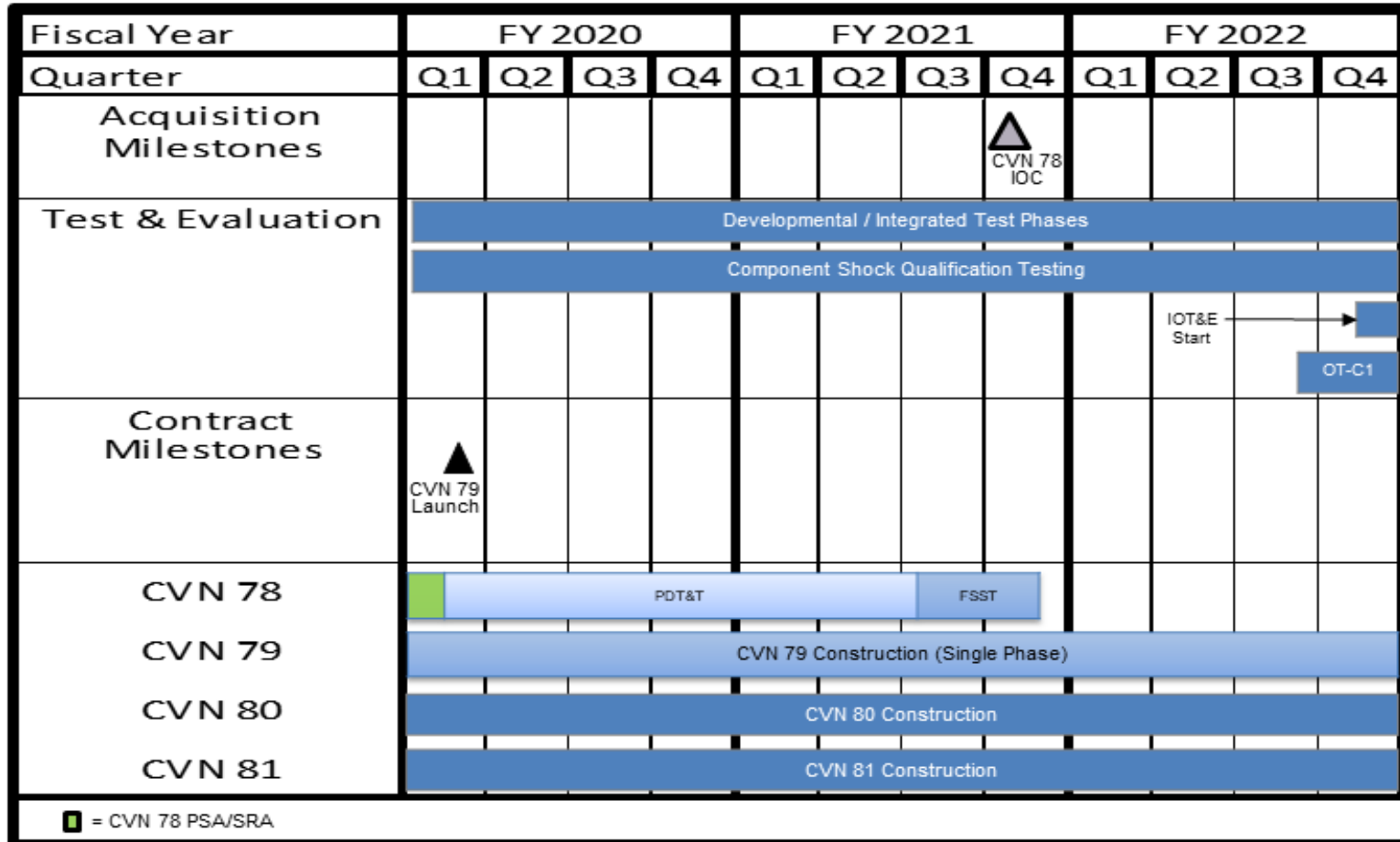
Date: May 2021

Appropriation/Budget Activity
1319 / 4

R-1 Program Element (Number/Name)
PE 0604112N / GERALD R FORD CI NUC
AIRCRAFT CARRIER CVN 78-80

Project (Number/Name)
9999 / Congressional Adds

Gerald R. Ford Class Carriers



UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / GERALD R FORD CI NUC AIRCRAFT CARRIER CVN 78-80	Project (Number/Name) 9999 / Congressional Adds

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 9999				
Electronic Personnel Qualification Standards System	1	2021	4	2022