Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Navy											Date: February 2016	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0305204N *I Tactical Unmanned Aer Vehicles*							
COST ($ in Millions)	**Prior Years**	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**Cost To Complete**	**Total Cost**
Total Program Element	189.266	8.505	8.550	8.436	-	8.436	8.897	9.085	9.277	9.464	Continuing	Continuing
2478: *Tactical Control System*	189.266	8.505	8.550	8.436	-	8.436	8.897	9.085	9.277	9.464	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Tactical Control System (TCS), a component of the MQ-8 System, is a Joint Military Intelligence Program.

This TCS Program Element (PE) provides for the joint tactical MQ-8 Fire Scout System. TCS, integrated into the MQ-8 Mission Control System, provides the warfighters with the capability for day/night aerial Intelligence, Surveillance and Reconnaissance, Target Acquisition, voice, data and command and control communications/relay, and mine detection and localization. Additionally, TCS provides a multi-level, scalable, and flexible operator control of the air vehicles and payloads, as well as direct receipt and dissemination of unmanned aerial vehicle sensor data.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	8.505	8.550	8.797	-	8.797
Current President's Budget	8.505	8.550	8.436	-	8.436
Total Adjustments	0.000	0.000	-0.361	-	-0.361
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Rate/Misc Adjustments	0.000	0.000	-0.361	-	-0.361

Change Summary Explanation

Decrease in Tactical Unmanned Aer Vehicles by $0.356M as required for the Department of the Navy to comply with the Bipartisan Budget Act of 2015.

Schedule:
Updated TCS schedule to coincide with MQ-8 Fire Scout schedule milestones.

MQ-8 related milestones
Revised milestone terminology: Updated Milestone C decision and reviews to align with planning for the restructured MQ-8 Fire Scout program.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Navy	Date: February 2016
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305204N *I Tactical Unmanned Aer Vehicles*

Technical: None

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy			Date: February 2016
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0305204N / *Tactical Unmanned Aer Vehicles*	Project (Number/Name) 2478 / *Tactical Control System*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
2478: *Tactical Control System*	189.266	8.505	8.550	8.436	-	8.436	8.897	9.085	9.277	9.464	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The TCS program supports the MQ-8 Fire Scout System and is a standards-based system, which provides interoperability and commonality for Command and Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) interfaces of Unmanned Aircraft Systems (UAS). TCS software, operating on Mission Control System (also referred to as a Ground Control Station) hardware, utilizes North Atlantic Treaty Organization (NATO) Standardization Agreements (STANAG)-4586 architecture to communicate across a Tactical Common Data Link.

TCS provides a full range of scalable UAS capabilities from passive receipt of air vehicle and payload data to full air vehicle and payload command and control. TCS offers the warfighter a common core operating environment to simultaneously receive, process, and disseminate data from different UAS types for intelligence, reconnaissance, surveillance, and combat assessment.

This program supports enhancements and updates to TCS in order to continue to meet supported air vehicle enhancements, incorporation of new technologies that will be used to enhance overall system performance, incorporate new payloads and payload capabilities (such as advanced sensors and weapons), incorporate multi-vehicle control, incorporate NATO STANAG-4586 and Command, Control, Communications, Computers and Intelligence enhancements, and alignment with OSD direction for UAS control segments.

TCS software is incorporated into the MQ-8 Fire Scout System and fields in conjunction with MQ-8. TCS software addresses MQ-8 requirements validated by the Joint Requirements Oversight Council in the MQ-8 Capability Production Document (May 2007) and multiple Joint Emergent Operational Need/Urgent Operational Needs statements. TCS is supported by an Operational Requirements Document (Feb 2000).

TCS maximizes the use of contractor and government off-the-shelf hardware and software whenever possible and incorporates software/hardware enhancements where appropriate to maintain growth potential and minimize hardware and operating system dependence. TCS software is interoperable and is compliant with the OSD Command and Control, Communications, Intelligence Joint Technical Architecture, Distributed Common Ground System standards, Global Command and Control System, and NATO standards. TCS hardware and software upgrades support the Navy's Common Control System migration.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: TCS Development and Integration	7.846	7.882	7.752	0.000	7.752
Articles:	-	-	-	-	-
FY 2015 Accomplishments:					

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0305204N / *Tactical Unmanned Aer Vehicles*	**Project (Number/Name)** 2478 / *Tactical Control System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Continued TCS integration and test with MQ-8 development. Continued new TCS capabilities to support requirements for Littoral Combat Ship efforts. Continued TCS Standardization Agreements (STANAG)-4586 compliance. Continued Tactical Control System (TCS) C4ISR interface integration and testing for MQ-8 systems. Continued hardware and operating system independence initiatives. Continued Radar and payload integration, MQ-8C Integration, and continued preparations for Common Control System integration and demonstrations. Continued TCS Version 5 Linux transition, TCS Version 6 technology refresh, and initiated move to TCS Version 7 service oriented architecture. ***FY 2016 Plans:*** Continue TCS integration and test with MQ-8 development. Continue new TCS capabilities to support requirements for Littoral Combat Ship (LCS) efforts. Continue TCS STANAG 4586 compliance. Continue TCS C4ISR interface integration and testing for MQ-8 systems. Continue hardware and operating system independence initiatives. Continue Radar and payload integration, MQ-8C integration, and continue preparations for Common Control System integration and demonstrations. Complete TCS Version 5 Linux transition, continue TCS Version 6 technology refresh, and continue TCS Version 7 service oriented architecture. ***FY 2017 Base Plans:*** Continue TCS integration and test with MQ-8 development. Continue new TCS capabilities to support requirements for LCS efforts. Continue TCS STANAG 4586 compliance. Continue TCS C4ISR interface integration and testing for MQ-8 systems. Continue hardware and operating system independence initiatives. Continue Radar and payload integration, MQ-8C integration, and continue preparations for Common Control System integration and demonstrations. Continue TCS Version 6 technology refresh, and continue TCS Version 7 service oriented common architecture. ***FY 2017 OCO Plans:*** N/A					
Title: Technical and Engineering Services	0.659	0.668	0.684	0.000	0.684
Articles:	-	-	-	-	-
FY 2015 Accomplishments: Continued government engineering support, contractor support, program support, and travel for the TCS program. ***FY 2016 Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Continue government engineering support, contractor support, program support, and travel for the TCS program. ***FY 2017 Base Plans:*** Continue government engineering support, contractor support, program support, and travel for the TCS program. ***FY 2017 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	8.505	8.550	8.436	0.000	8.436

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Tactical Control System (TCS) program is government owned, non-proprietary software that currently supports the MQ-8 Fire Scout System. The TCS program continues to focus on Navy requirements and standards-based architecture/software to support interoperability. The government-owned TCS software development toolkit is available to all UAS developers and manufacturers that allows a low-cost integration into the open architecture non-proprietary TCS system. TCS provides software modules to the Navy Common Control System (CCS) and the TCS tech refresh hardware supports migration to CCS software.

E. Performance Metrics

Successfully complete Navy payloads integration, to include Coastal Battlefield Reconnaissance and Analysis (COBRA). Support MQ-8C Endurance Upgrade, Radar, and future capabilities. Successfully complete Littoral Combat Ship Integration. Complete Developmental and Operational Test.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy			Date: February 2016
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0305204N / *Tactical Unmanned Aer Vehicles*	Project (Number/Name) 2478 / *Tactical Control System*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Software Development 2	SS/CPIF	Raytheon : Falls Church,VA	22.015	7.846	Nov 2014	7.882	Nov 2015	7.752	Nov 2016	-		7.752	39.610	85.105	85.105
Prior Year Cost no longer Funded in the FYDP	C/CPAF	Raytheon : Falls Church,VA	148.237	0.000		0.000		0.000		-		0.000	0.000	148.237	148.237
		Subtotal	170.252	7.846		7.882		7.752		-		7.752	39.610	233.342	233.342

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Test and Evaluation	WR	Various : Various	1.273	0.023	Nov 2014	0.023	Nov 2015	0.025	Nov 2016	-		0.025	Continuing	Continuing	Continuing
		Subtotal	1.273	0.023		0.023		0.025		-		0.025	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support	Various	Various : Various	3.296	0.190	Nov 2014	0.193	Nov 2015	0.197	Nov 2016	-		0.197	Continuing	Continuing	Continuing
Government Engineering Support	WR	Various : Various	9.686	0.226	Nov 2014	0.229	Nov 2015	0.236	Nov 2016	-		0.236	Continuing	Continuing	Continuing
Program Management Support	Various	Various : Various	4.436	0.197	Nov 2014	0.200	Nov 2015	0.203	Nov 2016	-		0.203	Continuing	Continuing	Continuing
Travel	WR	NAVAIR : Patuxent River, MD	0.323	0.023	Nov 2014	0.023	Nov 2015	0.023	Nov 2016	-		0.023	Continuing	Continuing	Continuing
		Subtotal	17.741	0.636		0.645		0.659		-		0.659	-	-	-

Remarks

Travel Contract Type is TO.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy			Date: February 2016
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	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	189.266	8.505		8.550		8.436		-		8.436	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0305204N / *Tactical Unmanned Aer Vehicles*	**Project (Number/Name)** 2478 / *Tactical Control System*

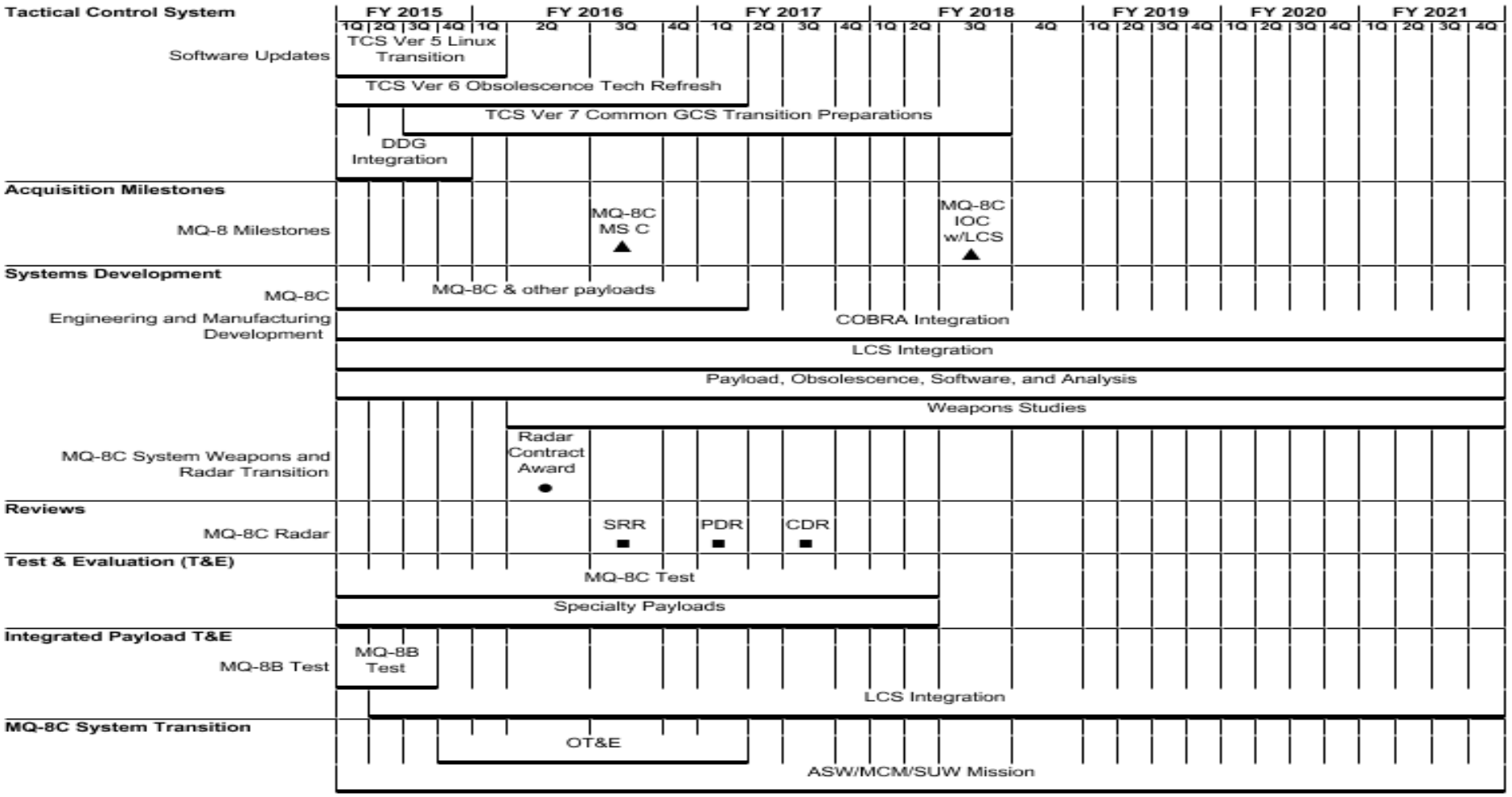

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0305204N / *Tactical Unmanned Aer Vehicles*	**Project (Number/Name)** 2478 / *Tactical Control System*

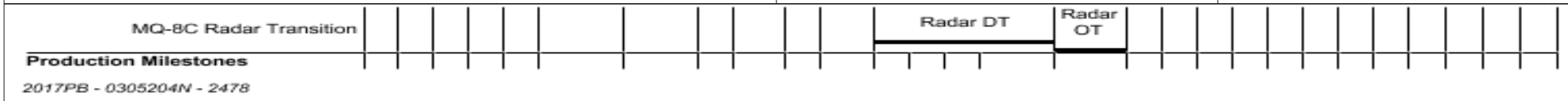

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0305204N / *Tactical Unmanned Aer Vehicles*	**Project (Number/Name)** 2478 / *Tactical Control System*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Tactical Control System				
Software Updates: TCS Ver 5 Linux Transition	1	2015	1	2016
Software Updates: TCS Ver 6 Obsolescence Tech Refresh	1	2015	1	2017
Software Updates: TCS Ver 7 Common GCS Transition Preparations	3	2015	3	2018
Software Updates: DDG Integration	1	2015	4	2015
Acquisition Milestones: MQ-8 Milestones: MQ-8 Initial Operational Capability (IOC) MQ-8C Littoral Combat Ship (LCS)	3	2018	3	2018
Acquisition Milestones: MQ-8 Milestones: MQ-8C Milestone C	3	2016	3	2016
Systems Development: MQ-8C: MQ-8C and other payloads	1	2015	1	2017
Systems Development: Engineering and Manufacturing Development: Coastal Battlefield Reconnaissance and Analysis Integration (COBRA), BLK 1/2/3	1	2015	4	2021
Systems Development: Engineering and Manufacturing Development: Littoral Combat Ship (LCS) Integration	1	2015	4	2021
Systems Development: Engineering and Manufacturing Development: Payload, Obsolescence, Software, and Analysis	1	2015	4	2021
Systems Development: Engineering and Manufacturing Development: Weapons Studies	2	2016	4	2021
Systems Development: MQ-8C System Weapons and Radar Transition: Radar Contract Award	2	2016	2	2016
Reviews: MQ-8C Radar: System Requirements Review (SRR)	3	2016	3	2016
Reviews: MQ-8C Radar: Preliminary Design Review (PDR)	1	2017	1	2017
Reviews: MQ-8C Radar: Critical Design Review (CDR)	3	2017	3	2017
Test & Evaluation (T&E): MQ-8C Development Test	1	2015	2	2018
Test & Evaluation (T&E): Specialty Payloads	1	2015	2	2018

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0305204N / *Tactical Unmanned Aer Vehicles*	**Project (Number/Name)** 2478 / *Tactical Control System*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Integrated Payload T&E: MQ-8B Test: MQ-8B	1	2015	3	2015
Integrated Payload T&E: MQ-8B Test: Littoral Combat Ship (LCS) Integration	2	2015	4	2021
MQ-8C System Transition: Operational Test and Evaluation (OT&E)	4	2015	1	2017
MQ-8C System Transition: ASW/MCM/SUW Mission	1	2015	4	2021
MQ-8C System Transition: MQ-8C Radar Transition: Radar Developmental Test (DT)	4	2017	3	2018
MQ-8C System Transition: MQ-8C Radar Transition: Radar Operational Test (OT)	4	2018	4	2018

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