Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0305231N *I MQ-8 UAV*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	490.533	62.656	24.143	29.618	-	29.618	29.763	20.300	12.637	8.991	146.213	824.854
2768: *MQ-8 Fire Scout*	490.533	62.656	9.843	29.618	-	29.618	29.763	20.300	12.637	8.991	146.213	810.554
9999: *Congressional Adds*	0.000	0.000	14.300	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	14.300
Program MDAP/MAIS Code: **Project MDAP/MAIS Code(s):** 253												

A. Mission Description and Budget Item Justification

The MQ-8 Unmanned Air System is a Joint Military Intelligence Program.

The MQ-8 Unmanned Air System is popularly known as "Fire Scout". The program achieved MS C in June 2017. The program includes MQ-8B air vehicles, MQ-8C air vehicles, and associated Mission Control Systems (MCS), Unmanned Aerial Vehicle Common Automatic Recovery Systems (UCARS) and support equipment. In addition to the air vehicles, Radar and Weapons capabilities were developed under the Navy's Rapid Deployment Capability (RDC) authorities. All acquisition actions previously planned under the RDCs have transitioned into the Program of Record (POR). Current analysis has determined that a total procurement of 68 air vehicles will satisfy current and foreseeable operational needs.

The MQ-8 System provides real-time and non-real-time Intelligence, Surveillance and Reconnaissance (ISR) data to tactical users without the use of manned aircraft or reliance on limited joint theater or national assets. The baseline MQ-8 can accomplish missions including over-the-horizon tactical reconnaissance, classification, targeting and laser designation and battle damage assessment (including voice communications relay). Development efforts respond to emerging fleet requirements through integration and improvements to Common Operational Picture capabilities, avionics, payloads, range, endurance, and targeting.

The MQ-8 launches and recovers vertically, and can operate from suitably-equipped air capable ships, as well as confined area land bases. Interoperability is achieved through the use of the Tactical Control System (TCS) software in the MCS, also referred to as a Ground Control Station (GCS), and through the use of the Tactical Common Data Link (TCDL). The data from the MQ-8 is provided through standard DoD Command, Control, Communications, Computers and ISR (C4ISR) system architectures and protocols.

A deployed MQ-8 system includes air vehicle(s), payloads (i.e. electro-optical/infrared/laser designator-range finder, Automated Identification System, voice communications relay, Radar, Weapons, and other specialty payloads), MCS (with TCS and TCDL integrated for interoperability), a UCARS for automatic launch and recovery, and associated spares and support equipment. The schedules for MCS and UCARS components are based on host ship requirements, while schedules for air vehicle components, support equipment, and training equipment are based on operational deployment plans. A limited number of land-based mission control systems supplement the shipboard systems to support shore-based operations, such as pre-deployment or acceptance functional check flights. These land-based mission control stations will also support depot-level maintenance/post-maintenance activities. The MQ-8C provides additional mission endurance and payload-weight-power, increased reliability, and improved maintainability to the MQ-8 Fire Scout System. MQ-8 systems will support missions on Littoral Combat Ship (LCS), Expeditionary Mobile Base

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305231N *I MQ-8 UAV*

(T-ESB), FFG(X), and/or suitably-equipped air capable ships. Quantities of air vehicles are derived from LCS and/or suitably-equipped air capable ship deployment requirements for Surface Warfare and Mine Countermeasures mission sets.

The MQ-8 Radar capability is the initial effort as part of the Surface Warfare (SUW) Increment of the MQ-8C. A non-developmental maritime Radar has been competitively selected for integration into the MQ-8C Fire Scout System. This system will provide the MQ-8 operators and the supported LCS, T-ESB and FFG(X) crew enhanced situational awareness of the Recognized Maritime Picture (RMP) by providing multiple operational modes to include surface search, track, Inverse Synthetic Aperture Radar (ISAR) maritime target classification, and Synthetic Aperture Radar (SAR) target classification capabilities. The maritime Radar will be fully integrated with the Mission Control Systems (MCS) and ship's combat systems providing data in standardized format for ease of dissemination to other users.

The MQ-8C Link-16 capability will disseminate sensor tack data to other Link-16 participants contributing to the Common Operational Picture. Both Line-of-Sight (LOS) and Beyond (BLOS) capability will connect Fleet users and disadvantaged users increasing situational awareness. Additionally, the Link-16 In-Flight Target Update (IFTU) capability will allow for Network Enabled Weapon Targeting (NEW-T) for Over-the-Horizon Targeting (OTH-T). Minotaur will be used to correlate sensor data and manage the Link-16 network.

This budget prioritizes system wholeness to ensure program of record capabilities are fully integrated and support fleet requirements. System wholeness supports completion of MQ-8C operational test requirements, development of radar, and component redesign required to maintain system hardware.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	62.656	9.843	17.687	-	17.687
Current President's Budget	62.656	24.143	29.618	-	29.618
Total Adjustments	0.000	14.300	11.931	-	11.931
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	14.300			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	12.000	-	12.000
• Rate/Misc Adjustments	0.000	0.000	-0.069	-	-0.069

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Project: 9999: *Congressional Adds*		
Congressional Add: *Radar Integration*	0.000	5.500
Congressional Add: *Weapons Capability Integration*	0.000	8.800

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305231N *I MQ-8 UAV*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Congressional Add Subtotals for Project: 9999	0.000	14.300
Congressional Add Totals for all Projects	0.000	14.300

Change Summary Explanation

The FY 2020 funding request was reduced by $11.000 million to account for the availability of prior year execution balances.

FY 2020 budget incorporates the execution delays caused by protest of the Radar Source Selection, while maintaining the Radar schedule. The additional increase to the FY 2020 budget is required to support critical activities which consist of conducting flight test, integration of MQ-8C Radar, and support Link-16 integration. The FY 2020 budget includes the addition of Link-16 to the Program of Record.

The FY2019 budget increased due to Congressional Adds provided for Radar Integration ($5.5M) and Weapons Capability Integration ($8.8M). The Congressional Add for Radar Integration is required for MQ-8C Radar System wholeness in order to maintain the Radar schedule in support of IOC and deployment dates. The increase in FY2019 Radar funding supports Radar System Developmental Test (DT) in FY2019 and continued studies for MQ-8C Sense and Avoid (SAA) and Back-up Landing System capabilities to support MQ-8C operational employment with Radar. The Congressional add for Weapons Capability Integration ($8.8M) supports requirements outlined in the MQ-8C Capabilities Production Document (CPD), to include trade studies for MQ-8C weaponization.

Technical: FY 2020 adds Link-16 capability with In-Flight Target Updates (IFTU) to Network Enabled Weapons for Over-the-Horizon Targeting (OTH-T). Remaining FYDP funding supports completion of Radar development, MQ-8C and Radar test requirements, and continued weapons studies. Radar and weapons funding supports requirements outlined in the MQ-8C Capabilities Production Document (CPD). Test funding supports developmental test and operational test events to meet Initial Operational Capability (IOC), and deployment dates. Future payload efforts will be considered when developing current efforts.

Schedule:
Updated milestone reviews and contract award dates for Radar and Link-16. Added contract award dates for Weapons studies.
Updated production and delivery schedules for the current production plan.
Added Milestone reviews and contract award dates for Link-16.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0305231N / *MQ-8 UAV*				Project (Number/Name) 2768 / *MQ-8 Fire Scout*			
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
2768: *MQ-8 Fire Scout*	490.533	62.656	9.843	29.618	-	29.618	29.763	20.300	12.637	8.991	146.213	810.554
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 253

A. Mission Description and Budget Item Justification

This budget prioritizes system wholeness to ensure program of record capabilities are fully integrated and support fleet requirements. System wholeness supports completion of MQ-8C operational test requirements, development of radar, development of Link-16, component redesign required to maintain system hardware and trade studies for the MQ-8C weaponization requirements.

The MQ-8 Unmanned Air System is popularly known as "Fire Scout". The program achieved MS C in June 2017. The program includes MQ-8B air vehicles, MQ-8C air vehicles, and associated Mission Control Systems (MCS), Unmanned Aerial Vehicle Common Automatic Recovery Systems (UCARS) and support equipment. In addition to the air vehicles, Radar and Weapons capabilities were developed under the Navy's Rapid Deployment Capability (RDC) authorities. All acquisition actions previously planned under the RDCs have transitioned into the Program of Record (POR). Current analysis has determined that a total fleet requirement of 68 air vehicles (59 procurement and 9 RDT&EN / 30 MQ-8Bs and 38 MQ-8Cs) will satisfy current Fleet needs.

The MQ-8 System provides real-time and non-real-time Intelligence, Surveillance and Reconnaissance (ISR) data to tactical users without the use of manned aircraft or reliance on limited joint theater or national assets. The baseline MQ-8 can accomplish missions including over-the-horizon tactical reconnaissance, classification, targeting and laser designation and battle damage assessment (including voice communications relay). Development efforts respond to emerging fleet requirements through integration and improvements to Common Operational Picture capabilities, avionics, payloads, range, endurance, and targeting.

The MQ-8 launches and recovers vertically, and can operate from suitably-equipped air capable ships, as well as confined area land bases. Interoperability is achieved through the use of the Tactical Control System (TCS) software in the MCS, also referred to as a Ground Control Station (GCS), and through the use of the Tactical Common Data Link (TCDL). The data from the MQ-8 is provided through standard DoD Command, Control, Communications, Computers and ISR (C4ISR) system architectures and protocols.

A deployed MQ-8 system includes air vehicle(s), payloads (i.e. electro-optical/infrared/laser designator-range finder, Automated Identification System, voice communications relay, Radar, Weapons, and other specialty payloads), MCS (with TCS and TCDL integrated for interoperability), a UCARS for automatic launch and recovery, and associated spares and support equipment. The schedules for MCS and UCARS components are based on host ship requirements, while schedules for air vehicle components, support equipment, and training equipment are based on operational deployment plans. A limited number of land-based mission control systems supplement the shipboard systems to support shore-based operations, such as pre-deployment or acceptance functional check flights. These land-based mission control stations will also support depot-level maintenance/post-maintenance activities. The MQ-8C provides additional mission endurance and payload-weight-power, increased reliability, and improved maintainability to the MQ-8 Fire Scout System. MQ-8 systems will support missions on Littoral Combat Ship (LCS), Expeditionary Mobile Base

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0305231N / *MQ-8 UAV*	**Project (Number/Name)** 2768 / *MQ-8 Fire Scout*

(T-ESB), FFG(X), and/or suitably-equipped air capable ships. Quantities of air vehicles are derived from LCS and/or suitably-equipped air capable ship deployment requirements for Surface Warfare and Mine Countermeasures mission sets.

The MQ-8 Radar capability is the initial effort as part of the Surface Warfare (SUW) Increment of the MQ-8C. A non-developmental maritime Radar has been competitively selected for integration into the MQ-8C Fire Scout System. This system will provide the MQ-8 operators and the supported LCS crew enhanced situational awareness of the Recognized Maritime Picture (RMP) by providing multiple operational modes to include surface search, track, Inverse Synthetic Aperture Radar (ISAR) maritime target classification, and Synthetic Aperture Radar (SAR) target classification capabilities. The maritime Radar will be fully integrated with the Mission Control Systems (MCS) and ship's combat systems providing data in standardized format for ease of dissemination to other users.

The MQ-8C Link-16 capability will disseminate sensor tack data to other Link-16 participants contributing to the Common Operational Picture. This capability will connect Fleet users and disadvantaged users increasing situational awareness. Additionally, the Link-16 In-Flight Target Update (IFTU) capability will allow for Network Enabled Weapon Targeting (NEW-T) for Over-the-Horizon Targeting (OTH-T). Minotaur will be used to correlate sensor data and manage the Link-16 network.

The MQ-8C Weapons capability integration study will evaluate weapons requirements outlined in the MQ-8C Capabilities Production Document (CPD). Weapons trade study will be conducted to assess the mission effectiveness and potential impacts of adding candidate weapons systems to the MQ-8C Fire Scout in a Surface Warfare (SUW) scenario. Additional trade studies will be conducted to analyze weapons platform integration, software architecture, stores management, and air vehicle structural requirements for addition of the MQ-8C Weapons capability.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Hardware and System Development	31.375	1.193	13.716	0.000	13.716
Articles:	-	-	-	-	-
FY 2019 Plans: Continue MQ-8C hardware, software modifications, other payload integration, cyber vulnerability closure and safety capability improvements such as backup landing system and collision avoidance systems. Continue MQ-8 integration and testing on LCS. Continue integration of the selected Radar with the MQ-8C Air Vehicle and MCS. Complete qualification of the selected Radar for the MQ-8C operational environment. Complete System Integration Lab testing of the software build for the maritime Radar integration. Continue MQ-8 FOT&E. Finalize Statement of Work, specification documentation, draft Request for Proposals (RFP), and release RFPs for Link-16. Conduct MQ-8C Weapons Studies.					
FY 2020 Base Plans: Continue MQ-8C hardware, software modifications, other payload integration, cyber vulnerability closure and safety capability improvements such a backup landing system and collision avoidance systems. Continue MQ-8 integration and testing on LCS. Continue integration of the selected Radar with the MQ-8C Air Vehicle and MCS.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0305231N / *MQ-8 UAV*	**Project (Number/Name)** 2768 / *MQ-8 Fire Scout*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Award contracts and hold System Requirements Review (SRR) for Link-16. Complete System Integration Lab testing of the software build for the maritime Radar integration. Continue MQ-8 FOT&E. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increases funding supports MQ-8C Link-16 capability and integration efforts and radar development.					
Title: Development/Operational Testing	19.616	5.268	7.353	0.000	7.353
Articles:	-	-	-	-	-
FY 2019 Plans: Continue Dynamic Interface testing of MQ-8C on both classes of Littoral Combat Ship (LCS). Continue MQ-8C developmental testing of hardware and software modifications and planning for other payload integration. Start developmental testing for Radar integration on MQ-8C. Complete MQ-8C IOT&E and continue MQ-8 FOT&E. ***FY 2020 Base Plans:*** Continue MQ-8C developmental testing of hardware and software modifications and planning for other payload integration. Continue developmental Testing of the maritime Radar on the MQ-8C Air Vehicle. Continue MQ-8 FOT&E. Support Link-16 integration efforts on the MQ-8C to include System Requirements Review (SRR). ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2020 funding takes into account the execution delays caused by protest of the Radar Source Selection while maintaining the Radar schedule. Additionally, FY 2020 budget supports critical flight test, development, and integration of MQ-8C Radar and Link-16.					
Title: Engineering and Technical Services	11.665	3.382	8.549	0.000	8.549
Articles:	-	-	-	-	-
FY 2019 Plans: Continue engineering, program technical management, and logistics support of the MQ-8C. Continue acquisition planning and execution to transition the Radar and Weapons capabilities. Continue Radar, Weapons, other payloads, LCS integration, and system studies and design. Continue MQ-8 FOT&E. ***FY 2020 Base Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0305231N / *MQ-8 UAV*	**Project (Number/Name)** 2768 / *MQ-8 Fire Scout*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continue engineering, program technical management, logistics support of the MQ-8C. Continue acquisition planning and execution to transition the Radar and Weapons capabilities. Continue Radar, Weapons, other payloads, LCS integration, and system studies and design. Continue MQ-8 FOT&E. Initiate Link-16 System Integration studies and procurement development. Award contracts and hold System Requirements Review (SRR) for the Link-16 Program of Record. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase results from Radar flight testing and Link-16 integration.					
Accomplishments/Planned Programs Subtotals	62.656	9.843	29.618	0.000	29.618

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• APN/0443: *MQ-8 UAV*	128.812	89.061	44.957	-	44.957	40.377	59.222	40.485	41.288	56.632	1,582.170
• APN/0605: *MQ-8 UAV Spares*	0.243	0.000	0.099	-	0.099	0.000	0.000	0.000	0.000	15.939	128.209
• APN/0588: *MQ-8 Series*	22.593	37.907	34.686	-	34.686	40.047	33.791	31.016	31.050	36.111	315.846

Remarks

D. Acquisition Strategy

The Navy's acquisition strategy capitalizes on prior Rapid Deployment Capability efforts, while leveraging existing program investments. The acquisition strategy maintains commonality of MQ-8B and MQ-8C systems, payloads, avionics, software, and ancillary equipment where possible. The acquisition strategy supports the revised Capability Production Document. Initial Operational Capability of an MQ-8B-based system was achieved in 2QFY14 while IOC of an MQ-8C-based system onboard Littoral Combat Ship (LCS) is anticipated in 1QFY19. The maritime Radar has been competitively selected. The integration effort will require sole source contracts to the current prime Original Equipment Manufacturers (OEM) for the Tactical Control System (TCS) and the MQ-8 Fire Scout air vehicle. The Link-16 effort will require sole source contracts to the current prime OEM for the TCS, Link-16 J-series Message Implementation Plan, and the MQ-8 Fire Scout air vehicle. Existing Department of Defense contracts will be leveraged for Link-16 Terminal, Minotaur, and peripheral procurements.

E. Performance Metrics

Successfully provide an MQ-8C air vehicle that supports operational deployments. Successfully provide a Radar capability for operational deployments. Successfully achieve LCS integration. Successfully provide a Link-16 with In-Flight Target Update capability for operational deployments.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0305231N / *MQ-8 UAV*	Project (Number/Name) 2768 / *MQ-8 Fire Scout*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development (MQ-8)	C/CPIF	Northrop Grumman Corp : San Diego, CA	345.704	26.338	Nov 2017	0.392	Nov 2018	5.566	Jan 2020	-		5.566	92.273	470.273	474.845
Primary Hardware Development (MQ-8)	C/CPIF	Raytheon Corp : Falls Church, VA	24.251	2.537	Nov 2017	0.801	Nov 2018	0.650	Jan 2020	-		0.650	23.085	51.324	51.674
Primary Hardware Development (RADAR OEM)	C/CPIF	Leonardo MW : Edinburgh, United Kingdom	10.821	0.000		0.000		0.000		-		0.000	0.000	10.821	10.821
Primary Hardware Development (Minotaur)	C/BA	John Hopkins University : Laurel, MD	1.850	2.500	Jul 2018	0.000		0.000		-		0.000	6.500	10.850	10.328
Primary Hardware Development(Link-16)	C/CPIF	Northrop Grumman : San Diego, CA	0.000	0.000		0.000		4.500	Jun 2020	-		4.500	0.000	4.500	-
Primary Hardware Development(Link-16)	C/CPIF	Raytheon Corp : Falls Church, VA	0.000	0.000		0.000		1.000	Jun 2020	-		1.000	0.000	1.000	-
Primary Hardware Development(Link-16)	C/BA	John Hopkins University : Laurel, MD	0.000	0.000		0.000		1.000	Mar 2020	-		1.000	0.000	1.000	-
Primary Hardware Development(Link-16)	TBD	TBD : TBD	0.000	0.000		0.000		1.000	Mar 2020	-		1.000	0.000	1.000	-
		Subtotal	382.626	31.375		1.193		13.716		-		13.716	121.858	550.768	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Logistics Support	Various	Various : Various	3.051	1.819	Nov 2017	0.385	Nov 2018	0.250	Dec 2019	-		0.250	10.431	15.936	-
		Subtotal	3.051	1.819		0.385		0.250		-		0.250	10.431	15.936	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0305231N / *MQ-8 UAV*	Project (Number/Name) 2768 / *MQ-8 Fire Scout*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NAWCAD : PAXRV, MD	16.275	12.569	Nov 2017	4.484	Nov 2018	3.500	Dec 2019	-		3.500	25.017	61.845	-
Operational Test & Evaluation/QRA	WR	NAWC : Various	10.434	7.047	Nov 2017	0.784	Nov 2018	3.603	Nov 2019	-		3.603	20.319	42.187	-
Prior Years T&E no longer funded in the FYDP	Various	Various : Various	1.646	0.000		0.000		0.000		-		0.000	0.000	1.646	-
		Subtotal	28.355	19.616		5.268		7.103		-		7.103	45.336	105.678	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Support	WR	NAWCAD : PAXRV, MD	54.937	7.116	Nov 2017	2.000	Nov 2018	5.146	Dec 2019	-		5.146	27.823	97.022	-
Program Management Support	Various	Various : Various	17.420	2.405	Nov 2017	0.712	Nov 2018	3.153	Dec 2019	-		3.153	10.336	34.026	-
Travel	WR	NAVAIR : PAXRV, MD	1.687	0.325	Nov 2017	0.285	Nov 2018	0.250	Dec 2019	-		0.250	2.554	5.101	-
Prior years Mgmt Svcs no longer funded in the FYDP	Various	Various : Various	2.457	0.000		0.000		0.000		-		0.000	0.000	2.457	-
		Subtotal	76.501	9.846		2.997		8.549		-		8.549	40.713	138.606	N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	490.533	62.656		9.843		29.618		-		29.618	218.338	810.988	N/A

Remarks

OT&E includes MQ-8C FOT&E

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0305231N / *MQ-8 UAV*	**Project (Number/Name)** 2768 / *MQ-8 Fire Scout*

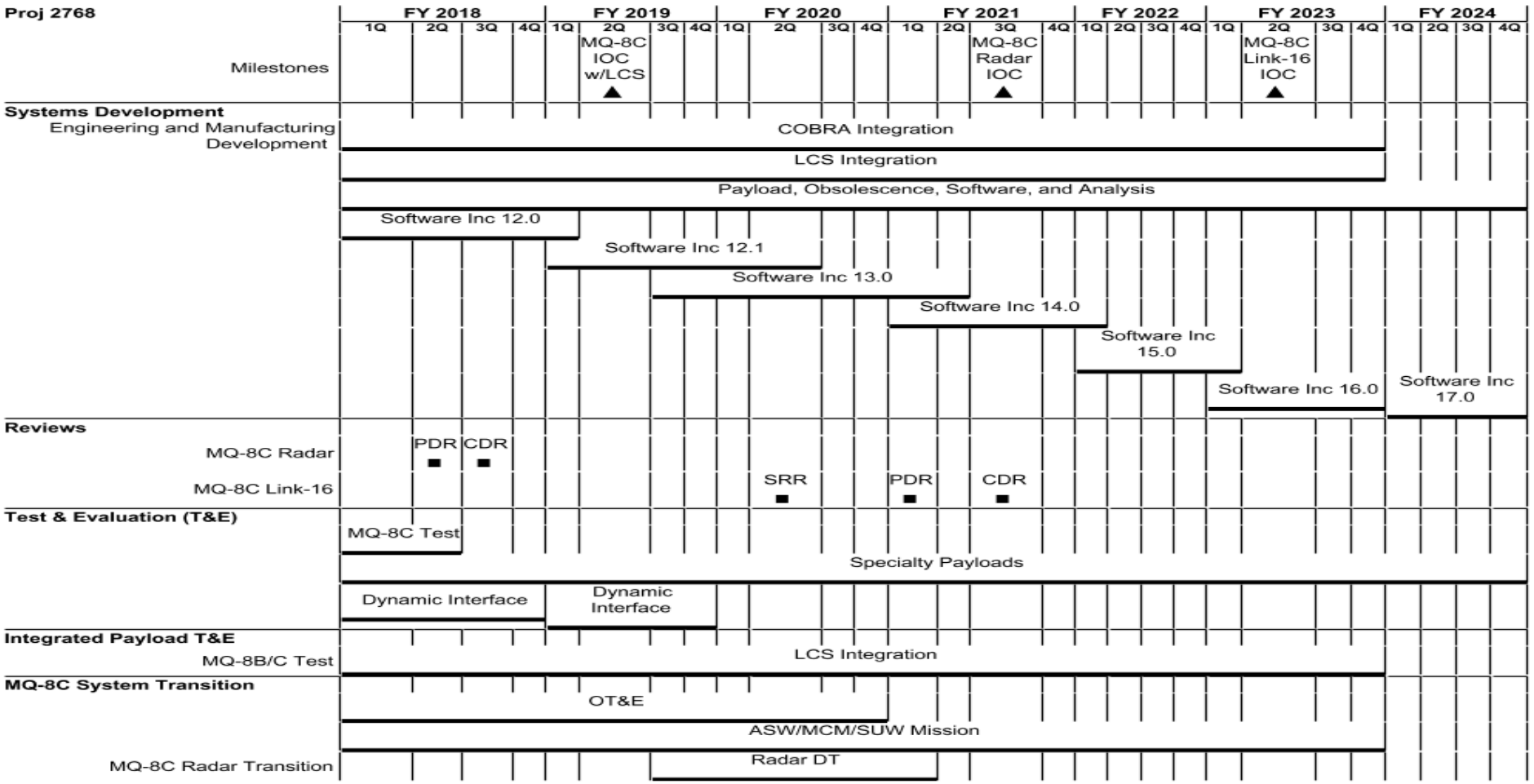

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0305231N / *MQ-8 UAV*	**Project (Number/Name)** 2768 / *MQ-8 Fire Scout*

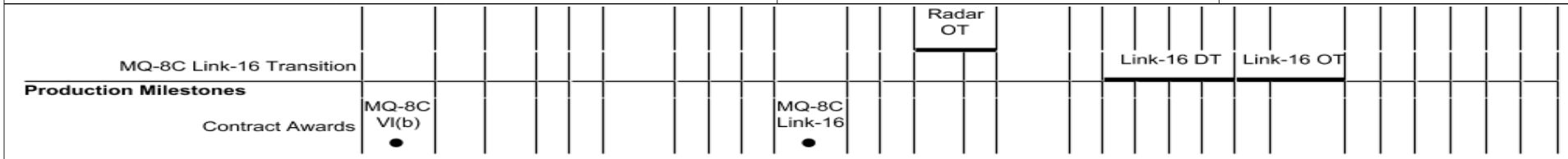

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0305231N / *MQ-8 UAV*	**Project (Number/Name)** 2768 / *MQ-8 Fire Scout*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2768				
Milestones: MQ-8 Initial Operational Capability (IOC) - MQ-8C Littoral Combat Ship (LCS)	2	2019	2	2019
Milestones: MQ-8C Radar IOC	3	2021	3	2021
Milestones: MQ-8C Initial Operational Capability (IOC) MQ-8C Link-16	2	2023	2	2023
Systems Development: Engineering and Manufacturing Development: Coastal Battlefield Reconnaissance and Analysis Integration (COBRA), BLK 1/2/3	1	2018	4	2023
Systems Development: Engineering and Manufacturing Development: Littoral Combat Ship (LCS) Integration	1	2018	4	2023
Systems Development: Engineering and Manufacturing Development: Payload, Obsolescence, Software, and Analysis	1	2018	4	2024
Systems Development: Engineering and Manufacturing Development: Software Increment 12.0	1	2018	1	2019
Systems Development: Engineering and Manufacturing Development: Software Increment 12.1	1	2019	2	2020
Systems Development: Engineering and Manufacturing Development: Software Increment 13.0	3	2019	2	2021
Systems Development: Engineering and Manufacturing Development: Software Increment 14.0	1	2021	1	2022
Systems Development: Engineering and Manufacturing Development: Software Increment 15.0	1	2022	1	2023
Systems Development: Engineering and Manufacturing Development: Software Increment 16.0	1	2023	4	2023
Systems Development: Engineering and Manufacturing Development: Software Increment 17.0	1	2024	4	2024
Reviews: MQ-8C Radar: Preliminary Design Review (PDR)	2	2018	2	2018

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
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	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Reviews: MQ-8C Radar: Critical Design Review (CDR)	3	2018	3	2018
Reviews: MQ-8C Link-16: System Requirement Review (SRR)	2	2020	2	2020
Reviews: MQ-8C Link-16: Preliminary Design Review (PDR)	1	2021	1	2021
Reviews: MQ-8C Link-16: Critical Design Review (CDR)	3	2021	3	2021
Test & Evaluation (T&E): MQ-8C Development Test	1	2018	2	2018
Test & Evaluation (T&E): Specialty Payloads	1	2018	4	2024
Test & Evaluation (T&E): MQ-8C Dynamic Interface (DI) Testing LCS Even Class	1	2018	4	2018
Test & Evaluation (T&E): MQ-8C Dynamic Interface (DI) Testing LCS Odd Class	1	2019	4	2019
Integrated Payload T&E: MQ-8B/C Test: Littoral Combat Ship (LCS) Integration	1	2018	4	2023
MQ-8C System Transition: Operational Test and Evaluation (OT&E)	1	2018	4	2020
MQ-8C System Transition: ASW/MCM/SUW Mission	1	2018	4	2023
MQ-8C System Transition: MQ-8C Radar Transition: Radar Developmental Test (DT)	3	2019	1	2021
MQ-8C System Transition: MQ-8C Radar Transition: Radar Operational Test (OT)	1	2021	2	2021
MQ-8C System Transition: MQ-8C Link-16 Transition: Link-16 Development Test (DT)	1	2022	4	2022
MQ-8C System Transition: MQ-8C Link-16 Transition: Link-16 Operational Test (OT)	1	2023	2	2023
Production Milestones: Contract Awards: Air Vehicles MQ-8C VI(b)	1	2018	1	2018
Production Milestones: Contract Awards: MQ-8C Link-16	2	2020	2	2020

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
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COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
9999: *Congressional Adds*	0.000	0.000	14.300	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	14.300
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The MQ-8 Unmanned Air System program, popularly known as "Fire Scout", includes MQ-8B air vehicles (AV), MQ-8C AV, associated Mission Control Systems (MCS), Unmanned Aerial Vehicle Common Automatic Recovery Systems (UCARS), and payloads, to include Radar and weapons capabilities.

The MQ-8 System provides real-time and non-real-time Intelligence, Surveillance and Reconnaissance (ISR) data to tactical users without the use of manned aircraft or reliance on limited joint theater or national assets. The baseline MQ-8 can accomplish missions including over-the-horizon tactical reconnaissance, classification, targeting and laser designation and battle damage assessment (including voice communications relay). Development efforts respond to emerging fleet requirements through integration and improvements to Common Operational Picture capabilities, avionics, payloads, range, endurance, and targeting.

The MQ-8 launches and recovers vertically, and can operate from suitably-equipped air capable ships, as well as confined area land bases. Interoperability is achieved through the use of the Tactical Control System (TCS) software in the MCS, also referred to as a Ground Control Station (GCS), and through the use of the Tactical Common Data Link (TCDL). The data from the MQ-8 is provided through standard DoD Command, Control, Communications, Computers and ISR (C4ISR) system architectures and protocols.

A deployed MQ-8 system includes air vehicle(s), payloads (i.e. electro-optical/infrared/laser designator-range finder, Automated Identification System, voice communications relay, Radar, Weapons, and other specialty payloads), MCS (with TCS and TCDL integrated for interoperability), a UCARS for automatic launch and recovery, and associated spares and support equipment.

The MQ-8 Radar capability is the initial effort of the Surface Warfare (SUW) Increment to the MQ-8C. A non-developmental maritime Radar has been competitively selected for integration into the MQ-8C Fire Scout System. This system will provide MQ-8 operators enhanced situational awareness of the Recognized Maritime Picture (RMP) by providing multiple operational modes to include surface search, track, Inverse Synthetic Aperture Radar (ISAR) maritime target classification, and Synthetic Aperture Radar (SAR) target classification capabilities. The maritime Radar will be fully integrated with the MCS and ship's combat systems, providing data in standardized format for ease of dissemination to other users.

The MQ-8C Weapons Capability Integration study will evaluate weapons requirements outlined in the MQ-8C Capabilities Production Document (CPD). Weapons trade study will be conducted to assess the mission effectiveness and potential impacts of adding candidate weapons systems to the MQ-8C Fire Scout in a Surface Warfare (SUW) scenario. Additional trade studies will be conducted to analyze weapons platform integration, software architecture, stores management, and air vehicle structural requirements for addition of the MQ-8C Weapons capability.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019
Congressional Add: Radar Integration ***FY 2018 Accomplishments:*** N/A ***FY 2019 Plans:*** FY 2019 Congressional Add funding provided to support MQ-8C Radar hardware, software modifications, payload integration, cyber vulnerability closure, and related MQ-8C Air Vehicle (AV) safety capability improvements. Funding supports integration of the selected Radar with the MQ-8C AV and Mission Control Station (MCS), completes qualification of the selected Radar for the MQ-8C operational environment, and initiates Developmental Testing (DT) for Radar hardware and software modification integration on the MQ-8C AV. Provides engineering, program technical management, logistics and T&E support of the MQ-8C AV and Radar programs.	0.000	5.500
Congressional Add: Weapons Capability Integration ***FY 2018 Accomplishments:*** N/A ***FY 2019 Plans:*** FY 2019 Congressional Add funding provided to support MQ-8C Weapons Capability Integration studies and evaluate weapons requirements outlined in the MQ-8C Capabilities Production Document (CPD). A weapons trade study will be conducted to assess the mission effectiveness and potential impacts of adding candidate weapons systems to the MQ-8C AV in a surface warfare scenario. Additional trade studies will be conducted to analyze weapons platform integration, software architecture, stores management, and MQ-8C AV structural requirements for the addition of weapons capabilities.	0.000	8.800
Congressional Adds Subtotals	0.000	14.300

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Successfully provide MQ-8 Radar capability as part of the Surface Warfare (SUW) Increment to the MQ-8C. The MQ-8C Weapons capability integration study will evaluate weapons requirements outlined in the MQ-8C Capabilities Production Document (CPD).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development (Weapons)	C/CPIF	NGC : San Diego, CA	0.000	0.000		1.000	Jun 2019	0.000		-		0.000	0.000	1.000	-
Primary Hardware Development (Weapons)	C/CPIF	Raytheon Corp : Falls Church, VA	0.000	0.000		1.000	Jun 2019	0.000		-		0.000	0.000	1.000	-
Primary Hardware Development (Weapons)	TBD	Bell : Not Specified	0.000	0.000		0.500	Jun 2019	0.000		-		0.000	0.000	0.500	-
Primary Hardware Development (Weapons)	C/BA	John Hopkins University : Laurel, MD	0.000	0.000		0.500	Jun 2019	0.000		-		0.000	0.000	0.500	-
Primary Hardware Development (Weapons)	TBD	TBD : TBD	0.000	0.000		1.500	Jun 2019	0.000		-		0.000	0.000	1.500	-
Primary Hardware Development (Radar)	TBD	TBD : TBD	0.000	0.000		1.460	Jun 2019	0.000		-		0.000	0.000	1.460	-
		Subtotal	0.000	0.000		5.960		0.000		-		0.000	0.000	5.960	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Logistics (Radar)	WR	Various : Various	0.000	0.000		0.240	Feb 2019	0.000		-		0.000	0.000	0.240	-
		Subtotal	0.000	0.000		0.240		0.000		-		0.000	0.000	0.240	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development & Test Eval (Radar)	WR	NAWCAD : Pax Rvr, MD	0.000	0.000		3.800	Feb 2019	0.000		-		0.000	0.000	3.800	-
		Subtotal	0.000	0.000		3.800		0.000		-		0.000	0.000	3.800	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Governement Engineering (Weapons)	WR	Various : Various	0.000	0.000		4.015	Feb 2019	0.000		-		0.000	0.000	4.015	-
Travel	C/BA	NAVAIR : Patuxent Rvr, MD	0.000	0.000		0.285	Sep 2019	0.000		-		0.000	0.000	0.285	-
		Subtotal	0.000	0.000		4.300		0.000		-		0.000	0.000	4.300	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		14.300		0.000		-		0.000	0.000	14.300	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
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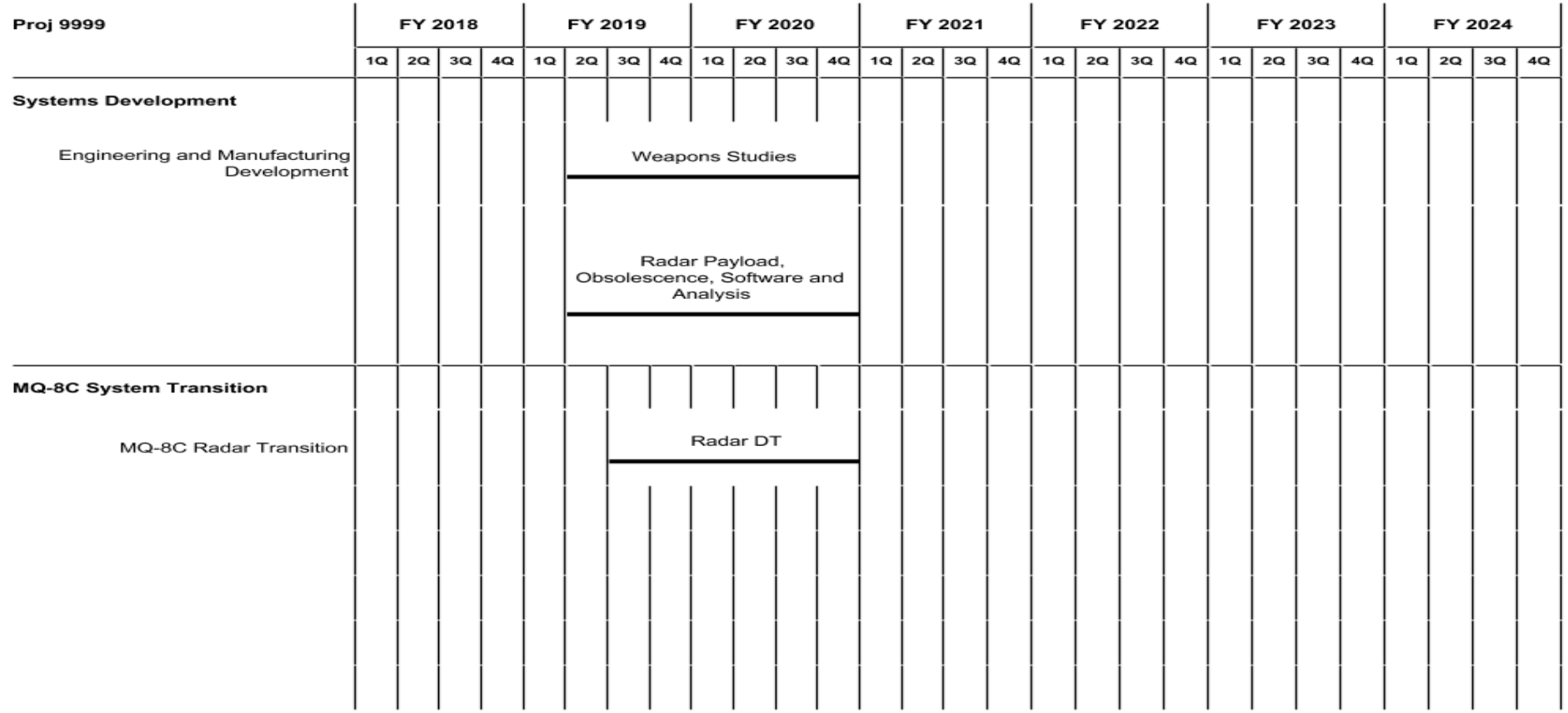

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
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Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9999				
Systems Development: Engineering and Manufacturing Development: Weapons Studies (Weapons)	2	2019	4	2020
Systems Development: Engineering and Manufacturing Development: Radar Payloads, Obsolescence, Software and Analysis	2	2019	4	2020
MQ-8C System Transition: MQ-8C Radar Transition: Radar Developmental Test (DT)	3	2019	4	2020