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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Navy **Date:** February 2020

<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0206335M I (U) <i>Common Aviation Command and Control Sys (CAC2S)</i>
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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	48.430	4.628	4.489	4.406	-	4.406	6.062	4.522	0.923	0.939	Continuing	Continuing
3373: <i>Common Aviation Command and Control System (CAC2S)</i>	48.430	4.628	4.489	4.406	-	4.406	6.062	4.522	0.923	0.939	Continuing	Continuing

**Program MDAP/MAIS Code:**  
**Project MDAP/MAIS Code(s):** MN36

**A. Mission Description and Budget Item Justification**

Common Aviation Command and Control System (CAC2S) - A coordinated modernization effort to replace the existing aviation command and control equipment of the Marine Air Command and Control System (MACCS) and to provide the Aviation Combat Element (ACE) with the necessary hardware, software, equipment, and facilities to effectively command, control, and coordinate aviation operations. The CAC2S system will accomplish the MACCS missions with a suite of operationally scalable modules to support the Marine Air Ground Task Force (MAGTF), Joint, and Coalition Forces. The CAC2S integrates the functions of aviation command and control into an interoperable system that will support the core competencies of all Marine Corps warfighting concepts. The CAC2S, in conjunction with the MACCS organic sensors (AN/TPS-63, AN/TPS-59, and AN/TPS-80 (Ground/Air Task Oriented Radar (G/ATOR)) and weapon system Composite Tracking Network (CTN) will provide enhanced air control, improved situational awareness, sensor integration (G/ATOR and AN/TPS-59), full Tactical Data Link integration, airspace and battle planning and command functionality as well as sensor netting integration (Composite Tracking Network (CTN)). CAC2S, with these organic MACCS programs, support the tenets of Expeditionary Maneuver Warfare and fosters joint interoperability. CAC2S Increment I replaces legacy aviation command and control systems in the following Marine aviation agencies: Direct Air Support Center (DASC), Tactical Air Command Center (TACC), and Tactical Air Operations Center (TAOC).

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	4.760	4.489	4.346	-	4.346
Current President's Budget	4.628	4.489	4.406	-	4.406
Total Adjustments	-0.132	0.000	0.060	-	0.060
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.025	0.000			
• SBIR/STTR Transfer	-0.157	0.000			
• Rate/Misc Adjustments	0.000	0.000	0.060	-	0.060

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<b><u>Change Summary Explanation</u></b> The funding decrease of \$0.083M from FY 2020 to FY 2021 is due to the completion of Mode 5 testing.		

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Navy										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 1319 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0206335M / (U)Common Aviation Command and Control Sys (CAC2S)				<b>Project (Number/Name)</b> 3373 / Common Aviation Command and Control System (CAC2S)			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
3373: Common Aviation Command and Control System (CAC2S)	48.430	4.628	4.489	4.406	-	4.406	6.062	4.522	0.923	0.939	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
<b>Project MDAP/MAIS Code:</b> MN36												

**A. Mission Description and Budget Item Justification**

Common Aviation Command and Control System (CAC2S) - A coordinated modernization effort to replace the existing aviation command and control equipment of the Marine Air Command and Control System (MACCS) and to provide the Aviation Combat Element (ACE) with the necessary hardware, software, equipment, and facilities to effectively command, control, and coordinate aviation operations. The CAC2S system will accomplish the MACCS missions with a suite of operationally scalable modules to support the Marine Air Ground Task Force (MAGTF), Joint, and Coalition Forces. The CAC2S integrates the functions of aviation command and control into an interoperable system that will support the core competencies of all Marine Corps warfighting concepts. The CAC2S, in conjunction with the MACCS organic sensors (AN/TPS-63, AN/TPS-59, and AN/TPS-80 (Ground/Air Task Oriented Radar (G/ATOR)) and weapon system Composite Tracking Network (CTN) will provide enhanced air control, improved situational awareness, sensor integration (G/ATOR and AN/TPS-59), full Tactical Data Link integration, airspace and battle planning and command functionality as well as sensor netting integration (Composite Tracking Network (CTN)). CAC2S, with these organic MACCS programs, support the tenets of Expeditionary Maneuver Warfare and fosters joint interoperability. CAC2S Increment I replaces legacy aviation command and control systems in the following Marine aviation agencies: Direct Air Support Center (DASC), Tactical Air Command Center (TACC), and Tactical Air Operations Center (TAOC). The funding decrease of \$0.083M from FY 2020 to FY 2021 is due to the completion of Mode 5 testing in FY2020.

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

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
<b>Title:</b> Support	0.760	1.008	1.299	0.000	1.299
<b>Articles:</b>	-	-	-	-	-
<b>FY 2020 Plans:</b> - Continue to conduct yearly Cyber Compliance Tests required with each of the CAC2S quarterly software releases and conduct the Annual Security Review testing to support the maintenance of the CAC2S Authority To Operate (ATO)/ Authority To Connect (ATC), which is scheduled for reaccreditation in 2nd quarter FY 2021.					
<b>FY 2021 Base Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Navy				<b>Date:</b> February 2020	
<b>Appropriation/Budget Activity</b> 1319 / 7		<b>R-1 Program Element (Number/Name)</b> PE 0206335M / (U)Common Aviation Command and Control Sys (CAC2S)		<b>Project (Number/Name)</b> 3373 / Common Aviation Command and Control System (CAC2S)	
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>					
<p>- Continue yearly Cyber Compliance Tests required with each of the CAC2S quarterly software releases and conduct the Annual Security Review testing to support the maintenance of the CAC2S Authority To Operate (ATO)/ Authority To Connect (ATC), which is scheduled for reaccreditation in 2nd quarter FY 2021.</p> <p><b>FY 2021 OCO Plans:</b> N/A</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Increase of \$0.291 from FY 2020 to FY2021 due to the ramp up of additional software test support as CAC2S transitioned to a Common Software Baseline (CSB) and transitioned its CSB sustainment from the Original Equipment Manufacturer. Program is currently sustaining the CSB with support from Naval Surface Warfare Centers (NSWC), such as NSWC Crane Division.</p>					
<p><b>Title:</b> Test and Evaluation</p> <p align="right"><b>Articles:</b></p>					
<p><b>FY 2020 Plans:</b></p> <ul style="list-style-type: none"> <li>- Complete Mode 5 interface test support with G/ATOR as well as CAC2S Phase 2 to validate G/ATOR interface.</li> <li>- Continue required integration and interface testing of upgraded hardware components and software enhancements associated with newly fielded AN/TSQ-297 Full Rate Production/Full Deployment Unit (FRP/ FDU) Air Command &amp; Control Systems (AC2S).</li> <li>- Initiate testing to support system software capability enhancements (Multi Source Correlator Tracker (MSCT), virtual Air Defense Systems Integrator (vADSI), Flexible Analysis and Mission Effectiveness System (FLAMES), and FLAMES Automated Simulation Trainer (FAST)) to improve capability and maintain system Authority To Operate (ATO)/ Authority To Connect (ATC).</li> </ul> <p><b>FY 2021 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue required integration and interface testing of upgraded hardware components and software enhancements.</li> <li>- Continue testing to support system software capability enhancements for capability improvement and to maintain system ATO and ATC.</li> </ul> <p><b>FY 2021 OCO Plans:</b> N/A</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b></p>					
	3.143	3.481	2.507	0.000	2.507
	-	-	-	-	-

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Navy **Date:** February 2020

<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0206335M / (U)Common Aviation Command and Control Sys (CAC2S)	<b>Project (Number/Name)</b> 3373 / Common Aviation Command and Control System (CAC2S)
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Decrease of \$0.974 from FY2020 to FY2021 due to the completion of Mode 5 interface test support with G/ATOR and reduction of scope in integration and interface testing associated with the system software capability enhancements from newly fielded AN/TSQ-297 FRP/FDU systems.					
<b>Title:</b> Management Services	0.725	0.000	0.600	0.000	0.600
<b>Articles:</b>	-	-	-	-	-
<b>FY 2020 Plans:</b> N/A					
<b>FY 2021 Base Plans:</b> - Continued support from vendor MITRE. MITRE is to monitor CAC2S integration efforts with the Marine Air Control Squadron (MACS) sensors, Ground/Air Task Oriented Radar (G/ATOR), AN/TPS-59, Composite Tracking Network (CTN)/ Cooperative Engagement Capability (CEC), and Ground Based Air Defense (GBAD) development. MITRE also is to develop prototype radar and track data injection tools to facilitate contractor integration and Government laboratory testing of CAC2S.					
<b>FY 2021 OCO Plans:</b> N/A					
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> \$0.600 increase from FY 2020 to FY 2021 is due to a restoration of scope required in FY 2021 to have MITRE provide support to monitor CAC2S integration efforts with the MACS sensors, G/ATOR, AN/TPS-59, CTN/CEC, and GBAD development and prototype radar and track data injection tools to support government laboratory testing.					
<b>Accomplishments/Planned Programs Subtotals</b>	4.628	4.489	4.406	0.000	4.406

<b>C. Other Program Funding Summary (\$ in Millions)</b>										
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete Total Cost</u>
• PMC/4644: Common Aviation Command And Control System (CAC2S)	32.587	30.812	35.057	-	35.057	18.585	22.092	20.415	23.463	0.000 312.677

**Remarks**  
RDT&E prior to FY15 was in PE 0206313M Marine Corps Comms Systems, Project 2273 Air Operations Command & Control (C2) Systems.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Navy		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0206335M / (U)Common Aviation Command and Control Sys (CAC2S)	<b>Project (Number/Name)</b> 3373 / Common Aviation Command and Control System (CAC2S)

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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PMC funding for FY15 and beyond was in BLI 4644 Common Aviation Command and Control System (CAC2S). Prior to FY15 PMC funding is listed in BLI 4640 Air Operations C2 Systems, Common Aviation Command and Control Systems (CAC2S).

**D. Acquisition Strategy**

CAC2S will employ an evolutionary acquisition strategy utilizing an incremental and phased approach for development and fielding of the CAC2S. The Capability Production Document (CPD) identifies two increments to achieve the full requirements of CAC2S. The current acquisition strategy addresses Increment I of the CAC2S development process and focuses on the requirements that will modernize the assault and air support, air defense and control, and Aviation Combat Element (ACE) battle management capabilities of the Marine Air Command and Control System (MACCS). Increment I of the CAC2S has been accomplished through a two phased approach. Phase 1 addressed the requirements to establish the baseline CAC2S capabilities for the MACCS and improved Air Command and Control (AC2) performance and effectiveness. Phase 2 addresses the requirements for remaining ACE Battle Management Command & Control (BMC2) requirements. Quantity nine (9) Phase 2 Limited Deployment Unit systems were procured in FY15 and FY16 and fielded in FY17. The Full Deployment Unit (FDU) production contract was awarded 24 August 2017 and a total of forty one (41) systems have been procured to be fielded over three years (FY 2018-FY 2020).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 7				PE 0206335M / (U)Common Aviation Command and Control Sys (CAC2S)				3373 / Common Aviation Command and Control System (CAC2S)							
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Various	Travel : TBD	0.265	0.039	Oct 2018	0.045	Oct 2019	0.050	Oct 2020	-		0.050	Continuing	Continuing	Continuing
Engineering Support	WR	NSWC DD : Dahlgren, VA	2.471	0.205	Nov 2018	0.292	Nov 2019	0.085	Nov 2020	-		0.085	0.000	3.053	-
Acquisition Support	WR	NSWC CD : Crane, IN	0.571	0.341	Nov 2018	0.311	Nov 2019	0.350	Nov 2020	-		0.350	0.000	1.573	-
Software Support	C/FFP	Raytheon Solipsys : Fulton, MD	0.000	0.175	May 2019	0.180	May 2020	0.631	May 2021	-		0.631	0.000	0.986	-
Software Support	C/FFP	Ternion : Huntsville, AL	0.000	0.000		0.180	May 2020	0.183	May 2021	-		0.183	0.000	0.363	-
Prior Years Cumulative Funding	Various	Various : Various	4.121	0.000		0.000		0.000		-		0.000	0.000	4.121	-
<b>Subtotal</b>			7.428	0.760		1.008		1.299		-		1.299	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Testing and Evaluation	WR	NSWC - Port Huenueme : Port Huenueme, CA	2.932	0.579	Nov 2018	0.000		0.000		-		0.000	0.955	4.466	-
Testing and Evaluation	Sub Allot	MCOTEA : Quantico, VA	3.038	0.000		0.000		0.000		-		0.000	3.465	6.503	-
Testing and Evaluation	Sub Allot	MCTSSA : Camp Pendleton, CA	7.504	0.118	Nov 2018	0.000		0.000		-		0.000	0.952	8.574	-
Testing and Evaluation	WR	NSWC CD : Crane, IN	8.310	1.673	Nov 2018	2.528	Nov 2019	1.607	Nov 2020	-		1.607	7.445	21.563	-
Testing and Evaluation	WR	NSWC DD : Dahlgren, VA	4.768	0.773	Nov 2018	0.435	Nov 2019	0.000		-		0.000	0.000	5.976	-
Testing and Evaluation	WR	NSWC Corona : Corona, CA	0.000	0.000		0.518	Nov 2019	0.900	Nov 2020	-		0.900	0.000	1.418	-
Prior Years Cumulative Funding	Various	Various : Various	8.624	0.000		0.000		0.000		-		0.000	0.000	8.624	-



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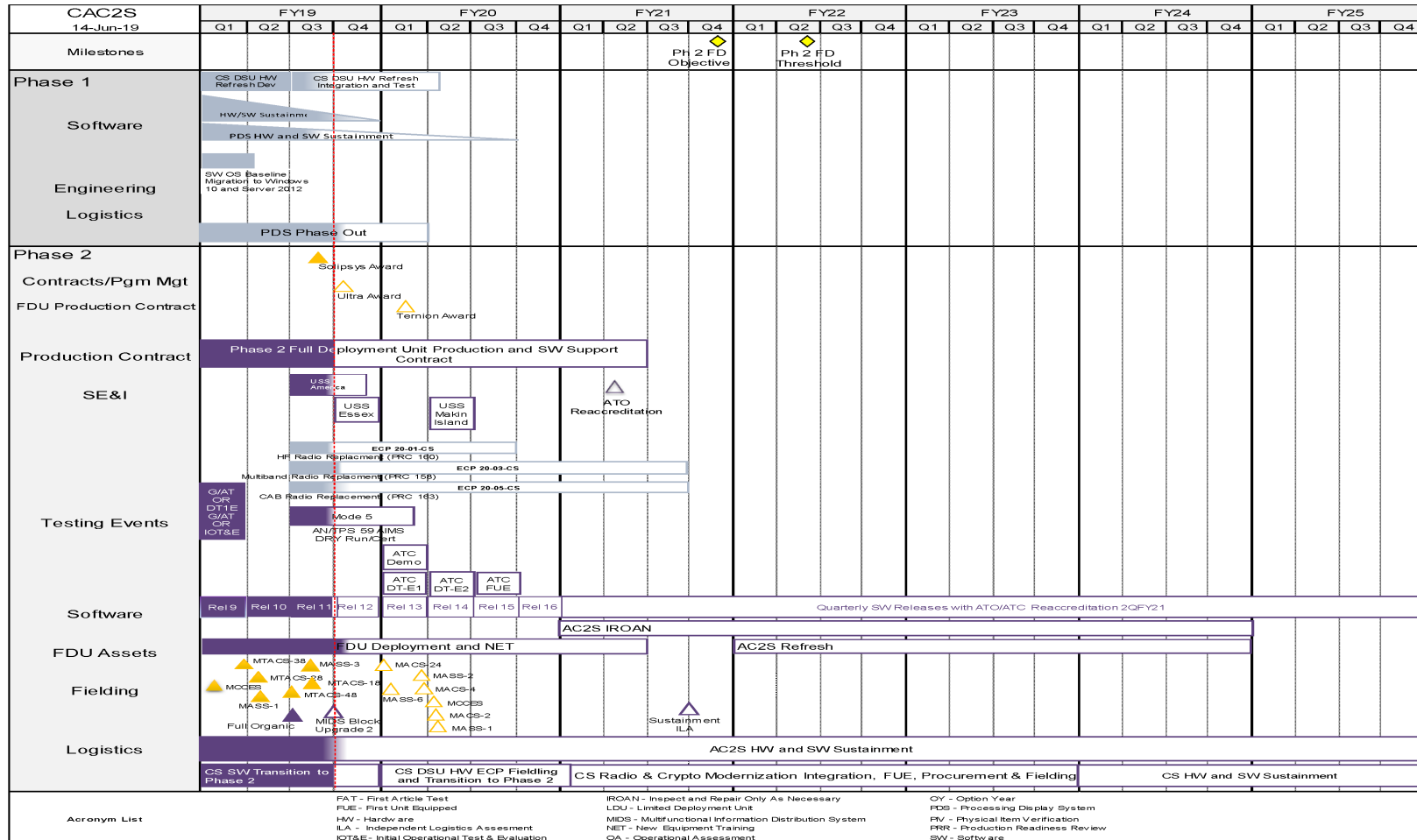
Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy

Date: February 2020

Appropriation/Budget Activity  
1319 / 7

R-1 Program Element (Number/Name)  
PE 0206335M / (U)Common Aviation  
Command and Control Sys (CAC2S)

Project (Number/Name)  
3373 / Common Aviation Command and  
Control System (CAC2S)



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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2021 Navy</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0206335M / (U)Common Aviation Command and Control Sys (CAC2S)	<b>Project (Number/Name)</b> 3373 / Common Aviation Command and Control System (CAC2S)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Proj 3373</b>				
CAC2S RDT&E IMS: G/ATOR DT1E / G/ATOR IOT&E	1	2019	1	2019
CAC2S RDT&E IMS: AN/MRQ-13 Communication Subsystem (CS) Tech Refresh	1	2019	4	2023
CAC2S RDT&E IMS: Quarterly SW release	1	2019	4	2025
CAC2S RDT&E IMS: Communication Subsystem (CS) Hardware Integration and Test	2	2019	2	2020
CAC2S RDT&E IMS: Mode 5 Integration Testing and Evaluation	3	2019	1	2020
CAC2S RDT&E IMS: SW Enhancements for ATO/ATC reaccreditation	1	2020	2	2021
CAC2S RDT&E IMS: AN/TSQ-297 AC2S FRP/FDU FOC Objective	4	2021	4	2021
CAC2S RDT&E IMS: AN/TSQ-297 AC2S FRP/FDU FOC Threshold	2	2022	2	2022