Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy											Date: February 2020	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604214M *I AV-8B Aircraft - Engine Dev*							
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
Total Program Element	479.218	45.639	27.441	20.054	-	20.054	17.872	18.079	17.472	17.818	Continuing	Continuing
0652: *AV-8B*	479.218	45.639	27.441	20.054	-	20.054	17.872	18.079	17.472	17.818	Continuing	Continuing

A. Mission Description and Budget Item Justification

The program provides for AV-8B Design, Development, Integration, and Test of various platform improvements such as: Engine Life Management Program (ELMP), Escape Systems, Joint Mission Planning System (JMPS), and Block upgrades to various mission systems and software Operational Flight Programs (OFPs) to include JMPS integration, avionics and communications systems, navigation equipment, weapons carriage and countermeasures, studies and analyses of future capability expansion and unique flight testing, and the Obsolescence Replacement (OR)/Readiness Management Plan (RMP) including structural, hydraulic, electrical, environmental, and mechanical systems. OR/RMP represents all engineering activities for development and design to support aircraft safety flight clearances, concept explorations, responses to evolving threats, and developments to support Program Objective Memorandum.

The program's Evolutionary Acquisition Strategy includes Design, Development, Integration, and Test activities under the consolidated effort of Block Developments: H6.2 and follow-on block upgrades, to include a H7.0 block upgrade that will be required to implement full Link 16 capability, provide weapon improvements and integrate AIM-9X and Joint Standoff Weapon (JSOW). An H6.2 update included the Common Avionics Program, provided AV-8B a self-contained Global Positioning System navigation capability that is required to access preferred airspaces, including a Litening OFP V3, and initial Link 16 Precise Participant Location and Identification capability, which provided interoperability, digital combat identification and increased situational awareness on the battlefield. Link 16 is a Top 10 item in the Operational Advisory and Systems Safety Groups. The H7.0 OFP will fully implement the Harrier Link 16 integration, which will provide information sharing capabilities, integration of an increased number of Link 16 J-series messages and the ability to act on shared target track information. Connection to the Link 16 network is vital to the AV-8B's ability to operate within some Command and Control situations and Operational Plans, as designed today, as well as provide a tactical capability for the more effective and safe prosecution of both airborne and ground targets. Continued AV-8B combat relevance and ability to respond to evolving and emergent threats through end of service is critical to the Marine Air-Ground Task Force's ability to generate aviation combat power throughout the transition to F-35B. J-series, K-series, Tactical Targeting Network Technology, and other emerging datalink technology messages, as well as compliance with crypto modernization requirements and ability to use GPS-modernized weapons, are required to support current and future mission threats. Linked performance on par with current tactical platforms as well as design to communicate with F-35 is required for the AV-8B to remain tactically relevant to transition. H7.0 will also include the integration and test of weapons and sensors such as, but not limited to, AIM-9X, JSOW and Litening OFP V4, and will integrate required Display Computer processing improvements to enable H7.0 functionality. Integration of these weapons, to include continued use of current weapons as they are upgraded to modernized GPS capability, is vital to the Harrier's continued combat relevance to the Marine Expeditionary Unit and Global Response Force Combatant Commanders particularly as obsolete AIM-9M inventory dwindles.

Additionally, software integration and stores expansion testing will be required for systems to include a Helmet Mounted Cueing System (HMCS), Unique Weapons, survivability and Countermeasures, Advanced Precision Kill Weapons System (APKWS), AIM-9X, ALE-43, survivability upgrades, standoff weapons such as JSOW, Joint Air-to-Ground Missile (JAGM) and AIM-120 unique platform flight test which will be required to utilize updated AIM-120C variants on the AV-8B as well as test of emergent tactical requirements, and test of crypto modernization compliance. AV-8B funding also supports peculiar flight test requirements to include weapons integration/carriage and avionics, software/firmware upgrades, and avionics hardware component redesign activity. Studies and analyses will be conducted on systems

such as survivability systems, HMCS and Beyond Line of Sight (BLOS) to assess feasibility of integrating on the AV-8B. The ELMP is a comprehensive plan to increase and maintain safety of flight and operational readiness of the AV-8B F402-RR-408 Engine and accessories. The program will accomplish this mission by conducting Engineering Project Description investigations to develop engineering solutions that address emergent safety, obsolescence, foreign object debris detection and prevention, fatigue life and maintenance issues. The OR/RMP is required to ensure the AV-8B air vehicle's sustained mission availability, and safe and reliable operational readiness until end of service. Air vehicle sustainment requires component and system analyses, technical planning, identification, prioritization, and diagnosis of emergent problems and the allocation of resources for the development, testing and flight clearance of engineering solutions in the areas of flight, crew safety, and escape systems and structural integrity, obsolescence, systems reliability and maintainability, inventory preservation, alternative mission development, or other emergent material or equipment conditions affecting AV-8B systems readiness. Activities include research/analysis for system safety deficiency corrections, fuel system safety improvements, structural analyses, monitoring and integrity analysis, component compatibility, component and materials obsolescence analyses and mitigation development, explorations for aging equipment, reliability improvement analyses and design developments.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	46.363	27.441	23.646	-	23.646
Current President's Budget	45.639	27.441	20.054	-	20.054
Total Adjustments	-0.724	0.000	-3.592	-	-3.592
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.724	0.000			
• Program Adjustments	0.000	0.000	-2.500	-	-2.500
• Rate/Misc Adjustments	0.000	0.000	-1.092	-	-1.092

Change Summary Explanation

The FY 2021 request is less than FY2020 due to the evolution of H7.0 OFP into final testing and preparing for FY 2022 fielding.
The FY2021 funding request was further reduced by $2.500 million to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604214M / *AV-8B Aircraft - Engine Dev*	Project (Number/Name) 0652 / *AV-8B*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
0652: *AV-8B*	479.218	45.639	27.441	20.054	-	20.054	17.872	18.079	17.472	17.818	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program provides for AV-8B Design, Development, Integration and Test of the following improvements: Engine Life Management Program (ELMP), Operational Flight Programs (OFPs) and Avionics/Weapons Integration, Escape System, and Readiness Management Plan (RMP). The ELMP is a comprehensive plan to increase safety of flight and operational readiness of the AV-8B F402-RR-408 Engine and Gas Turbine Starter (GTS), as well as other critical engine components. The Program Office will accomplish this mission through the Component Improvement Program (CIP), which entails Engineering Project Description investigations to derive safety and reliability improvements to the engine and engine components. H7.0 OFP will integrate full Harrier Link 16 capability, provide software updates, integrate AIM-9X, a Litening Common OFP update, provide Advanced Precision Kill Weapons System (APKWS) integration improvements, Joint Standoff Weapon (JSOW) integration, and common avionics ADS-B (out), Mode 5, and Mode S Identification Friend or Foe capabilities as well as integrate required Radar Display Computer processing improvements to enable H7.0 functionality. Other efforts include compliance with crypto modernization requirements, testing compatibility with GPS-modernized weapons, peculiar integration and flight test requirements such as AIM-120C flight test, as AIM-120A/B will become obsolete, unique weapons, sensors, and countermeasures integration and stores expansion to include APKWS, Helmet Mounted Cueing System (HMCS), Beyond-Line-of-Sight (BLOS) communications, AIM-9X, ALE-43, standoff weapons such as JSOW, and unique flight test, study and component redesign efforts of other avionics, sensors, or weapons systems , or emergent tactical requirements, as they arise. The program is working closely with the Common Avionics Program and the Allies (Spain and Italy) on all efforts. RMP represents all engineering activities for development, design and test to support aircraft safety, flight clearance and concept exploration for resolution of emergent safety, service life, escape systems, compatibility, obsolescence, and readiness issues as well as response to fleet urgent operational requirements.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Development of RMP Engineering Change Proposals	7.096	4.527	4.428	0.000	4.428
Articles:	-	-	-	-	-
Description: Develop obsolescence solutions to improve safety, structural integrity, and systems reliability of the AV-8B aircraft.					
FY 2020 Plans: Extension of AV-8B End of Service date to 2028 requires continued obsolescence mitigation efforts to maintain aircraft readiness and reliability. The program will continue to address known, predicted, and emergent obsolescence equipment issues, continuing efforts from prior years. Continue fatigue life tracking analyses and algorithm update development. Continue Fuselage Fatigue Life Assessment to assure continued safe operation of the aircraft through the end of service date. Systems engineering will support ongoing and emergent analysis and design/ development/test efforts required to identify ECP requirements to correct systems safety, structural					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604214M / *AV-8B Aircraft - Engine Dev*	**Project (Number/Name)** 0652 / *AV-8B*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
integrity, compatibility, and readiness/reliability issues including efforts required to respond to evolving and emergent threats, mission systems, communications systems, navigation equipment, weapons carriage and countermeasures, structural, hydraulic, electrical, environmental, and mechanical systems. ***FY 2021 Base Plans:*** Extension of AV-8B End of Service date to 2028 requires continued research and innovation studies for airframe and subsystem Engineering Change Proposal (ECP) development to improve safety and reliability. The program will continue to address known, predicted, and emergent obsolescence equipment issues, continuing efforts from prior years. Continue fatigue life tracking analyses and algorithm update development. Continue Fuselage Fatigue Life Assessment to assure continued safe operation of the aircraft through the end of service date. Systems engineering will support ongoing and emergent analysis and design/ development/test efforts required to identify ECP requirements to correct systems safety, structural integrity, compatibility, and readiness issues including efforts required to respond to evolving and emergent threats, mission systems, communications systems, navigation equipment, weapons carriage and countermeasures, structural, hydraulic, electrical, environmental, and mechanical systems. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY20 to FY21 due to decreased requirement for airframe structural and subcomponent improvement studies.					
Title: Operational Flight Program (OFP) and Avionics Weapons Systems Development and Integration	31.349	16.928	11.507	0.000	11.507
Articles:	-	-	-	-	-
Description: Develop, integrate, and test aircraft OFP updates, mission planning updates, Litening Pod software updates/capability expansions, support aircraft avionics development efforts, integrate and test unique weapons systems, sensors, and countermeasures such as AIM-120C, AIM-9X, HMCS, APKWS, BLOS Communications, Crypto Modernization activities, avionics component obsolescence redesign efforts, survivability upgrades, ALE-43, standoff weapons such as JSOW and other weapons/avionics and sensor systems, avionics component redesign efforts and emergent tactical requirements as they arise, perform stores expansion testing, crypto modernization compatibility testing/integration, GPS-modernization compatibility testing/integration and conduct Digital Interoperability (to include Link 16) development, integration, and test efforts. Evaluate future capability expansions via studies and analyses.					
FY 2020 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604214M / *AV-8B Aircraft - Engine Dev*	**Project (Number/Name)** 0652 / *AV-8B*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Funds will provide for future capability expansion studies and analysis efforts to include HMCS, BLOS and survivability upgrades, future OFPs such as H8.0, efforts required to respond to evolving and emerging threats, peculiar flight test requirements to include various required weapons/sensors/countermeasures/crypto modernization/stores expansion integration and testing such as AIM-9X, ALE-43, JSOW and other weapons/ avionics systems as they arise. Funds will also provide for continuation of H7.0 OFP/Link 16/AIM-9X software integration and test efforts. ***FY 2021 Base Plans:*** Funds will provide for completion of H7.0 OFP/Link 16/ AIM-9X integration and integrated flight test efforts. leading toward release of the H7.0 OFP. Funds will also provide for future capability expansion studies and analyses efforts, future OFP requirement development, efforts required to respond to evolving and emerging threats, peculiar flight test requirements to include various required weapons/sensors/countermeasures/crypto modernization/GPS modernization compatibility testing/stores expansion integration and testing such as AIM-9X, ALE-43, JSOW, and other weapons/avionics systems as they arise. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funds decrease in FY2021 as H7.0 OFP completes development and flight test and prepares for fielding.					
Title: F402-RR-408 Engine Safety and Reliability Enhancements	7.194	5.986	4.119	0.000	4.119
Articles:	-	-	-	-	-
Description: Improve Safety and Reliability of the F402-RR-408 Engine and accessories for the AV-8B Harrier. ***FY 2020 Plans:*** The engineering CIP will conduct engineering investigations to develop ECPs for improvements and design solutions to correct deficiencies resulting from safety, obsolescence and structural fatigue for the engine and engine accessories, to maintain readiness and to meet mission requirements. Conduct research and innovation studies for Foreign Object Debris (FOD) mitigation and other operational environment changes to improve engine safety and reliability. ***FY 2021 Base Plans:*** The engineering CIP will conduct engineering investigations to develop ECPs for improvements and design solutions to correct deficiencies resulting from safety, obsolescence and structural fatigue for the engine and					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604214M / *AV-8B Aircraft - Engine Dev*	**Project (Number/Name)** 0652 / *AV-8B*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
engine accessories, to maintain readiness and to meet mission requirements. Conduct research and innovation studies for FOD mitigation and other operational environment changes to improve engine safety and reliability. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY20 to FY21 is due to completion of Foreign Object Damage(FOD) mitigation study and due to decreased requirement for development of Component Improvement Plans.					
Accomplishments/Planned Programs Subtotals	45.639	27.441	20.054	0.000	20.054

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• APN/0514: *AV-8 Series*	58.498	39.472	34.125	-	34.125	32.640	38.826	39.607	40.403	95.181	1,795.063

Remarks

D. Acquisition Strategy

The Obsolescence Replacement (OR)/RMP ensures the maximum reliability and readiness levels for the AV-8B Type/Model/Series by maintaining post production engineering and logistic support with the Original Equipment Manufacturers (OEMs). RMP tracks readiness degraders, identifies and addresses obsolescence for non-avionics systems, and identifies and addresses emerging in-service material developments related to ease of maintenance, safety, airframe life management and improved performance. The multi-disciplined team of program management, engineering, logistics, and financial personnel develop Engineering Change Proposals (ECPs), Rapid Action Minor Engineering Changes, Interim Rapid Action Changes to publications, trainer and support equipment modifications necessary to maintain aircraft reliability and safety. The RMP additionally supports the constant improvement and analysis of fleet Fatigue Life Expended data to maximize aircraft structural life and to support the NAVAIR annual Structural Appraisal of Fatigue Effects report required by OPNAV, and structural fatigue life assessments to assure continued safe operation of the aircraft through the end of service date. Funding for the ELMP will be placed on a cost-type contract to Rolls-Royce to address safety of flight issues, top readiness degraders, engine removal and mission failure drivers in order to improve Fleet readiness and reduce cost of ownership of the F402-RR-408 and accessories. It is also developed to assess life management program issues and design fixes for any service revealed deficiencies. The program's Evolutionary Acquisition Strategy includes Design, Development, Integration, and Test activity under the consolidated effort of Block Developments: H2.0, H4.0, H5.0, H6.0, H6.1., H6.2, H7.0, and following OFPs. H7.0 OFP will provide the AV-8B integration of additional required Link 16 J-series messages, integration of AIM-9X and JSOW weapons, and APKWS integration updates. H7.0 will also be accomplished in conjunction with the Common Avionics Program and will integrate ADS-B (out), Mode 5, and Mode S capabilities. Peculiar flight test efforts to include weapons, avionics, survivability, and sensor integration such as AIM-120, AIM-9X, APKWS, ALE-43, ALR-67, HMCS, standoff weapons such as JSOW, crypto modernization compliance integration/testing, GPS modernization compatibility, other avionics/weapons and sensor systems and emergent tactical requirements and avionics component redesign actions as they arise. Studies and analyses will be accomplished to assess future

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604214M / *AV-8B Aircraft - Engine Dev*	**Project (Number/Name)** 0652 / *AV-8B*

capability expansion feasibility and integration concepts to include weapons expansion, BLOS communications, survivability upgrades, and other potential avionics, weapons, or software capabilities as they arise.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604214M / *AV-8B Aircraft - Engine Dev*	Project (Number/Name) 0652 / *AV-8B*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development - ELMP	C/CPFF	Rolls-Royce PLC : Bristol, GB	36.187	3.165	Dec 2018	2.796	Dec 2019	1.476	Dec 2020	-		1.476	6.018	49.642	49.642
Primary Hardware Development - ELMP	C/CPFF	ONTIC (Goodrich) PS : Pitstone, GB	6.881	0.768	Mar 2019	0.000	Mar 2020	0.000		-		0.000	0.000	7.649	7.649
Primary Hardware Development - OFP	WR	NAWCWD : China Lake, CA	71.061	17.191	Dec 2018	8.367	Nov 2019	5.386	Nov 2020	-		5.386	Continuing	Continuing	Continuing
Primary Hardware Development - OFP	C/CPFF	Boeing : St. Louis, MO	10.777	4.384	Dec 2018	1.691	Dec 2019	0.000		-		0.000	0.000	16.852	16.852
Primary Hardware Development - OFP	C/CPFF	Raytheon : Waltham, MA	4.450	0.355	Dec 2018	0.000		0.000		-		0.000	0.000	4.805	4.805
Systems Engineering - RMP	C/CPFF	Boeing : St. Louis, MO	36.570	1.694	Jan 2019	1.373	Jan 2020	1.476	Jan 2021	-		1.476	14.326	55.439	55.439
Systems Engineering - RMP	WR	NAWCWD : China Lake, CA	3.755	0.159	Nov 2018	0.098	Nov 2019	0.100	Nov 2020	-		0.100	Continuing	Continuing	Continuing
Systems Engineering - RMP	WR	NAWCAD : Patuxent River, MD	9.238	1.097	Nov 2018	1.472	Nov 2019	1.501	Nov 2020	-		1.501	Continuing	Continuing	Continuing
Systems Engineering - OFP	WR	NAWCWD : China Lake, CA	0.837	0.050	Nov 2018	0.500	Nov 2019	0.169	Nov 2020	-		0.169	Continuing	Continuing	Continuing
Systems Engineering - OFP	C/CPFF	Raytheon : TBD	0.000	1.200	Jun 2019	0.000		0.100	Jun 2021	-		0.100	0.000	1.300	1.300
Prior year cost no longer funded in the FYDP	Various	Various : Various	44.016	0.000		0.000		0.000		-		0.000	0.000	44.016	-
		Subtotal	223.772	30.063		16.297		10.208		-		10.208	Continuing	Continuing	N/A

Remarks

Line 1: Decrease from FY20 to FY21 due to decreased requirement for development of Component Improvement Plans.
Line 3: Decrease from FY20 to FY21 due to evolution of H7.0 OFP into final testing and preparing for FY 2022 fielding.
Line 10: FY19 one time effort for JSOW integration with mission planning software. FY21 funding supports recurring component redesign efforts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604214M / *AV-8B Aircraft - Engine Dev*	Project (Number/Name) 0652 / *AV-8B*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development - RMP	C/CPFF	Boeing : St. Louis, MO	2.255	0.761	Jun 2019	0.000	Jun 2020	0.000	Jun 2021	-		0.000	2.146	5.162	5.162
Studies and Analysis - RMP	C/CPFF	Boeing : St. Louis, MO	4.962	2.900	Jul 2019	1.128	Jul 2020	0.887	Jul 2021	-		0.887	3.090	12.967	12.967
Studies and Analysis - OFP	WR	NAWCWD : China Lake, CA	0.881	0.079	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Studies and Analysis - OFP	C/CPFF	Boeing : St. Louis, MO	4.519	0.663	Jan 2019	0.239	Jan 2020	0.075	Jan 2021	-		0.075	0.000	5.496	5.496
Studies & Analysis - ELMP	C/CPFF	Moog, Inc. : Salt Lake City, UT	6.121	0.436	Jun 2019	0.000		0.000		-		0.000	0.000	6.557	6.557
Studies & Analysis - ELMP	C/CPFF	Trex : San Diego, CA	0.000	0.000		0.600	Jan 2020	0.000		-		0.000	0.000	0.600	0.600
Prior year cost no longer funded in the FYDP	Various	Various : Various	55.452	0.000		0.000		0.000		-		0.000	0.000	55.452	-
		Subtotal	74.190	4.839		1.967		0.962		-		0.962	Continuing	Continuing	N/A

Remarks

Line 14: Decrease from FY20 to FY21 due to decreased requirement for future capability studies. Study costs fluctuate due to duration and complexity of the efforts.
Line 6: Decrease from FY20 to FY21 due to completion of expeditionary FoD mitigation study (one-time effort).

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation - OFP	WR	NAWCWD : China Lake, CA	26.444	4.839	Jan 2019	3.957	Jan 2020	4.017	Jan 2021	-		4.017	Continuing	Continuing	Continuing
Operational Test & Evaluation - OFP	WR	COMOPTEVFOR : Norfolk, VA	25.013	0.257	Jan 2019	0.579	Jan 2020	0.275	Jan 2021	-		0.275	Continuing	Continuing	Continuing
Developmental Test & Evaluation - RMP/OFP	Various	Various : Various	0.100	0.505	Jan 2019	0.105	Jan 2020	0.110	Jan 2021	-		0.110	Continuing	Continuing	Continuing
Prior year cost no longer funded in the FYDP	Various	Various : Various	68.682	0.000		0.000		0.000		-		0.000	0.000	68.682	-
		Subtotal	120.239	5.601		4.641		4.402		-		4.402	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604214M / *AV-8B Aircraft - Engine Dev*	Project (Number/Name) 0652 / *AV-8B*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering & Tec SRVC (Non-FFRDC) - RMP	C/CPFF	Trident : Huntsville, AL	1.301	0.125	Mar 2019	0.126	Mar 2020	0.128	Mar 2021	-		0.128	0.867	2.547	2.547
Engineering & Tec SRVC (Non-FFRDC) - ELMP	C/CPFF	LTM, Inc : Havelock, NC	5.231	1.191	Jun 2019	1.459	Jun 2020	1.488	Jun 2021	-		1.488	8.845	18.214	18.214
Engineering & Tec SRVC (Non-FFRDC)	C/CPFF	Various : Various	10.729	0.262	Dec 2018	0.280	Dec 2019	0.286	Dec 2020	-		0.286	0.000	11.557	11.557
MGT & PROF SUPPT SRVC (NON-FFRDC)	C/CPFF	Various : Various	9.248	0.061	Dec 2018	0.000		0.000		-		0.000	12.064	21.373	21.373
Government Engineering Support - ELMP	WR	NAWCAD : Patuxent River, MD	10.055	1.563	Nov 2018	1.079	Nov 2019	1.109	Nov 2020	-		1.109	Continuing	Continuing	Continuing
Government Engineering Support - OFP	WR	NAWCAD : Patuxent River, MD	4.104	1.725	Nov 2018	1.420	Nov 2019	1.305	Nov 2020	-		1.305	Continuing	Continuing	Continuing
Travel	WR	Various : Various	1.800	0.209	Oct 2018	0.172	Oct 2019	0.166	Oct 2020	-		0.166	Continuing	Continuing	Continuing
Prior year cost no longer funded in the FYDP	Various	Various : Various	18.549	0.000		0.000		0.000		-		0.000	0.000	18.549	-
		Subtotal	61.017	5.136		4.536		4.482		-		4.482	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	479.218	45.639		27.441		20.054		-		20.054	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604214M / *AV-8B Aircraft - Engine Dev*	**Project (Number/Name)** 0652 / *AV-8B*

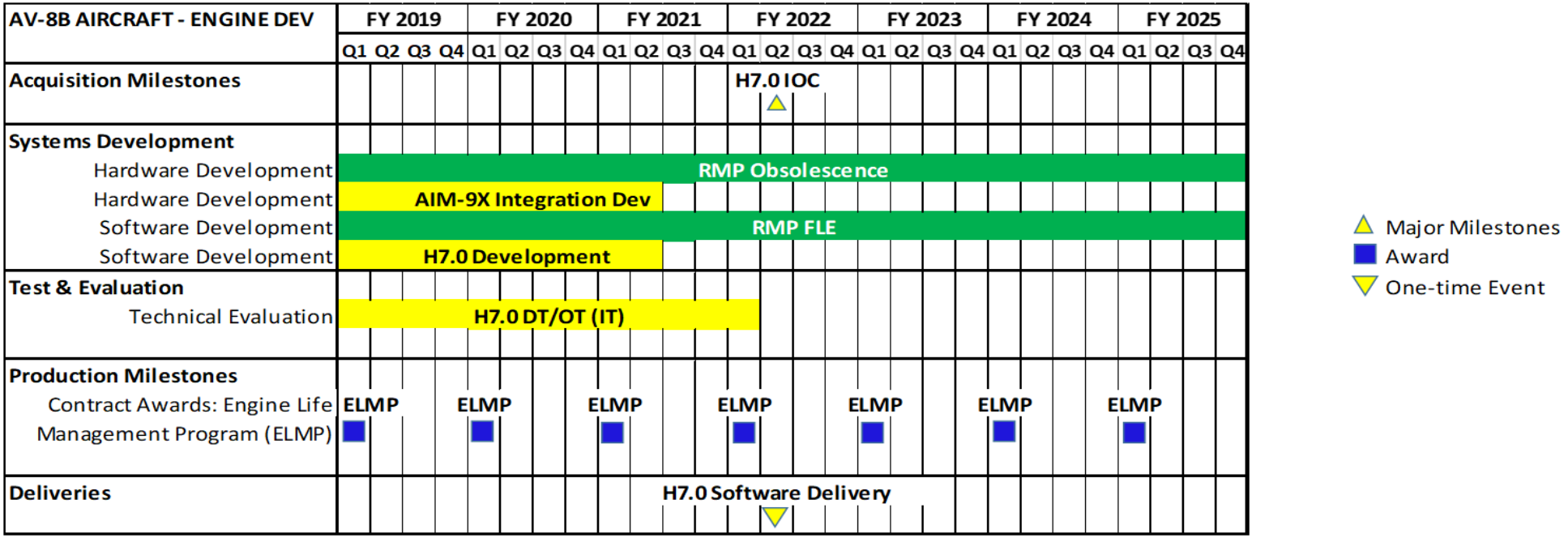

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604214M / *AV-8B Aircraft - Engine Dev*	**Project (Number/Name)** 0652 / *AV-8B*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
AV-8B AIRCRAFT - ENGINE DEV				
Acquisition Milestones: H7.0 IOC	2	2022	2	2022
Systems Development: Hardware Development: AIM-9X Integration Development	1	2019	2	2021
Systems Development: Hardware Development: RMP Obsolescence Development	1	2019	4	2025
Systems Development: Software Development: H7.0 Development	1	2019	2	2021
Systems Development: Software Development: RMP Fatigue Life Expended Development	1	2019	4	2025
Test & Evaluation: Technical Evaluation: H7.0 Link 16 DT/OT (IT)	1	2019	1	2022
Production Milestones: Contract Awards: Engine Life Management Program (ELMP): ELMP Contract Award FY19	1	2019	1	2019
Production Milestones: Contract Awards: Engine Life Management Program (ELMP): ELMP Contract Award FY20	1	2020	1	2020
Production Milestones: Contract Awards: Engine Life Management Program (ELMP): ELMP Contract Award FY21	1	2021	1	2021
Production Milestones: Contract Awards: Engine Life Management Program (ELMP): ELMP Contract Award FY22	1	2022	1	2022
Production Milestones: Contract Awards: Engine Life Management Program (ELMP): ELMP Contract Award FY23	1	2023	1	2023
Production Milestones: Contract Awards: Engine Life Management Program (ELMP): ELMP Contract Award FY24	1	2024	1	2024
Production Milestones: Contract Awards: Engine Life Management Program (ELMP): ELMP Contract Award FY25	1	2025	1	2025
Deliveries: H7.0 S/W Delivery	2	2022	2	2022