Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Navy	Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	294.710	9.837	10.576	11.235	-	11.235	10.145	10.328	10.493	10.704	Continuing	Continuing
2478: *Tactical Control System*	294.710	9.837	10.576	11.235	-	11.235	10.145	10.328	10.493	10.704	Continuing	Continuing

A. Mission Description and Budget Item Justification

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

This program element provides funding for the software development capabilities associated with Mission modules of the Tactical Unmanned Aerial Vehicle. This project is a Joint Military Intelligence Program.

The Tactical Control System (TCS), a component of the MQ-8 System, provides software for the joint tactical MQ-8 Fire Scout System. TCS integrated into the MQ-8 Mission Control System (MCS) provides the warfighters with the capability for day/night aerial Intelligence, Surveillance and Reconnaissance (ISR), 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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	9.837	10.576	11.185	-	11.185
Current President's Budget	9.837	10.576	11.235	-	11.235
Total Adjustments	0.000	0.000	0.050	-	0.050
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Rate/Misc Adjustments	0.000	0.000	0.050	-	0.050

Change Summary Explanation

Funding: The FY 2024 Request increased by $0.050M since the previous President's Budget submission due to inflation and working capital fund rate adjustments.

Schedule: TCS schedule deliveries updated to reflect changes in MQ-8 Fire Scout schedule milestones. Version 10 is scheduled to complete in the fourth quarter of FY 2023. This aligns with MQ-8 and supports subsequent TCS deliveries. Coastal Battlefield Reconnaissance and Analysis (COBRA) was renamed Mine

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Navy	Date: March 2023
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Counter Measures (MCM) to refer to the capability. The schedule was updated to incorporate TCS versions in support of continued MQ-8 operations with the addition of MCM, Optical Sensor System and Datalink Networks.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy			Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
2478: *Tactical Control System*	294.710	9.837	10.576	11.235	-	11.235	10.145	10.328	10.493	10.704	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Tactical Control System (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 (MCS) (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, includes software updates to support Mission System Trainers (MST), incorporate new payloads and payload capabilities, 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 (Nov 2016) 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 (CCS) migration and as such can be used to support future UAS MCS requirements.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: TCS Development and Integration	8.748	9.070	8.906	0.000	8.906
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
FY 2023 Plans: Continue TCS integration and test with MQ-8 development. Continue new TCS capabilities to support requirements for MQ-8 land-based efforts plus support for air capable ships (to include Littoral Combat Ship (LCS), Frigates (FFG(X)), and Expeditionary Support Bases (ESB). 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 Minotaur updates. Start TCS version 11 integration and test. ***FY 2024 Base Plans:*** Continue new TCS capabilities to support requirements for MQ-8 land-based efforts plus support for air capable ships (to include LCS, Frigates (FFG(X)), and Expeditionary Support Bases (ESB). Continue TCS STANAG 4586 compliance. Continue TCS C4ISR interface integration and testing for MQ-8 systems. Continue hardware and operating system independence initiatives. Continue TCS version 11 development and test to integrate user interface enhancements, cyber security updates, and onboard operator proficiency training capability. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Decrease of $0.164M from FY2023 to FY2024 due to the transition from a 12 month to an 18 month software development schedule.					
Title: Technical and Engineering Services	1.089	1.506	2.329	0.000	2.329
Articles:	-	-	-	-	-
FY 2023 Plans: Increase in Government Engineering support related to TCS rel 10.0 correction of deficiencies (COD) build and capability enhancements for rel 11.0. ***FY 2024 Base Plans:*** Developmental testing of TCS software modifications to support capability enhancements and corrections of deficiencies (COD). ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Increase of $0.823M from FY2023 to FY2024 due to increase in Test and Evaluation to support integration of additional capability, correction of deficiencies and training systems testing requirements, and an increase of management support as it relates to rate adjustments.					
Accomplishments/Planned Programs Subtotals	9.837	10.576	11.235	0.000	11.235

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy		Date: March 2023
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 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Software Development	SS/CPIF	Raytheon : Falls Church,VA	73.906	8.748	Dec 2021	8.241	Dec 2022	8.013	Dec 2023	-		8.013	40.244	139.152	122.874
Prior Year Cost no longer Funded in the FYDP	Various	Various : Various	195.505	0.000		0.000		0.000		-		0.000	0.000	195.505	195.505
Software Development	TBD	Various : Various	0.934	0.000	Nov 2021	0.829	Nov 2022	0.893	Nov 2023	-		0.893	9.376	12.032	11.418
		Subtotal	270.345	8.748		9.070		8.906		-		8.906	49.620	346.689	N/A

Remarks

FY 2024 decrease due to transition from a 12 month to an 18 month software development schedule.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation (DT&E)	WR	Various : Various	1.455	0.032	Nov 2021	0.158	Nov 2022	0.938	Nov 2023	-		0.938	Continuing	Continuing	Continuing
		Subtotal	1.455	0.032		0.158		0.938		-		0.938	Continuing	Continuing	N/A

Remarks

FY 2024 increased by $0.780 in Test and Evaluation to support integration of capability enhancements, correction of deficiencies and training systems testing requirements for TCS Rel 10.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support	Various	Various : Various	5.012	0.236	Aug 2022	0.329	Nov 2022	0.336	Nov 2023	-		0.336	Continuing	Continuing	Continuing
Government Engineering Support	WR	Various : Various	11.689	0.583	Nov 2021	0.687	Nov 2022	0.679	Nov 2023	-		0.679	Continuing	Continuing	Continuing
Program Management Support	Various	Various : Various	5.717	0.212	Nov 2021	0.298	Nov 2022	0.341	Nov 2023	-		0.341	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0305204N / *Tactical Unmanned Aer Vehicles*	Project (Number/Name) 2478 / *Tactical Control System*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	WR	NAVAIR : Patuxent River, MD	0.492	0.026	Nov 2021	0.034	Nov 2022	0.035	Nov 2023	-		0.035	Continuing	Continuing	Continuing
		Subtotal	22.910	1.057		1.348		1.391		-		1.391	Continuing	Continuing	N/A

Remarks

FY 2024 increased by $.043 in Management Services: Contractor Engineering support, Program Management support, and Travel relates to working capital fund rate adjustments.

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	294.710	9.837		10.576		11.235		-		11.235	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0305204N / *Tactical Unmanned Aer Vehicles*	**Project (Number/Name)** 2478 / *Tactical Control System*

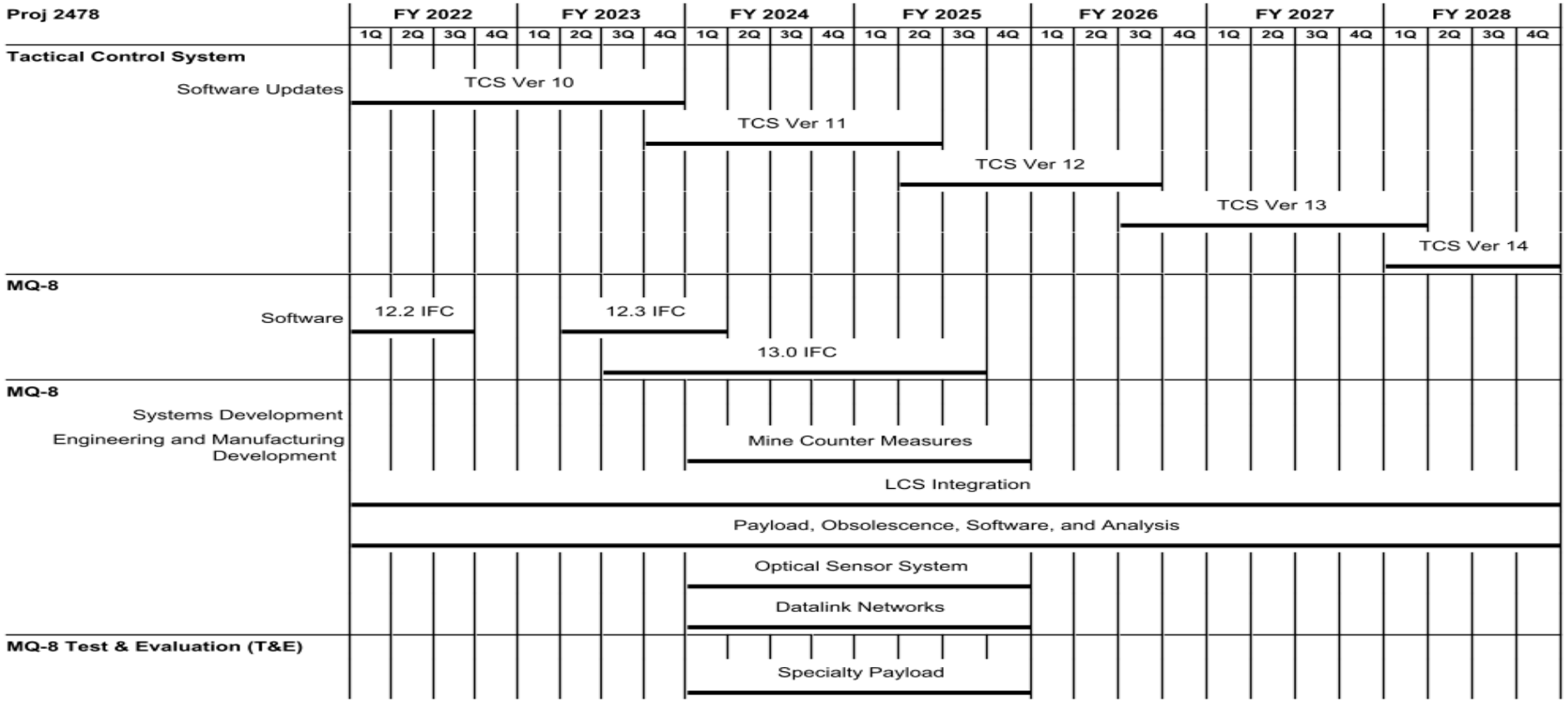

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0305204N / *Tactical Unmanned Aer Vehicles*	**Project (Number/Name)** 2478 / *Tactical Control System*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2478				
Tactical Control System: Software Updates: TCS Version 10	1	2022	4	2023
Tactical Control System: Software Updates: TCS Version 11	4	2023	2	2025
Tactical Control System: Software Updates: TCS Version 12	2	2025	3	2026
Tactical Control System: Software Updates: TCS Version 13	3	2026	1	2028
Tactical Control System: Software Updates: TCS Version 14	1	2028	4	2028
MQ-8: Software: 12.2 IFC	1	2022	3	2022
MQ-8: Software: 12.3 IFC	2	2023	1	2024
MQ-8: Software: 13.0 IFC	3	2023	3	2025
MQ-8: Engineering and Manufacturing Development: Mine Counter Measures (MCM)	1	2024	4	2025
MQ-8: Engineering and Manufacturing Development: Littoral Combat Ship (LCS) Integration	1	2022	4	2028
MQ-8: Engineering and Manufacturing Development: Payload, Obsolescence, Software, and Analysis	1	2022	4	2028
MQ-8: Engineering and Manufacturing Development: Optical Sensor System	1	2024	4	2025
MQ-8: Engineering and Manufacturing Development: Datalink Networks	1	2024	4	2025
MQ-8 Test & Evaluation (T&E): Specialty Payload	1	2024	4	2025