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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2
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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	-	1,085.909	1,032.528	1,275.268	0.000	1,275.268	1,325.999	1,164.122	1,097.200	911.395	Continuing	Continuing
673501: <i>Air Vehicle - Tech Refresh 3</i>	-	144.023	67.210	0.000	0.000	0.000	0.000	0.000	8.603	8.914	0.000	228.750
673502: <i>Air Vehicle Block 4 Planning & Sys Eng</i>	-	296.882	370.411	490.402	0.000	490.402	470.800	341.273	334.745	256.000	0.000	2,560.513
673503: <i>Test and Evaluation (T&E)</i>	-	241.723	270.841	261.303	0.000	261.303	342.251	355.370	296.977	205.707	0.000	1,974.172
673504: <i>Propulsion (PP)</i>	-	146.006	52.391	266.422	0.000	266.422	267.489	206.599	216.848	197.560	Continuing	Continuing
673505: <i>Maintenance Systems (MxS)</i>	-	44.064	49.836	42.044	0.000	42.044	33.681	30.494	29.845	30.924	0.000	260.888
673506: <i>Combat Data Systems (CDS)</i>	-	40.937	53.248	39.496	0.000	39.496	29.902	36.343	39.442	40.871	Continuing	Continuing
673507: <i>Training Systems & Simulation</i>	-	78.972	74.619	61.472	0.000	61.472	54.890	62.451	68.237	70.707	Continuing	Continuing
673508: <i>Infrastructure & Support Costs</i>	-	67.860	74.101	73.600	0.000	73.600	75.456	78.847	80.878	83.804	Continuing	Continuing
673509: <i>DevSecOps</i>	-	25.442	19.871	22.886	0.000	22.886	23.499	24.594	4.406	4.565	Continuing	Continuing
673510: <i>Utility and Subsystem Support to Mission Systems</i>	-	0.000	0.000	16.263	0.000	16.263	27.203	27.306	16.356	10.916	Continuing	Continuing
674871: <i>Information Operations Technology</i>	-	0.000	0.000	0.342	0.000	0.342	0.000	0.000	0.000	0.000	0.000	0.342
675346: <i>F-35</i>	-	0.000	0.000	1.038	0.000	1.038	0.828	0.845	0.863	1.427	0.000	5.001

Note
 This program, BA 7, PE 0604840F, project , PTMS Upgrade, is a new start.
 This program, BA 7, PE 0604840F, project , Information Operations Technology, is a new start.

A. Mission Description and Budget Item Justification
 The F-35 Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike aircraft for the United States Air Force, United States Navy, United States Marine Corps and International Partners countries. There are three variants: the F-35A Conventional Takeoff and Landing

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Appropriation/Budget Activity
3600: Research, Development, Test & Evaluation, Air Force I BA 7:
Operational Systems Development

R-1 Program Element (Number/Name)
PE 0604840F / F-35 C2D2

(CTOL), F-35B Short Take Off and Vertical Landing (STOVL), and the F-35C Carrier Variant (CV). Maximum commonality among the variants, consistent with National Disclosure Policy, will minimize total air system life cycle costs. Planning, systems engineering, development, and testing for Block 4 continues across the F-35 Air System to include the air vehicle, propulsion system, combat data systems, maintenance systems, and training systems as Initial Operational Capability (IOC) has been met for each variant.

The JSF Continuous Capability Development & Delivery (C2D2) efforts provide incremental warfighting capability improvements to maintain joint air dominance against evolving threats. Block 4 capability requirements were initiated through ongoing Service-led operational analysis of warfighting gaps identified in the Fifth Generation Fighter Modernization Initial Capabilities Document (ICD), and through F-35 JSF Block 4 Mission Decomposition analysis completed in FY2014. These analyses served as the basis for the Block 4 Capability Development Document (CDD), staffed through the Air Force Requirements Oversight Council (AFROC) and signed by the USAF Chief of Staff in January 2015. Joint Requirements Oversight Council (JROC) approved the CDD on 21 March 2017. Modernization activities in FY2023 and FY2024 continue with the incremental releases of Block 4 capabilities. Block 4 efforts include a robust weapons integration portfolio and provide new opportunities for International Partners to assess, integrate, and field unique capabilities based on global sovereign requirements.

The United Kingdom, Italy, Netherlands, Canada, Australia, Denmark and Norway are participants in F-35 modernization. The program shown here reflects United States Air Force funding. Foreign Military Sales are ongoing separately.

FY24 PE 0604840 F-35 C2D2 Project 675346 is submitting a Technical Adjustment to realign \$1.038 million to PE 0604840F Project 673508 for, civilian pay funding.

FY24 PE 0604840 F-35 C2D2 Project 673502 is submitting a Technical Adjustment to realign \$5.000 million to PE 0604281F for, Software Programmable OMS Compliant (SPoC)

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY2022, \$54.5M was expended for civilian pay expenses in this project element, and in FY2023, \$58.7M is forecasted for civilian pay expenses in this project element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2
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B. Program Change Summary (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	1,105.404	1,014.708	808.922	0.000	808.922
Current President's Budget	1,085.909	1,032.528	1,275.268	0.000	1,275.268
Total Adjustments	-19.495	17.820	466.346	0.000	466.346
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-19.680			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	37.500			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	9.999	0.000			
• SBIR/STTR Transfer	-29.494	0.000			
• Other Adjustments	0.000	0.000	466.346	0.000	466.346

Change Summary Explanation

FY22 reduction of -\$29.494 million for SBIR; +\$9.999 millions AFDW reprogramming

FY23 funding decreased by Congress for a program decrease and a Congressional increase of \$37.500 million for F135 engine enhancements.

FY24 funding increased for Block 4 Planning and Test & Evaluation efforts.

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673501 / Air Vehicle - Tech Refresh 3
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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
673501: Air Vehicle - Tech Refresh 3	-	144.023	67.210	0.000	0.000	0.000	0.000	0.000	8.603	8.914	0.000	228.750
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Technology Refresh 3 (TR-3) conducts post Critical Design Review (CDR) design activities. This effort will develop and deliver a TR-3 system through full flight-worthy certification and production readiness review for Lot 15. The design of TR-3 subsystems Integrated Core Processor (ICP), Aircraft Memory System (AMS), and Panoramic Cockpit Display Electronics Unit and Display Unit (PCD-EU, PCD-DU) configurations will contain new backplane technology, commercial operating systems, and modified middleware necessary to support Block 3F functionality and incorporation of all Block 4 capabilities. This work includes nonrecurring engineering for the development, test, and certification of the ICP, AMS, PCD-EU, and PCD-DU, and includes processing capacity to ensure long term viability for future capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY22, \$54.5M was expended for civilian pay expenses in this project element, and in FY23, \$58.7M is forecasted for civilian pay expenses in this project element.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Technology Refresh 3 (TR-3)	144.023	67.210	0.000	0.000	0.000
Description: TR-3 conducts post CDR design activities. This effort will develop and deliver a TR-3 system through full flight-worthy certification and production readiness review for Lot 15. The design of TR-3 subsystems ICP, AMS, PCD-EU, and PCD-DU configurations will contain new backplane technology, commercial operating systems, and modified middleware necessary to support Block 3F functionality and incorporation of all Block 4 capabilities. This work includes nonrecurring engineering for the development, test, and certification of the ICP, AMS, PCD-EU, and PCD-DU, and includes processing capacity to ensure long term viability for future capabilities.					
FY 2023 Plans: The TR-3 program will complete final laboratory system integration and test, flight test, and system certification requirements for fleet fielding.					
FY 2024 Base Plans: N/A					
FY 2024 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force	Date: March 2023
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673501 / Air Vehicle - Tech Refresh 3
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
N/A					
<i>FY 2023 to FY 2024 Increase/Decrease Statement:</i> Funding decreased due to the program nearing completion. This is driven by the ramp down and completion of sub tier supplier scope, and completion of system development at the Prime.					
Accomplishments/Planned Programs Subtotals	144.023	67.210	0.000	0.000	0.000

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

N/A

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673501 / Air Vehicle - Tech Refresh 3
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Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TR-3 Prime Development	C/CPIF	LM/FORT WORTH TX : TBD	-	133.574	Oct 2021	67.210	Oct 2022	-		-		-	0.000	200.784	-
TR-3 Prime Next GenDAS Shipsets Proc	C/CPIF	LM/FORT WORTH TX : TBD	-	6.146	Feb 2022	-		-		-		-	0.000	6.146	-
TR-3 Prime OT NRE	C/CPIF	LM/FORT WORTH TX : TBD	-	2.049	Nov 2021	-		-		-		-	0.000	2.049	-
TR-3 Prime OT NextGen DAS NRE	C/CPIF	LM/FORT WORTH TX : TBD	-	2.049	Nov 2021	-		-		-		-	0.000	2.049	-
Subtotal			-	143.818		67.210		-		-		-	0.000	211.028	N/A

Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TR-3 Project Support	MIPR	Various : TBD	-	0.205	Nov 2021	-		-		-		-	0.000	0.205	-
Subtotal			-	0.205		-		-		-		-	0.000	0.205	N/A

Remarks
1. Government support at National Security Agency (NSA) / Communications Electronics Research Development and Engineering Center (CERDEC) in support of TR-3 development.

	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	-	144.023	67.210	-	-	-	0.000	211.233	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673501 / Air Vehicle - Tech Refresh 3

	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
673501																												
Perform Safety of Flight Qualification Testing	■																											
Conduct TR-3 System Test Readiness Review			■																									
Perform Ground Test				■																								
Perform TR-3 Flight Test				■	■	■	■																					
Perform Final Hardware Qualification Testing	■	■	■	■																								
Deliver First Shipsets of TR-3 Hardware to Lot 15 Production Line				■																								
1st Aircraft Lot 15 DD250								■	■	■	■																	

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673501 / Air Vehicle - Tech Refresh 3

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
673501				
Perform Safety of Flight Qualification Testing	1	2022	1	2022
Conduct TR-3 System Test Readiness Review	3	2022	3	2022
Perform Ground Test	4	2022	4	2022
Perform TR-3 Flight Test	4	2022	2	2023
Perform Final Hardware Qualification Testing	1	2022	1	2023
Deliver First Shipsets of TR-3 Hardware to Lot 15 Production Line	4	2022	4	2022
1st Aircraft Lot 15 DD250	3	2023	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force										Date: March 2023		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2				Project (Number/Name) 673502 / Air Vehicle Block 4 Planning & Sys Eng			
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
673502: Air Vehicle Block 4 Planning & Sys Eng	-	296.882	370.411	490.402	0.000	490.402	470.800	341.273	334.745	256.000	0.000	2,560.513
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

F-35 Block 4 Modernization is designed to counter the full spectrum of evolving near-peer enemy threats to ensure US and Allied forces have freedom of operation even in the face of advanced adversary Anti-Access/Area Denial (A2/AD) capabilities. As designed, Block 4 consists of three principle lines of effort: development of software-based capabilities, development and integration of new and modernized aircraft hardware which enable the development of new capabilities, and new weapons integration. Efforts under the Air Vehicle / Block 4 Planning and Systems Engineering project range from requirements decomposition and preliminary design of capabilities through completion of Developmental Flight Test. These activities are a continuation of the previous Block 4 developmental contracts, and include activities required to enable the successful completion of Flight Test, to include select facility upgrades required for research, development, test and evaluation. Block 4 upgraded capabilities and continuous improvements will maintain Air System viability against the evolving threats indicated in the Electronic Warfare Initial Capabilities Document (ICD), the Fifth Generation Fighter Modernization ICD, and the Block 4 Capability Development Document (CDD). Additionally, the Block 4 capabilities will reduce life cycle cost, improve Air System Integration, and improve operational suitability. Weapons integration efforts included under this project include AARGM-ER integration, employment envelope expansion for current F-35 weapons, non-recurring engineering (NRE) for obsolescence, and increased Air-to-Air Missile Carriage.

Included in the Air Vehicle (AV)/Block 4 Planning and Systems Engineering effort is both Prime and Government Systems Engineering Support needed for Avionics/ Electronic Warfare and Weapons Integration efforts to include studies, analysis and risk reduction efforts.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY22, \$54.5M was expended for civilian pay expenses in this project element, and in FY23, \$58.7M is forecasted for civilian pay expenses in this project element.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Air Vehicle Block 4 Planning & Sys Eng	296.882	370.411	490.402	0.000	490.402
Description: The F-35 Air Vehicle Program Management Office (AV PMO) development portfolio includes efforts to improve the F-35 air vehicle lethality, survivability, and interoperability in response to emerging threats outlined in the National Security Strategy and Operational Plans. As designed, Block 4 consists of three principle lines of effort: development of software-based capabilities, development and integration of new and modernized aircraft hardware which enable the development of new capabilities, and new weapons integration. Included in					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673502 / Air Vehicle Block 4 Planning & Sys Eng

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>the AV/Block 4 Planning and Systems Engineering effort is both Prime and Government Systems Engineering Support needed for Avionics/Electronic Warfare and Weapons Integration efforts to include studies, analysis and risk reduction efforts.</p> <p>FY 2023 Plans: Continue with Agile development of capabilities through Developmental and Operational Flight Test. Continue requirements decomposition and preliminary design activities for advanced Block 4 capabilities. Continue development and maturity of key long lead capabilities and service unique weapons, enabling A2AD strategies including increased payloads, integrated fires, passive weapons, interoperability and multi-spectrum dominance in response to near-peer threats. Initiate development of enhanced cyber detection and mitigation capability for the F-35 in response to critical and emerging threats. Continue and expand application of cyber resilience engineering processes and tools for software, hardware, and weapons, through flight test. Continue and expand application of cyber resilient engineering processes and tools for software, hardware, and weapons, though flight test. Continuing development and timely delivery of software drops to meet warfighter need. Continue supporting efforts for airframe, air vehicle systems, Air-Ship integration, including Electromagnetic aircraft launch system - advanced arresting gear (EMALS-AAG) launch bulletins and related work, mission systems, future capabilities studies and weapons integration efforts. Continue support for Block 4 Capabilities and support preliminary systems engineering efforts associated with AARGM-ER, AGM-158 family of weapons, and increased air-to-air missile carriage. Continue systems engineering, integration, and test (SEIT) development for avionics, weapons, studies & analyses, and risk reduction efforts.</p> <p>FY 2024 Base Plans: Continue with Agile development of capabilities through Developmental and Operational Flight Test. Continue requirements decomposition and preliminary design activities for advanced Block 4 capabilities. Continue development and maturity of key long lead capabilities and service unique weapons, enabling A2AD strategies including increased payloads, integrated fires, passive weapons, interoperability and multi-spectrum dominance in response to near-peer threats. Initiate development of enhanced cyber detection and mitigation capability for the F-35 in response to critical and emerging threats. Continue and expand application of cyber resilience engineering processes and tools for software, hardware, and weapons, through flight test. Continue and expand application of cyber resilient engineering processes and tools for software, hardware, and weapons, though flight test. Continuing development and timely delivery of software drops to meet warfighter need. Continue supporting efforts for airframe, air vehicle systems, Air-Ship integration, including Electromagnetic aircraft launch system advanced arresting gear (EMALS-AAG) launch bulletins and related work, mission systems, future capabilities</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673502 / Air Vehicle Block 4 Planning & Sys Eng

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>studies and weapons integration efforts. Continue support for Block 4 Capabilities and support preliminary systems engineering efforts associated with AARGM-ER, AGM-158 family of weapons, and increased air to-air missile carriage. Continue systems engineering, integration, and test (SEIT) development for avionics, sensors, weapons, studies & analyses, and risk reduction efforts. Continue and expand the joint requirement for Common Low Observable Waveform development as a new tactical data link (TDL) to be used for interoperability across joint platforms within a highly contested environment. Begin the development of the Common Low Observable Waveform to meet the Joint requirement to start RDT&E work in FY2024/2025 in order to field a capability in FY2028/2029. The reason for the need for an accelerated timeline is due to limitations of Link-16 in the highly contested environment.</p> <p>FY 2024 OCO Plans: N/A</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increased due to the addition of the Common Low Observable Waveform development.</p>					
Accomplishments/Planned Programs Subtotals	296.882	370.411	490.402	0.000	490.402

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy

The C2D2 acquisition strategy employs both Cost and Fixed Price Incentive contracts for the Block 4 engineering and development efforts. In addition, a separate Basic Ordering Agreement or Indefinite Quantity/Indefinite Delivery contract is planned to provide a long term approach to upgrading and maintaining laboratories and test aircraft and supporting technology maturation for future C2D2 capabilities.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force											Date: March 2023				
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2					Project (Number/Name) 673502 / Air Vehicle Block 4 Planning & Sys Eng				

Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
AV Prime Phase II Cape/Development	C/CPIF	LM /Fort Worth TX : TBD	-	261.727	Oct 2021	308.328	Oct 2022	296.568	Nov 2023	-		296.568	Continuing	Continuing	-
AV Prime Phase II Fee	C/CPIF	LM /Fort Worth TX : TBD	-	10.244	Oct 2021	10.244	Oct 2022	42.600	Nov 2023	-		42.600	Continuing	Continuing	-
AV Prime Air Vehicle Integration	C/CPFF	LM /Fort Worth TX : TBD	-	2.500	Oct 2021	2.500	Oct 2022	3.128	Nov 2023	-		3.128	Continuing	Continuing	-
AV Common Low Observable Waveform	TBD	TBD : TBD	-	-		-		99.000	Nov 2023	-		99.000	Continuing	Continuing	-
AV Systems Engineering	Various	Various : TBD	-	6.381	Dec 2021	8.624	Dec 2022	11.668	Nov 2023	-		11.668	Continuing	Continuing	-
AV Cyber Survivability	Various	Various : TBD	-	-		9.834	Oct 2022	18.764	Nov 2023	-		18.764	Continuing	Continuing	-
Subtotal			-	280.852		339.530		471.728		-		471.728	Continuing	Continuing	N/A

Remarks

1. Breaking out Cyber survivability as separate line item in FY23.
2. Phase 2.3 Performance Incentive Fee (PIF) events are tagged to incrementally mature hardware deliveries. FY24 will see increased hardware deliveries as development with potential PIF payouts upon delivery.

Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
AV Mission Systems Support	Various	Various : TBD	-	10.530	Nov 2021	7.881	Nov 2022	10.651	Nov 2023	-		10.651	Continuing	Continuing	-
AV Vehicle Systems Support	Various	Various : TBD	-	0.500	Nov 2021	17.000	Nov 2022	0.500	Nov 2023	-		0.500	Continuing	Continuing	-
AV CSO Development Support	Various	Various : TBD	-	5.000	Nov 2021	6.000	Nov 2022	7.523	Nov 2023	-		7.523	Continuing	Continuing	-
Subtotal			-	16.030		30.881		18.674		-		18.674	Continuing	Continuing	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
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FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

673502	
Systems Engineering & Agile Capability Development: Planning Events	
Systems Engineering & Agile Capability Development: IPRs	
Hardware Enablers: A/C Cooling	
Hardware Enablers: Electronic Warfare (EW) Upgrade	
Hardware Enablers: Embedded GPS Inertial (EGI)	
Hardware Enablers: Beyond Line Of Sight (BLOS) Communications	
Hardware Enablers: Common Low Observable Waveform	
Production: LOT 15	
Production: LOT 16	
Production: LOT 17	
Production: LOT 18	
Production: LOT 19	
Production: LOT 20	

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673502 / Air Vehicle Block 4 Planning & Sys Eng

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
673502				
Systems Engineering & Agile Capability Development: Planning Events	1	2022	4	2028
Systems Engineering & Agile Capability Development: IPRs	1	2022	4	2028
Hardware Enablers: A/C Cooling	1	2022	4	2025
Hardware Enablers: Electronic Warfare (EW) Upgrade	1	2022	1	2028
Hardware Enablers: Embedded GPS Inertial (EGI)	1	2022	1	2027
Hardware Enablers: Beyond Line Of Sight (BLOS) Communications	4	2022	4	2028
Hardware Enablers: Common Low Observable Waveform	1	2024	4	2028
Production: LOT 15	2	2023	1	2024
Production: LOT 16	2	2024	1	2025
Production: LOT 17	2	2025	1	2026
Production: LOT 18	2	2026	1	2027
Production: LOT 19	2	2027	1	2028
Production: LOT 20	2	2028	4	2028

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force										Date: March 2023		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2				Project (Number/Name) 673503 / Test and Evaluation (T&E)			
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
673503: Test and Evaluation (T&E)	-	241.723	270.841	261.303	0.000	261.303	342.251	355.370	296.977	205.707	0.000	1,974.172
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Integrated Test activities in support of Continuous Capability Development and Delivery (C2D2), Lockheed Martin support at all test sites, non-recurring engineering required to plan for the service life extension of existing development test (DT) aircraft, modifications necessary to bring DT aircraft fleet to a more production-representative configuration, develop flight test instrumentation, and release test software to meet Block 4 requirements. Additional upgrades required to support development and evaluation of improvements driven by changes in the threat environment and as identified in the Electronic Warfare Initial Capabilities Document (ICD), the Fifth Generation Fighter Modernization ICD, and the Block 4 Capability Development Document (CDD). Efforts include non-recurring engineering and procurement of a test article to evaluate service life of F-35B Short Takeoff and Vertical Landing (STOVL) Aircraft. Integrated test also supports the evaluation of upgrades to Autonomic Logistics Information System (ALIS), fielding of Operational Data Integrated Network (ODIN) Base Kits, regression testing of fielded weapons upgrades, and various validation/verification efforts.

Costs in the Accomplishments/Planned Program section have been broken out into the following categories: Development Foundation Contract (DFC), DT, Operational Test (OT), Future Flight Test Capabilities/Investments, and Ground Test and Simulation Infrastructure (GTSI). All of the development efforts presented in the budget submission existed in prior years and were rolled up under previously submitted Accomplishments/Planned Program costs in the Test and Evaluation category.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY22, \$54.5M was expended for civilian pay expenses in this project element, and in FY23, \$58.7M is forecasted for civilian pay expenses in this project element.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Development Foundation Contract (DFC) Flight Test and Tech Refresh	83.039	90.605	81.832	-	81.832
Description: Flight test infrastructure at Edwards Air Force Base (AFB) and Pax River Naval Air Station (NAS) and F-35 tech refresh for laboratory development at Fort Worth, TX for Lockheed Martin Aeronautics and its subcontractors. This includes investment planning and other test planning activities required for Block 4 development, integration, developmental test and evaluation. Funding is required for the Lockheed Martin Integrated Test Force contractor labor, suppliers, and material. Other support efforts are provided for airframe, air vehicle systems, air-ship integration, mission systems, weapons integration, offboard mission support, autonomic logistics development, joint reprogramming enterprise and modeling and joint simulation environment					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673503 / Test and Evaluation (T&E)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>activities, including Nimble Lightning efforts. Other costs in support of ranges, chase planes and DT site operations.</p> <p>FY 2023 Plans: Support F-35 capability enhancements identified in approved requirements documents. DFC will provide flight test for C2D2 Block 4 capabilities including weapons testing, as well as continue annualized technology refresh and specific lab modernization efforts. These efforts will sustain, replace, upgrade, and modify hardware and software at the module level and facilitate test integration with the development process.</p> <p>FY 2024 Base Plans: Support F-35 capability enhancements. DFC will provide flight test for C2D2 Block 4 capabilities including weapons testing, as well as continue annualized equipment recapitalization along with technology refresh and specific lab modernization efforts. These efforts will sustain, replace, upgrade, and modify hardware and software.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding decreased due to negotiating Development Foundation Contract at a lower cost while deferring FY2024 efforts to ramp up again in FY2025.</p>					
<p>Title: Developmental Test (DT)</p> <p>Description: Government test site Integrated Test activities to support development of Air Vehicle C2D2 and TR-3 programs, as well as inherent maintenance systems, training systems, and combat data systems test support. Testing includes ground, logistics, and flight testing of incremental flight software releases, weapon integration, Diminishing Manufacturing Sources (DMS)/fleet sustainment, service-life extension, hardware refresh, and regression efforts to ensure total system integration meets program requirements. Test site capabilities to meet program requirements include infrastructure, ranges, engineering, administration, logistics, maintenance, controls, information technologies, classified facilities, and service-unique supporting capabilities. The sites to be funded include but are not limited to Naval Air Warfare Center Aircraft Division (NAWCAD) Pax River, NAWCAD China Lake, and Edwards AFB.</p> <p>FY 2023 Plans: Continue to support Integrated Test capacity and flight test execution (manpower, weapons, flight hours, range time, and chase, target & tanker support assets) to develop, verify, and test capabilities as directed by the F-35 JPO. Major program testing includes Block 4 weapons integration, incremental software releases with new capability and bug fixes, integrated system evaluations, multi-ship operations, and mission effectiveness</p>	30.913	43.916	37.581	-	37.581

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force	Date: March 2023
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673503 / Test and Evaluation (T&E)
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>evaluations. Continue funding for DT Aircraft Modification broken out from the rest of the Development activities. This is continued support from FY2022 for DT aircraft modifications in order to be test-ready and operationally-representative.</p> <p>FY 2024 Base Plans: Continue to support Integrated Test capacity and flight test execution (manpower, weapons, flight hours, range time, and chase, target & tanker support assets) to develop and verify and test capabilities as directed by the F-35 JPO. Major program testing includes Block 4 weapons integration, integrated system evaluations, multi-ship operations, and mission effectiveness evaluations. Continue funding for Development Test Aircraft Modification broken out from the rest of the Development activities. This is continued support from FY22 for Developmental Test (DT) aircraft modifications in order to be test-ready and operationally-representative. Funding will also procure Developmental Test (DT) Kits. Continue to support flight test capacity and flight test execution. This includes first increment testing through initial and fully operational increments. The funding will be used for continuing to develop and test incrementally, for new software releases and deficiency fixes.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding decreased due to the decrease in TR-3 Developmental Test (DT) efforts.</p>					
<p>Title: Operational Test (OT)</p> <p>Description: Government test site Integrated Test activities to support development of Air Vehicle C2D2 and TR-3 programs, as well as inherent maintenance systems, training systems, and combat data systems test support. Testing includes ground, logistics, and flight-testing of incremental flight software releases, weapon integration, DMS/fleet sustainment, hardware refresh and regression efforts to ensure total system integration meets program requirements in an operationally representative environment. Test site capabilities to meet program requirements include infrastructure, ranges, engineering, administration, logistics; maintenance, controls, information technologies, classified facilities, and service unique supporting capabilities. The sites to be funded include but are not limited to Nellis AFB and Yuma Air Station.</p> <p>FY 2023 Plans: Funding will support Integrated Test capacity and flight test execution (manpower, weapons, flight hours, range time, and chase, target & tanker support assets) to develop, verify, and test capabilities as directed by the F-35 JPO. Major program testing includes TR-3 integration, Block 4 weapons integration, incremental software releases with new capability and deficiency report fixes, integrated system evaluations, multi-ship operations and mission effectiveness evaluations in an operationally representative environment. Continue funding for OT aircraft modifications in order to be test-ready and operationally-representative. Funding also includes the</p>	22.058	19.762	31.059	-	31.059

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673503 / Test and Evaluation (T&E)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>execution of the remaining 64 OT virtual mission trials and Initial Operational Test and Evaluation (IOT&E) close out tasks.</p> <p>FY 2024 Base Plans: Funding will support Integrated Test capacity and flight test execution (manpower, weapons, flight hours, range time, and chase, target & tanker support assets) to develop and verify and test capabilities as directed by the F-35 JPO. Major program testing includes TR-3 integration, Block 4 weapons integration, integrated system evaluations, multi-ship operations and mission effectiveness evaluations in an operationally representative environment. Continued funding for Operational Test (OT) aircraft modifications in order to be test-ready and operationally-representative. The funding will be used for continual development through incremental test of new software and deficiency fixes. Funding also includes the execution of the remaining 64 OT virtual mission trials and IOT&E close out tasks. AV is the TR-3 system owner responsible for verifying capability with data provided from DT and OT funded in this chart.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increased due to ramp up of Follow-on Modernization Phase 2.3 Operational Test Kit support.</p>					
<p>Title: Future Flight Test Capabilities/Investments</p> <p>Description: Investments in test fleet modifications, test mission equipment/assets, instrumentation capability, and data center are required to support Block 4 capability development and integrated test. TR-3 related capability requires current test aircraft and replacement test aircraft configurations to be modified with new hardware, software, and instrumentation systems. Program priorities, flight test demand, data quantity/bandwidth upgrades, and capability delivery schedules require a steady update to test fleet configurations. Modifications and instrumentation design/procurement/install are long-lead efforts requiring stable funding and contract vehicles to meet program needs.</p> <p>FY 2023 Plans: Continue incremental funding of Lot 14 Contract for Flight Test Instrumentation (FTI) design, procurement and installation. Continue FTI design/fabrication/installation (long-lead NRE, parts procurement, kit fabrication) for replacement test aircraft (16 unique designs). Continue non-recurring engineering (NRE)/procurement/installation to retrofit or maintain test aircraft viability. Continue development, procurement, and installation of flight test data center system upgrades to support Integrated Testing across multiple F-35 stakeholder sites. FTI development, procurement, fabrication, and installation for current/future service loaner aircraft in order to continue Integrated Testing with Service OT organizations. Further, continue integration and procurement efforts</p>	92.226	103.420	104.005	-	104.005

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force	Date: March 2023
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673503 / Test and Evaluation (T&E)
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
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for required Block 4 test mission assets, includes but not limited to weapons test vehicles, unique test mission equipment, and other test execution support equipment.

FY 2024 Base Plans:

Begin incremental funding for Flight Sciences Replacements jets FTI design, procurement and installation (1 per variant). Begin incremental funding for Flight Science Lite jets for FTI design in support of weapons testing (1xF-35B and 2xF-35C). Continues FTI design/fabrication/installation (long-lead NRE, parts procurement, kit fabrication) for replacement test aircraft (16x unique designs). Continues NRE/procurement/installation to retrofit or maintain test aircraft viability. Additionally, development, procurement, and installation of flight test data center system upgrades to support Integrated Testing across multiple F-35 stakeholder sites. FTI development, procurement, fabrication, and installation for current/future service loaner aircraft in order to continue Integrated Testing with Service Operational Test organizations. Further, continue integration and procurement efforts for required Block 4 test mission assets, includes but not limited to weapons test vehicles, unique test mission equipment, and other test execution support equipment.

FY 2023 to FY 2024 Increase/Decrease Statement:

Funding increased due to continued ramp up of activities across the board, to include Lot 18/19 Flight Science, Flight Science Lite, Operational Test in support of TR-3 Flight Test Instrumentation and ramp up in JASSM-ER/LRASM and AARGM-ER flight test assets in FY2024.

Title: Ground Test and Simulation Infrastructure (GTSI)

Description: Development of GTSI capabilities from Block 4/TR-3 and other C2D2 early-on design and development through Installed Systems Verification activities prior to Developmental Flight Test for all variants of the F-35 aircraft. Infrastructure efforts include Laboratory Developments of Improvements & Modernization (I&M) assets used for design, development and test of Block 4 capabilities, and development of Ground Test & Evaluation Capabilities for digital and non-digital installed systems verification. Laboratory and/or Venue Developments will focus on the pure development of Block 4 capabilities through a Capability Verification Infrastructure that meets required fidelities that would advance the high-quality development of the Air System capabilities. GTSI will also include capabilities for cyber testing for TR-3 assessments within three main areas: air vehicle, information systems, and supply chain.

FY 2023 Plans:

Continue GTSI improvements and modernization capabilities needed for Block 4 Air System developments to include but are not limited to the Next-generation Electronic Warfare Environment Simulator (NEWEG), Automatic Test & Re-Test (ATRT) phase 3, GT&S Catalog, Friendly and Threat Signal Development and

	13.487	13.138	6.826	-	6.826

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673503 / Test and Evaluation (T&E)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
	<p>Delivery, Multi-Spectral Environment improvements, etc. Efforts required to enable efficiencies in the Capability Verification process and decrease reliance on Flight Test Operations as the overwhelmingly sole means of Verification. Test Infrastructure improvements include Vendor Development lab capabilities as well as USG Organic Infrastructure. Develop F-35 mission threads for continued digital verification automated capabilities for early-on software development and continue aircraft cyber improvements and testing efforts. Major Investments include improvements to Digital Capabilities and Analysis and Ground Integrated Battlespace Verification.</p> <p>FY 2024 Base Plans: Continue GTSI improvements and modernization capabilities needed for Block 4 air system development. Efforts required to enable efficiencies in the Capability Verification process and decrease reliance on Flight Test Operations as the overwhelming sole means of Verification. Test Infrastructure improvements include Vendor lab capabilities as well as USG Organic Infrastructure. Develop F-35 mission threads for continued digital verification automated capabilities for early-on software development, and continue aircraft cyber improvements and testing efforts. Major Investments include improvements to Digital Capabilities and Analysis and Ground Integrated Battlespace Verification.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding decreased due to fielding of some GTSI Developments for the Ground Test Infrastructure and other Developments.</p>				
Accomplishments/Planned Programs Subtotals	241.723	270.841	261.303	-	261.303

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

N/A

Remarks

D. Acquisition Strategy

The T&E project will maximize use of existing F-35 contracts, where possible, for the various T&E-related capabilities and investments. For example, provisions for new instrumentation on new flight test aircraft are being implemented when applicable via existing production contracts in order to allow installation of the required hardware while those airframes are still on the assembly line. This will save significant costs and effort that would be required if instrumentation installation occurred after aircraft delivery. Other modifications and/or NRE may be implemented via existing contracts being managed by the Air Vehicle PMO as part of the Block 4 engineering and development efforts. In addition, a separate Cost-Plus-Incentive-Fee-type contract is planned to provide a long-term approach to upgrading and maintaining laboratories and also for maintaining the older existing System Development and Demonstration (SDD) test aircraft. Viability modifications to the SDD test aircraft are being contracted via a combination of Streamlined Delivery Orders for NRE and hardware as well as a Cost Plus-type contract, using both expedites the right modifications as needed at the right time in order to avoid test aircraft grounding and to maximize their availability. In addition, separate Basic Ordering Agreements or Indefinite Quantity/

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
3600 / 7	PE 0604840F / <i>F-35 C2D2</i>	673503 / <i>Test and Evaluation (T&E)</i>

Indefinite Delivery contracts may be used to implement a long-term approach to upgrading and maintaining laboratories and test aircraft and supporting technology maturation for future capabilities. Several new cost reduction initiatives are being studied to determine possible migration away from Lockheed-Martin support to less-expensive organic support (via either government solutions, local test-base support contracts, or a combination of both) in areas such as test aircraft maintenance, test operations support, and networks/knowledge management. Other initiatives are being pursued to move more test data collection requirements from the open-air ranges to ground test chambers, computer-based models and simulations, or other laboratory venues where possible.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673503 / Test and Evaluation (T&E)
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Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
DFC - Prime Developmental Foundation Contract	C/CPIF	LM; Fort Worth TX : TBD	-	90.258	Nov 2021	90.605	Nov 2022	72.188	Nov 2023	-		72.188	Continuing	Continuing	-
OT - Prime Operation Test Aircraft Modification	C/CPIF	LM; Fort Worth TX : TBD	-	4.540	Jun 2022	3.600	Aug 2023	18.251	Aug 2024	-		18.251	Continuing	Continuing	-
FI - Prime DT AC Viability	C/CPIF	LM; Fort Worth TX : TBD	-	24.584	Dec 2021	25.876	Dec 2022	79.310	Dec 2023	-		79.310	Continuing	Continuing	-
FI - Flight Test Asset	C/CPIF	LM; Fort Worth TX : TBD	-	56.072	Dec 2021	56.930	Dec 2022	21.394	Dec 2023	-		21.394	Continuing	Continuing	-
DT - Prime Development Test Aircraft Modification	C/CPIF	LM; Fort Worth TX : TBD	-	-		8.550	Aug 2023	4.332	Aug 2024	-		4.332	Continuing	Continuing	-
Laboratory Development	C/CPIF	LM; Fort Worth TX : TBD	-	-		-		9.645	Nov 2023	-		9.645	Continuing	Continuing	-
Subtotal			-	175.454		185.561		205.120		-		205.120	Continuing	Continuing	N/A

Remarks

R-3 Acronyms correspond to R-2A categories, per below breakout:
 DFC - Development Foundation Contract (DFC) Flight Test
 OT - Operational Test
 DT - Developmental Test
 FI - Future Flight Test Capabilities and Investments
 GTSI - Ground Test Simulation and Infrastructure
 Flight Test assets include DT and OT weapons procurement to support test and assets needed for flight test instrumentation

Test and Evaluation (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
Developmental Test & Evaluation (EDW)	MIPR	Edwards AFB, CA : TBD	-	11.934	Dec 2021	16.389	Dec 2022	15.643	Dec 2023	-		15.643	Continuing	Continuing	-
Developmental Test & Evaluation (IDT)	MIPR	IDT : Ballston, VA : TBD	-	3.052	Dec 2021	3.434	Dec 2022	1.506	Dec 2023	-		1.506	Continuing	Continuing	-
Developmental Test & Evaluation (JHU)	MIPR	JHU : Lauren, MD : TBD	-	1.665	Dec 2021	1.873	Dec 2022	0.815	Dec 2023	-		0.815	Continuing	Continuing	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673503 / Test and Evaluation (T&E)
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Test and Evaluation (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Developmental Test & Evaluation (PAX)	WR	NAWCAD : Pax River, MD : TBD	-	16.097	Dec 2021	21.340	Dec 2022	15.549	Dec 2023	-		15.549	Continuing	Continuing	-
Developmental Test & Evaluation (CHLK)	WR	NAWCWD: China Lake, CA : TBD	-	0.628	Dec 2021	0.863	Dec 2022	1.309	Dec 2023	-		1.309	Continuing	Continuing	-
Operational Test & Evaluation (EDW)	MIPR	Edwards AFB, CA : TBD	-	0.627	Dec 2021	0.550	Dec 2022	0.999	Nov 2023	-		0.999	Continuing	Continuing	-
Operational Test & Evaluation (Eglin)	MIPR	Eglin AFB, FL : TBD	-	1.491	Dec 2021	2.048	Dec 2022	1.251	Jun 2024	-		1.251	Continuing	Continuing	-
Operational Test & Evaluation (PAX)	WR	NAWCAD : Pax River, MD : TBD	-	0.219	Dec 2021	0.300	Dec 2022	0.192	Dec 2023	-		0.192	Continuing	Continuing	-
Operational Test & Evaluation (CHLK)	WR	NAWCWD: China Lake, CA : TBD	-	4.173	Dec 2021	4.073	Dec 2022	7.919	Dec 2023	-		7.919	Continuing	Continuing	-
Operational Test & Evaluation (Nellis)	MIPR	Nellis AFB, NV : TBD	-	25.756	Dec 2021	33.860	Dec 2022	9.765	Dec 2023	-		9.765	Continuing	Continuing	-
Operational Test & Evaluation (NSMA)	MIPR	NSMA : NSMA : TBD	-	0.627	Dec 2021	0.550	Dec 2022	1.235	Dec 2023	-		1.235	Continuing	Continuing	-
Subtotal			-	66.269		85.280		56.183		-		56.183	Continuing	Continuing	N/A

Remarks
 Changing R-3 Test and Evaluation categories in accordance with OSD direction that these line items be one of the following three types: Developmental Test & Evaluation (DT&E), Operational Test & Evaluation (OT&E), or Live Fire Test & Evaluation (LFT&E). Duplicate checks are done by ITEM NAME - CONTRACT TYPE - ACTIVITY/ LOCATION.
 Crosswalk:
 DT&E Edwards AFB - DT - C2D2, TR-3, Block 4
 DT&E IDT - GTSI - C2D2, TR-3, Block 4
 DT&E JHU - GTSI - C2D2, TR-3, Block 4
 DT&E NAWCAD - DT + GTSI - C2D2, TR-3, Block 4
 DT&E NAWCWD - DT + GTSI - C2D2, TR-3, Block 4
 OT&E Edwards AFB - OT - C2D2, TR-3, Block 4
 OT&E Eglin AFB - GTSI - C2D2, TR-3, Block 4
 OT&E NAWCAD - GTSI - C2D2, TR-3, Block 4
 OT&E NAWCWD - OT - C2D2, TR-3, Block 4
 OT&E Nellis AFB - OT + FTI + GTSI - C2D2, TR-3, Block 4
 OT&E NSMA - OT - C2D2, TR-3, Block 4

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673503 / Test and Evaluation (T&E)
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FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

673503	
Development Foundation Contract Part III	
DT Aircraft Viability	
Flight Test Instrumentation	
Systems Engineering, Integration, and Test Contract	
OFP Development & Test	

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673503 / Test and Evaluation (T&E)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
673503				
Development Foundation Contract Part III	1	2022	2	2027
DT Aircraft Viability	1	2022	1	2026
Flight Test Instrumentation	1	2022	4	2028
Systems Engineering, Integration, and Test Contract	1	2023	1	2026
OFP Development & Test	1	2022	2	2026

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force										Date: March 2023		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2				Project (Number/Name) 673504 / Propulsion (PP)			
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
673504: <i>Propulsion (PP)</i>	-	146.006	52.391	266.422	0.000	266.422	267.489	206.599	216.848	197.560	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Propulsion F135 projects within the Continuous Capability Development & Delivery (C2D2) are provided for developmental efforts for propulsion systems and test engine requirements such as Block 4 Integrated Flight Test Support, Engine Flight Test Mechanics, Flight Test Engineering, Engine Hardware, Test Engine procurements, research, component and capability development, prototypes, various studies, and other associated government costs integral to support the developmental stages for F-35 engine modernization, affordability drivers for top engine availability degraders, and improvement to support the F135 Propulsion System for the F-35 Air Vehicle. Testing and development of the three F-35 aircraft variants require engine propulsion funding to enable continued flight hours. Flight hours are budgeted and planned to meet the Block 4 flight test timelines, and required Flight Test support. Flight Test Support efforts will transition to Organic support by FY2026. Transition of Flight Test Support requirements to organic capability includes efforts performed by contractor and government installations, Autonomic Logistics Information System / Operational Data Integrated Network (ALIS/ODIN) transition, and Final Flight Release (FFR) engine support efforts. Propulsion C2D2 provides funding for requirements to support the Air Vehicle modernization efforts with signature predicting improvements and a bridge program for engine modernization. Engine Modernization is part of the wider Air System Modernization effort. In FY2022 and F20Y23, there was a Congressional Add for F135 Engine Enhancement that is being used to fund F135 Engine Core Upgrade (ECU) Preliminary Design through a Preliminary Design Review in December 2023. Starting in FY2024, Engine Modernization will be funded through the standard funding process. ECU Detailed Design labor will be added to the F135 Engine Enhancement contract in December 2024, and the rest of ECU EMD will be awarded in June 2024.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY22, \$54.5M was expended for civilian pay expenses in this project element, and in FY23, \$58.7M is forecasted for civilian pay expenses in this project element.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Propulsion (PP)	146.006	52.391	266.422	-	266.422
Description: Propulsion F135 Block 4 Integrated Flight Test Support includes efforts such as Engine Flight Test Mechanics, Flight Test Engineers, Replacement Engine Hardware, Test Engine Procurement, and other associated government costs.					
FY 2023 Plans: Continue Propulsion F135 Block 4 Integrated Flight Test Support to include Engine Flight Test Mechanics, Flight Test Engineering, Engine Hardware, Test Engine Procurement, research, component and capability					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673504 / Propulsion (PP)

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>development, prototypes, various studies, and other associated government costs. The Flight Test Fleet will maintain aircraft inventory at twelve aircraft in FY2023. This includes seven at Edwards Air Force Base and five at Patuxent River Naval Air Base. Flights and Engine Flight Hours (EFH) are expected to maintain the FY2022 levels at 240 flights and 480 flight hours per quarter. Flight Test Support efforts will transition to Organic support by FY2027. Transition of Flight Test Support requirements to organic capability includes efforts performed by contractor and government installations, ALIS/ODIN transition, and FFR engine support efforts. FY2023 Propulsion C2D2 provides funding for requirements to support the Air Vehicle modernization efforts, Engine signature predicting improvement efforts, and continuing F135 Engine Modernization developmental efforts.</p> <p>FY 2024 Base Plans: Continue Propulsion F135 Block 4 Integrated Flight Test Support to include Engine Flight Test Mechanics, Flight Test Engineering, Engine Hardware, Test Engine Procurements, research, component and capability development, prototypes, various studies, and other associated government costs integral to support the developmental stages for engine modernization and improvement to support the F135 Air Vehicle. Propulsion Flight Test Support enables the execution of F135 Air Vehicle Air System Playbook (ASP 16.1), and Technology Refresh 3 (TR-3) Requirements.</p> <p>The Flight Test Fleet will maintain similar elevated aircraft inventory at twelve aircraft in FY2024. This includes seven at Edwards Air Force Base and five at Patuxent River Naval Air Base. Flights and Engine Flight Hours (EFH) are expected to maintain their prior year levels at 240 flights and 480 flight hours per quarter. Flight Test Support efforts will transition to Organic support by FY2027.</p> <p>Transition of Flight Test Support requirements to organic capability includes efforts performed by contractor and government installations, Autonomic Logistics Information System / Operational Data Integrated Network (ALIS/ODIN) transition, and Final Flight Release (FFR) engine support efforts. FY2024 Propulsion C2D2 provides funding for requirements to support the Air Vehicle modernization efforts, Engine signature predicting improvement efforts, and continuing F135 Engine Modernization/Propulsion System Upgrade developmental efforts.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increased due to Air Vehicle modernization efforts and continuing F135 Engine Modernization/ Propulsion System Upgrade developmental efforts. FY2024 Budget includes first year of EMD program for ECU, greatly increasing development funding in FY2024.</p>					
Accomplishments/Planned Programs Subtotals	146.006	52.391	266.422	-	266.422

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

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673504 / Propulsion (PP)
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C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy

The C2D2 acquisition strategy is to employ both Cost and Fixed Price Incentive contracts for the Block 4 engineering and development efforts. A new modernization contract structure will be established for all post SDD Block 4 efforts. In addition, a separate Basic Ordering Agreement or Indefinite Quantity/Indefinite Delivery contract is planned to provide a long term approach to upgrading and maintaining laboratories and test aircraft and supporting technology maturation for future C2D2 capabilities.

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673504 / Propulsion (PP)
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FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

673504	
P&W Flight Test	
2 DT Engine Purchase Inc 3	
1 Flight Test DT Engine Purchase	
DevSecOps Emulation Lab for Full Authority Digital Engine Control (FADEC)	
F135 Engine Modernization	
Engine Signature Predictor (ESP)	

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673504 / Propulsion (PP)
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
673504				
P&W Flight Test	1	2022	1	2027
2 DT Engine Purchase Inc 3	1	2022	4	2022
1 Flight Test DT Engine Purchase	1	2022	4	2023
DevSecOps Emulation Lab for Full Authority Digital Engine Control (FADEC)	1	2022	4	2023
F135 Engine Modernization	1	2022	4	2028
Engine Signature Predictor (ESP)	1	2023	1	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673505 / Maintenance Systems (MxS)
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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
673505: Maintenance Systems (MxS)	-	44.064	49.836	42.044	0.000	42.044	33.681	30.494	29.845	30.924	0.000	260.888
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Autonomic Logistics Information System (ALIS) is the current F-35 program solution for delivering core maintenance and logistics information solutions to F-35 warfighters. ALIS will continue to deliver the core logistics and maintenance infrastructure requirements for the F-35 enterprise as ALIS evolves into Operational Data Integrated Network (ODIN). ALIS includes features such as aircraft scheduling, training delivery, record keeping, technical data delivery, supply chain management, maintenance management, pilot and maintenance debriefing, and mission planning. Current ALIS development efforts are focused on low cost and high return investments that provide a high confidence return on investment in the short term, significant warfighter impact, and/or offer synergy with ODIN development efforts.

ODIN will incrementally provide a modern, user-friendly integrated information system for the F-35 to deliver core maintenance and logistics information solutions. ODIN will be comprised of multiple elements to include modern hardware, architectures, software development methods, data environments, and platforms. Leveraging agile and modern software development practices, ODIN will serve as the primary logistics tool to support F-35 warfighter operations, health and diagnostics, mission planning, supply chain management, maintenance, and training. ODIN will substantially decrease F-35 administrator and maintainer workload, increase readiness rates for all F-35 variants, and allow software engineers to rapidly develop and deploy updates in response to changing warfighter requirements and improve data management, quality, and integrity. The ALIS to ODIN transition is intended to enable holistic fleet management, improve performance, enhance readiness, and reduce costs to the F-35 program. ODIN is comprised of both hardware and software which support the flow of Unclassified and Classified aircraft and maintenance-related data.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY22, \$54.5M was expended for civilian pay expenses in this project element, and in FY23, \$58.7M is forecasted for civilian pay expenses in this project element.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Operational Data Integrated Network (ODIN)	42.164	48.836	42.044	0.000	42.044
Description: ODIN will incrementally provide a modern, user-friendly integrated information system for the F-35 to deliver core maintenance and logistics information solutions. ODIN will be comprised of multiple elements to include modern hardware, architectures, software development methods, data environments, and platforms. Leveraging agile and modern software development practices, ODIN will serve as the primary logistics tool to support F-35 warfighter operations, health and diagnostics, mission planning, supply chain management,					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673505 / Maintenance Systems (MxS)

B. Accomplishments/Planned Programs (\$ in Millions)

maintenance, and training. ODIN will substantially decrease F-35 administrator and maintainer workload, increase readiness rates for all F-35 variants, and allow software engineers to rapidly develop and deploy updates in response to changing warfighter requirements and improve data management, quality, and integrity. The ALIS to ODIN transition is intended to enable holistic fleet management, improve performance, enhance readiness, and reduce costs to the F-35 program. ODIN is comprised of both hardware and software which support the flow of Unclassified and Classified aircraft and maintenance-related data.

FY 2023 Plans:

Continue to modernize and reduce sustainment costs of the F-35 logistics information system by delivering incremental capabilities to transition aircraft, data, and operations from ALIS to ODIN. Initiate next-gen ODIN hardware refresh analysis and trade studies to support targeted five year hardware replacement. Implement the ODIN cloud-based infrastructure, migrate ALIS development into the government managed cloud environment, and begin transition to the new ODIN Enterprise Architecture. Continue modernization of the ODIN data architecture and implementation of the government managed ODIN data processing, analytics and archive environment. Efforts will continue in cybersecurity survivability and development of user-focused training. Execute efforts continuing to modernize current applications where applicable, leveraging commercial and government off the shelf and maximizing re-use from existing US Services logistics modernization efforts.

FY 2024 Base Plans:

Complete ALIS to ODIN software containerization efforts and development of foundational infrastructure for software and data modernization to increase user capability. Continue development of the Linux platform and ODIN data architecture. Finalize current generation hardware update. Continue analysis of alternatives on next-generation hardware tech insertion supporting ODIN development and test plan as well as capability requirements that are not currently encompassed in the baseline equipment. Optimize the ODIN cloud-based infrastructure while continuing migration and modernization of the ODIN enterprise. Leverage the establishment of modern software architecture from Unclassified development efforts to develop and release the Classified portion of the F-35 Maintenance Systems ODIN enterprise. Develop and deploy improved capabilities to replace legacy applications.

FY 2024 OCO Plans:

N/A

FY 2023 to FY 2024 Increase/Decrease Statement:

FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force	Date: March 2023
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673505 / Maintenance Systems (MxS)
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Funding decreased due to a periodic ramp down in hardware development as requirements are finalized following FY2023 current generation hardware development efforts.					
<p>Title: Prognostics and Health Management (PHM)</p> <p>Description: Prognostics and Health Management (PHM) encompasses the Air-System set of software, technical data and capabilities to enable optimal maintenance, and resolution of aircraft failures and impending failures. On-aircraft software identifies failures, enables reporting of status to the pilot, and records data for life cycle management and sustaining engineering. The data processed by ALIS/ODIN supports maintenance debriefs, life cycle management via Assess Material Condition (AMC), and failure resolution via Health Reporting Codes (HRCs) and Anomaly and Failure Resolution System (AFRS). Maintenance performance (inclusive of reliability and maintainability) is enhanced via the collection and reporting of the Failure Reporting and Corrective Action System (FRACAS). Applied advanced analytics on the aggregate PHM is used for airframe lifing and enterprise use, and improves responsiveness to operational needs.</p> <p>FY 2023 Plans: Finalize development of PHM failure resolution improvements by analyzing AFRS technical data, as identified by the associated affordability war room initiatives and Performance-to-Plan metrics, and AMC algorithm development and implementation. Finalize development of government-hosted PHM data storage and analytics infrastructure. Finalize Systems Engineering and architecture development of PHM Downlink capability.</p> <p>FY 2024 Base Plans: N/A</p> <p>FY 2024 OCO Plans: N/A</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding decreased due to program completion.</p>	1.900	1.000	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	44.064	49.836	42.044	0.000	42.044

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / <i>F-35 C2D2</i>	Project (Number/Name) 673505 / <i>Maintenance Systems (MxS)</i>

D. Acquisition Strategy

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673505 / Maintenance Systems (MxS)
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Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
MxS Prime LM ODIN	C/CPFF	LM; Ft Worth Tx : TBD	-	22.997	Nov 2021	24.218	Nov 2022	23.200	Nov 2023	-		23.200	Continuing	Continuing	-
MxS Prime PW ODIN	C/CPFF	PW; E Hartford, CT : TBD	-	1.970	Nov 2021	4.932	Nov 2022	3.800	Nov 2023	-		3.800	Continuing	Continuing	-
MxS Prime PHM	C/CPFF	LM; Ft Worth Tx : TBD	-	1.900	Nov 2021	1.000	Nov 2022	0.000		-		0.000	Continuing	Continuing	-
Subtotal			-	26.867		30.150		27.000		-		27.000	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
MxS ODIN Development Support	Various	Various : TBD	-	17.197	Nov 2021	19.686	Nov 2022	10.644	Nov 2023	-		10.644	Continuing	Continuing	-
MxS ODIN Development Support - DTIC	Various	DTIC; Ft. Belvoir, VA : TBD	-	-		-		3.000		-		3.000	Continuing	Continuing	-
MxS ODIN Development Support - NIWC	Various	NIWC; Charleston, SC : TBD	-	-		-		1.400		-		1.400	Continuing	Continuing	-
Subtotal			-	17.197		19.686		15.044		-		15.044	Continuing	Continuing	N/A

	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		-	44.064	49.836	42.044	-	42.044	Continuing	Continuing	N/A

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673505 / Maintenance Systems (MxS)
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
673505				
Operational Data Integrated Network (ODIN): Hardware Development	1	2022	4	2024
Operational Data Integrated Network (ODIN): Hardware Development - Next Gen	1	2025	4	2028
Operational Data Integrated Network (ODIN): Software Architecture Development	1	2023	4	2024
Operational Data Integrated Network (ODIN): Software Application Modernization	1	2023	4	2028
Operational Data Integrated Network (ODIN): Software Prototyping	1	2023	3	2025
Operational Data Integrated Network (ODIN): Software Fielding	3	2023	1	2025
Operational Data Integrated Network (ODIN): ALIS Containerization	1	2023	1	2025
Operational Data Integrated Network (ODIN): Platform Development	1	2023	1	2025
Operational Data Integrated Network (ODIN): Platform Development Follow-On	4	2024	4	2028
Operational Data Integrated Network (ODIN): Integrated Data Environment Development	1	2023	4	2026
Operational Data Integrated Network (ODIN): Data Architecture Modernization	1	2023	4	2028
Operational Data Integrated Network (ODIN): Legacy Modernization and Migration	1	2023	1	2025
Operational Data Integrated Network (ODIN): COTS/GOTS Application Configuration, Software Development, and Integration	4	2023	4	2025
Prognostics and Health Management (PHM): PHM Algorithm Development	2	2022	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force										Date: March 2023		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2				Project (Number/Name) 673506 / Combat Data Systems (CDS)			
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
673506: <i>Combat Data Systems (CDS)</i>	-	40.937	53.248	39.496	0.000	39.496	29.902	36.343	39.442	40.871	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Investment and modernization activities required for Block 4 development, integration, test and evaluation of Mission Data Tools, Verification & Validation Systems, and Mission Planning Software/Hardware. Funding related to key deliveries to Electronic Warfare Squadrons and F-35 Operational Squadrons and enables government and contractor labor for mission planning support environment and joint reprogramming enterprise. Other costs support Technology Investment for key Modernization / Innovation activities and cloud-based DevSecOps infrastructure.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY22, \$54.5M was expended for civilian pay expenses in this project element, and in FY23, \$58.7M is forecasted for civilian pay expenses in this project element.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Joint Reprogramming Environment (JRE)	25.059	39.992	29.510	0.000	29.510
<p>Description: JRE is investment and modernization activities required for Block 4 development, integration, test and evaluation of Mission Data Tools, Verification & Validation Systems, and Mission Planning Software/Hardware. Funding related to key deliveries to Electronic Warfare Squadrons and F-35 Operational Squadrons and enables government and contractor labor for mission planning support environment and joint reprogramming enterprise. Other costs support Technology Investment for key Modernization/Innovation activities and Cloud based DevSecOps infrastructure.</p> <p>FY 2023 Plans: Continue efforts for the agile development of Common Reprogramming Tools (CRT) to provide Electronic Warfare Squadrons with essential software tools that reduce Mission Data File (MDF) development time and human error and increase combat effectiveness. The CRT effort will continue software coding and testing to support development/deployment of the software tool. Continue ongoing design and delivery efforts to upgrade RVVS to meet the Block 4 capability requirements and next generation threats. Continue ongoing efforts to support aircraft in relation to TR-3, Continuous Capability Development and Delivery (C2D2), and Network Boundary Consolidation. Continue development support for defining, managing and acquiring the</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673506 / Combat Data Systems (CDS)
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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>Continue development support for defining, managing and acquiring the F-35 Mission Planning capability enhancements identified in approved requirements documents for Block 4 and modernization efforts within the mission planning support hardware and software boundary. Continue development support of the MPSE software suite that is customized for each and every air vehicle Operational Flight Program (OFF) / Software Data Load (SDL) release to support the features and enhancements of that release. Continue development of the F-35 Next Generation Mission Planning (formerly Open Secure Collaboration Architecture (OSCAR)) to: a) Replace the Joint Mission Planning Software (JMPS) framework that is facing end-of-life, increasing cost, decreasing performance, and limited capability growth, and b) Replace the Ground Data Receptacle (GDR) cross-domain solution and encryption/decryption device that has been assessed by the NSA to have high cyber security risks and not able to meet NSA Raise-the-Bar requirements without a complete re-design. Continue ongoing efforts to transition F-35 mission planning software development to Agile and DevSecOps methodologies to reduce costs and increase speed of delivering capabilities to the warfighter. Continue ongoing efforts to transition F-35 mission planning software development workload from contractor to the Government, securing organic software development capability and reducing costs.</p> <p>FY 2024 Base Plans: Continue development support for F-35 Mission Planning capability enhancements identified in approved requirements documents for Block 4 and modernization efforts within the mission planning support hardware and software. Continue development support of the MPSE software suite that is customized for each and every air vehicle OFF/SDL release to support the features and enhancements of that release. Continue development of the F-35 Next Generation Mission Planning. Continue efforts to transition F-35 mission planning software development to Agile and DevSecOps methodologies to reduce costs and increase speed of delivering capabilities to the warfighter. Continue ongoing efforts to transition F-35 mission planning software development workload from contractor to the Government, securing organic software development capability and reducing costs.</p> <p>FY 2024 OCO Plans: N/A</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding decreased due to completion of efforts associated with Government Systems Engineering and Testing, specifically the Partner Analysis Laboratory Operations, Lab Based Security Assessment, and Baseline Performance Measurement</p>					
Accomplishments/Planned Programs Subtotals	40.937	53.248	39.496	0.000	39.496

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673506 / <i>Combat Data Systems (CDS)</i>

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

N/A

Remarks

D. Acquisition Strategy

Combat Data Systems Program Management Office (CDS PMO) continues to develop JRE and MPSE requirements by leveraging existing F-35 Joint Program Office contracts, use of Other Government Contracts, and by developing and competing new contract actions for unique CDS PMO requirements.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673506 / Combat Data Systems (CDS)
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Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
CDS Prime JRE Development - CRT Increment 1	C/CPFF	LM; Ft Worth Tx : TBD	-	5.867	Oct 2021	13.360	Oct 2022	7.102	Dec 2023	-		7.102	Continuing	Continuing	-
CDS Prime JRE Development - RVVS	C/CPIF	LM; Ft Worth Tx : TBD	-	0.000	Jul 2022	14.282	Jul 2023	10.340	Dec 2023	-		10.340	Continuing	Continuing	-
CDS Prime JRE Development - CURC	C/CPFF	LM; Ft Worth Tx : TBD	-	3.588	Oct 2021	-		-		-		-	Continuing	Continuing	-
CDS Prime JRE Development - TR-3	C/CPAF	LM; Ft Worth Tx : TBD	-	2.987	Apr 2022	0.742	Apr 2023	-		-		-	Continuing	Continuing	-
CDS Prime JRE Development - SEIT	C/CPAF	LM; Ft Worth Tx : TBD	-	0.000		2.888	Oct 2022	6.898	Jul 2024	-		6.898	Continuing	Continuing	-
CDS Prime JRE Development - FRL	Various	Various : TBD	-	0.000		0.938	Oct 2022	-		-		-	Continuing	Continuing	-
CDS Prime JRE Development - Capability Development	MIPR	LM; Eglin AFB, FL : TBD	-	2.100	Dec 2021	6.840	Dec 2022	2.780	Dec 2023	-		2.780	Continuing	Continuing	-
CDS Prime MPSE Development F-35 Next Generation Mission Planning	C/CPIF	LM; Ft Worth Tx : TBD	-	11.750	Jul 2022	3.922	Jul 2023	3.922	Mar 2024	-		3.922	Continuing	Continuing	-
CDS Prime MPSE Development - CapabilityDevelopment	Various	Various : TBD	-	0.000		5.908	Oct 2022	5.014	Dec 2023	-		5.014	Continuing	Continuing	-
Subtotal			-	26.292		48.880		36.056		-		36.056	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
CDS JRE Development Support	Various	Various : TBD	-	10.517	Dec 2021	0.942	Dec 2022	2.390	Dec 2023	-		2.390	Continuing	Continuing	-
CDS MPSE Development Support	Various	Various : TBD	-	4.128	Dec 2021	3.426	Dec 2022	1.050	Dec 2023	-		1.050	Continuing	Continuing	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673506 / Combat Data Systems (CDS)
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	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
673506																												
Joint Reprogramming Environment (JRE): Technology Refresh 3 (TR3) Reprogramming LabUpgrade																												
Joint Reprogramming Environment (JRE): Reprogramming Verification & Validation Systems(RVVS): Stimulator Upgrades SLDO 3																												
Joint Reprogramming Environment (JRE): Reprogramming Verification & Validation Systems(RVVS): Stimulator Upgrades Main																												
Joint Reprogramming Environment (JRE): Reprogramming Verification & Validation Systems(RVVS): Long Lead Procurement																												
Joint Reprogramming Environment (JRE): Phase 2.3 - 30P05/30P07 Mission Data Tools -Contract																												
Joint Reprogramming Environment (JRE): 40P02+ Mission Data Tools, Block 4 Hardware, Training																												
Joint Reprogramming Environment (JRE): CRT INC 1 - CRT LOE																												
Joint Reprogramming Environment (JRE): CRT INC 1 - Long Lead Procurement																												
Joint Reprogramming Environment (JRE): CRT INC 1 - CRT INC 1 - Development																												
Mission Planning Support Environment (MPSE): TR-3/Enablers for TR-3 - Contract																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673506 / Combat Data Systems (CDS)
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	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Mission Planning Support Environment (MPSE): TR-3/Enablers for TR-3 - MPSE TR2Configuration																												
Mission Planning Support Environment (MPSE): TR-3/Enablers for TR-3 - MPSE TR3Configuration																												
Mission Planning Support Environment (MPSE): MPSE Re-architecture - Contract																												
Mission Planning Support Environment (MPSE): F-35 Next Gen Mission Planning - PrototypeSLDO																												
Mission Planning Support Environment (MPSE): F-35 Next Gen Mission Planning - Increment1																												
Mission Planning Support Environment (MPSE): F-35 Next Gen Mission Planning - Increment2																												
Mission Planning Support Environment (MPSE): DevSecOps - Hill AFB, China Lake, Pt Mugu																												
Mission Planning Support Environment (MPSE): DevSecOps - NOMS Cloud Development(Multiple)																												
Mission Planning Support Environment (MPSE): OGCs - Contracts																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673506 / Combat Data Systems (CDS)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
673506				
Joint Reprogramming Environment (JRE): Technology Refresh 3 (TR3) Reprogramming LabUpgrade	1	2022	2	2023
Joint Reprogramming Environment (JRE): Reprogramming Verification & Validation Systems(RVVS): Stimulator Upgrades SLDO 3	1	2022	3	2022
Joint Reprogramming Environment (JRE): Reprogramming Verification & Validation Systems(RVVS): Stimulator Upgrades Main	4	2022	4	2024
Joint Reprogramming Environment (JRE): Reprogramming Verification & Validation Systems(RVVS): Long Lead Procurement	1	2022	3	2023
Joint Reprogramming Environment (JRE): Phase 2.3 - 30P05/30P07 Mission Data Tools -Contract	1	2022	4	2023
Joint Reprogramming Environment (JRE): 40P02+ Mission Data Tools, Block 4 Hardware, Training	3	2023	4	2028
Joint Reprogramming Environment (JRE): CRT INC 1 - CRT LOE	2	2022	2	2022
Joint Reprogramming Environment (JRE): CRT INC 1 - Long Lead Procurement	1	2022	2	2022
Joint Reprogramming Environment (JRE): CRT INC 1 - CRT INC 1 - Development	1	2022	2	2024
Mission Planning Support Environment (MPSE): TR-3/Enablers for TR-3 - Contract	1	2022	2	2023
Mission Planning Support Environment (MPSE): TR-3/Enablers for TR-3 - MPSE TR2Configuration	1	2022	4	2028
Mission Planning Support Environment (MPSE): TR-3/Enablers for TR-3 - MPSE TR3Configuration	1	2023	4	2028
Mission Planning Support Environment (MPSE): MPSE Re-architecture - Contract	3	2023	4	2028
Mission Planning Support Environment (MPSE): F-35 Next Gen Mission Planning - PrototypeSLDO	1	2022	1	2022

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673506 / <i>Combat Data Systems (CDS)</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Mission Planning Support Environment (MPSE): F-35 Next Gen Mission Planning - Increment1	1	2022	2	2023
Mission Planning Support Environment (MPSE): F-35 Next Gen Mission Planning - Increment2	4	2022	3	2026
Mission Planning Support Environment (MPSE): DevSecOps - Hill AFB, China Lake, Pt Mugu	1	2022	4	2026
Mission Planning Support Environment (MPSE): DevSecOps - NOMS Cloud Development(Multiple)	1	2022	4	2022
Mission Planning Support Environment (MPSE): OGCs - Contracts	1	2022	4	2028

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force										Date: March 2023		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2				Project (Number/Name) 673507 / Training Systems & Simulation			
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
673507: Training Systems & Simulation	-	78.972	74.619	61.472	0.000	61.472	54.890	62.451	68.237	70.707	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The F-35 Training Systems & Simulation Program Management Office (TSS PMO) development portfolio is aligned with the program's Continuous Capability Development & Delivery (C2D2) efforts and is organized in three primary lines of effort; Training System Capability Development (TSCD), Training Systems Investments (TSI) Roadmap, and Joint Simulation Environment (JSE) Development. As a function of the F-35 organizational pivot, this is the first budget cycle in which TSS PMO budget requirements have been comprehensively and discretely defined within a dedicated Project Unit.

Training System Capability Development (TSCD): Efforts will continue with a primary focus on alignment of Training System capabilities with other elements of the Air System. Specific efforts will include development of Block 4 capabilities to equivalent maturity of those in the Air Vehicle enabling release of one capability upgrade per year to the fleet, continued development of the Production Runtime Server (PRTS) - Pilot Training Device TR-3 equivalent - to enable Block 4 capabilities, continued development of Live-Virtual-Constructive (LVC) capabilities including Distributed Mission Training (DMT), and appropriate lab infrastructure to enable Training System development.

Training Systems Investments (TSI) Roadmap: Development efforts will continue to focus on modernization of activities outlined in the TSS PMO roadmaps that will target the requirement of bringing higher fidelity training to the warfighter. Specific development and testing efforts focus on software architecture modernization, hardware architecture modernization, and Synthetic Threat Enhancement.

Joint Simulation Environment (JSE): Development and testing efforts will continue with a focus on remaining F-35 In-A-Box (FIAB) software integration, complex threat/sensor model integration to establish operationally representative simulation environment required for operational test trial validity, and the completion of Verification, Validation and Accreditation (VV&A) activities for F-35 Block 4 modernization. Efforts will include FIAB development, model fidelity and capability upgrades for existing threats/sensors/weapons, development of new threat/sensor/weapon models, and environment upgrades to enable effective verification of Block 4 capabilities. Efforts will continue toward expansion of JSE capability to Wright Patterson AFB, Edwards AFB and Nellis AFB.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY22, \$54.5M was expended for civilian pay expenses in this project element, and in FY23, \$58.7M is forecasted for civilian pay expenses in this project element.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Training Systems Capability Development (TSCD)	51.031	36.602	31.000	0.000	31.000

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673507 / Training Systems & Simulation

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>Description: The F-35 Training Systems & Simulation Program Management Office (TSS PMO) development portfolio is aligned with the program's Continuous Capability Development & Delivery (C2D2) efforts and is organized in three primary lines of effort; Training System Capability Development (TSCD), Training Systems Investments (TSI) Roadmap, and Joint Simulation Environment (JSE) Development. As a function of the F-35 organizational pivot, this is the first budget cycle in which TSS PMO budget requirements have been comprehensively and discretely defined within a dedicated Project Unit.</p> <p>FY 2023 Plans: Efforts will continue to support development, integration and test of Block 4 capabilities in the Training System with a focus on equivalent capability maturity between the Training System and other elements of the Air System and preparing a relevant capability upgrade (Pilot Training, Maintainer Training, Instructional Products) for release to the fleet in FY2023. Additionally, PRTS will continue critical development, integration and test activities required to enable Block 4 training capabilities. The DMT program will continue with development activities to ensure DMT capability remains fully integrated with Capability Increments 1-3 (CI1-3) capabilities and in-line with overall Air System capability to include certified and exportable Cross Domain Solutions (CDS) to enable fully integrated DMT across the F-35 Enterprise. Within the LVC portfolio, requirements derivation and planning activities for Enhanced Embedded Training and TCTS II integration will continue to evolve. Training System lab infrastructure assets will be configured to enable current and future Training System development activities across the portfolio.</p> <p>FY 2024 Base Plans: Efforts will continue to support development, integration and test of Block 4 capabilities in the Training System with a focus on equivalent capability maturity between the Training System and other elements of the Air System and preparing relevant capability upgrades (Pilot Training, Maintainer Training, Instructional Products) for release to the fleet in FY2024. Additionally, the Production RunTime Server (PRTS) will continue critical development, integration and test activities required to enable TR-3 training capabilities. The Distributed Mission Trainer (DMT) Program will continue with development activities to ensure DMT can support the CI1-3 capabilities to be leveraged via US networks and in-line with overall Air System Capability to include certified and exportable Cross Domain Solutions (CDS) to enable fully integrated DMT across the F-35 Enterprise. Within the Live-Virtual-Constructive (LVC) portfolio, requirements derivation and planning activities for Enhanced Embedded Training and TCTS II integration will continue to evolve to support the US Service's LVC integrated training environment. Training System lab infrastructure assets will be configured to enable current and future Training System development activities across the portfolio. Effects Based Simulation (EBS) will continue design, development, and integration activities to support requirements analysis and pilot training tasks. EBS</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673507 / Training Systems & Simulation

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>was formerly carried as an effort in the Joint Simulation Environment (JSE) R-2A category, but was aligned to the Training System Capability Development (TSCD) R-2A category beginning in FY23.</p> <p>FY 2024 OCO Plans: N/A</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding decreased due to the delayed Training System transition from TR-2 to TR-3. Because of delays with the Training System hardware and software architecture modernization that is required to field TR-3 OFPs, and because the initial TR-3 OFPs are rehosts of TR-2 capabilities, the Training System is not delivering a new software load to support the initial TR-3 series OFPs. The Training System will again align to the Air Vehicle in Lot 17.</p>					
<p>Title: Training Systems Investments (TSI) Roadmap</p> <p>Description: Training Systems Investments (TSI) Roadmap: Development efforts will continue to focus on modernization of activities outlined in the TSS PMO roadmaps that will target the requirement of bringing higher fidelity training to the warfighter. Specific development and testing efforts focus on software architecture modernization, hardware architecture modernization, and Synthetic Threat Enhancement.</p> <p>FY 2023 Plans: Efforts will continue to support development, integration and test of Block 4 capabilities in the Training System with a focus on equivalent capability maturity between the Training System and other elements of the Air System and preparing a relevant capability upgrade (Pilot Training, Maintainer Training, Instructional Products) for release to the fleet in FY2023. Additionally, PRTS will continue critical development, integration and test activities required to enable Block 4 training capabilities. The DMT program will continue with development activities to ensure DMT capability remains fully integrated with C11-3 capabilities and in-line with overall Air System capability to include certified and exportable Cross Domain Solutions (CDS) to enable fully integrated DMT across the F-35 Enterprise. Within the LVC portfolio, requirements derivation and planning activities for Enhanced Embedded Training and TCTS II integration will continue to evolve. Training System lab infrastructure assets will be configured to enable current and future Training System development activities across the portfolio.</p> <p>FY 2024 Base Plans: Efforts will continue to support analysis, design, development, integration and test of Block 4 capabilities in the Training System with a focus on equivalent capability maturity between the Training System and other elements of the Air System and preparing relevant capability upgrades (Pilot Training, Maintainer Training, Instructional</p>	9.993	13.687	12.500	0.000	12.500

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673507 / Training Systems & Simulation

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>Products) for release to the fleet in FY24. Additionally, F-35 Lightning Integrated Training Environment (FLITE) will continue critical development, integration and test activities with the first delivery expected in FY26. The Distributed Mission Training (DMT) Program will continue with development activities to ensure DMT can support the C11-3 capabilities to be leveraged via US networks and in-line with overall Air System Capability to include certified and exportable Cross Domain Solutions (CDS) to enable fully integrated DMT across the F-35 Enterprise. DMT will ensure the connection of F-35 Pilot Training Devices (PTDs) to customer provided and accredited Wide Area Networks (WAN) to facilitate connecting multiple sites and enabling a virtual training environment in a common synthetic environment for the US Services; Within the Live-Virtual-Constructed (LVC) portfolio, requirements derivation and planning activities for Enhanced Embedded Training and TCTS II integration will continue to evolve to support the US LVC integrated training environment.</p> <p>FY 2024 OCO Plans: N/A</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding decreased due to delays in the integration efforts of Joint Simulation Environment components, specifically Next Generation Threat System (NGTS), into the exportable Program of Record (PoR) Pilot Training Device (PTD).</p>					
<p>Title: Joint Simulation Environment (JSE) Development</p> <p>Description: Joint Simulation Environment (JSE): Development and testing efforts will continue with a focus on remaining F-35 In-A-Box (FIAB) software integration, complex threat/sensor model integration to establish operationally representative simulation environment required for operational test trial validity, and the completion of Verification, Validation and Accreditation (VV&A) activities for F-35 Block 4 modernization. Efforts will include FIAB development, model fidelity and capability upgrades for existing threats/sensors/weapons, development of new threat/sensor/weapon models, and environment upgrades to enable effective verification of Block 4 capabilities. Efforts will continue toward expansion of JSE capability to Wright Patterson AFB, Edwards AFB and Nellis AFB.</p> <p>FY 2023 Plans: Efforts will continue with a focus on the completion of IOT&E operational test trails through completion of Run-for-Score events. Efforts will include testing and evaluation of FIAB software developments for integration, threat/weapon/sensor model fidelity upgrades, and JSE upgrades to enable effective verification of Block 4 capabilities.</p> <p>FY 2024 Base Plans:</p>	17.948	24.330	17.972	0.000	17.972

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force	Date: March 2023
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673507 / Training Systems & Simulation
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B. Accomplishments/Planned Programs (\$ in Millions)

Efforts will include modernization of F-35 In-A-Box (FIAB) software development and integration, model fidelity and capability upgrades for existing threats/sensors/weapon models, development of new threat/sensor/weapon models, and environment upgrades to enable effective verification of Block 4 capabilities. Planning efforts will continue toward expansion of JSE capability to Wright Patterson AFB, Edwards AFB, and Nellis AFB.

FY 2024 OCO Plans:
N/A

FY 2023 to FY 2024 Increase/Decrease Statement:
Funding decreased due to on-going FIAB Block 4 development, integration activities and development of new threats/ weapons models being extended due to contractor manpower constraints, the restructure of JPO contracts and the continuation of FIAB data rights litigation and licensing issues preventing documentation and software deliveries.

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Accomplishments/Planned Programs Subtotals	78.972	74.619	61.472	0.000	61.472

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

N/A

Remarks

D. Acquisition Strategy

The majority of Training System capability development requirements (CI1-3 development, PRTS development, Lab Infrastructure) will be executed via training specific CLINs in Enterprise-level development contracts (Block 4 - Phase 2.3, Development Foundation). Training System Investment requirements will be executed via a combination of training specific CLINs in Enterprise-level contracts, TSS PMO specific contract actions and Other Transaction Authority (OTA) contracts. JSE development requirements will be executed via a combination of Enterprise-level contract actions and MIPR transactions to support OGC activities.

In concert with continued maturation of the F-35 organizational pivot, the TSS PMO acquisition strategy will transition toward TSS PMO controlled contract actions that will enable more effective oversight of PMO cost-schedule-performance execution.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673507 / Training Systems & Simulation
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Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
TSS Prime Training System Alignment (TSCD)	C/CPIF	Lockheed Martin : Ft. Worth, TX	-	24.632	Nov 2021	11.926	Nov 2022	11.946	Nov 2023	-		11.946	Continuing	Continuing	156.494
TSS Prime PTD TR-3 Development (TSCD)	C/CPIF	Lockheed Martin : Ft. Worth, TX	-	10.198	Nov 2021	13.079	Nov 2022	9.546	Nov 2023	-		9.546	Continuing	Continuing	87.945
TSS Prime Training Lab Infrastructure (TSCD)	C/CPFF	Lockheed Martin : Ft. Worth, TX	-	14.815	Nov 2021	8.897	Nov 2022	7.323	Nov 2023	-		7.323	Continuing	Continuing	73.316
TSS Live-Virtual-Constructive (LVC) - DMT (TSCD)	C/CPFF	Lockheed Martin : Ft. Worth, TX	-	1.250	Nov 2021	1.500	Nov 2022	0.958	Nov 2023	-		0.958	Continuing	Continuing	35.389
TSS Effects Based Simulation Development (TSCD)	C/CPFF	J.F. Taylor Inc. : Lexington Park, MD	-	-		1.200	Nov 2022	1.227	Nov 2023	-		1.227	Continuing	Continuing	15.258
TSS Hardware Re-architecture (TSI)	Various	Not specified. : TBD	-	2.143	Nov 2021	6.663	Nov 2022	5.770	Nov 2023	-		5.770	Continuing	Continuing	20.223
TSS Software Re-architecture (TSI)	C/CPIF	Lockheed Martin : Ft. Worth, TX	-	7.500	Nov 2021	6.495	Nov 2022	4.738	Nov 2023	-		4.738	Continuing	Continuing	46.379
TSS Synthetic Threat Enhancement (TSI)	C/CPFF	Lockheed Martin : Ft. Worth, TX	-	0.350	Nov 2021	0.529	Nov 2022	1.992	Nov 2023	-		1.992	Continuing	Continuing	16.664
TSS JSE Prime FIAB Development	C/CPIF	Lockheed Martin : Ft. Worth, TX	-	7.146	Nov 2021	10.421	Nov 2022	8.617	Nov 2023	-		8.617	Continuing	Continuing	55.394
TSS JSE VWC Development	Various	Various : TBD	-	0.000	Nov 2021	-		-		-		-	Continuing	Continuing	7.592
Subtotal			-	68.034		60.710		52.117		-		52.117	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
TSS JSE Pax Development Support	MIPR	NAWCAD : NAS Patuxent River, MD	-	9.034	Nov 2021	11.823	Nov 2022	7.687	Nov 2023	-		7.687	Continuing	Continuing	50.892
TSS JSE Other Development Support	Various	Various : TBD	-	1.768	Nov 2021	2.086	Nov 2022	1.668	Nov 2023	-		1.668	Continuing	Continuing	5.063

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673507 / Training Systems & Simulation
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FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

673507	
Training System Capability Development	
Training System Lab Infrastructure	
Production Run-Time Server (PRTS) TR-3 Development	
Effects Based Simulation (EBS) Capability Development	
Distributed Mission Training (DMT)	
F-35 Lightning Integrated Training Environment (FLITE)	
Weapon Service Development	
Common Training Services	
Synthetic Threat Enhancement	
Joint Simulation Environment, Capability Development & Air System Alignment	
JSE IOT&E Execution	
JSE Block 4 Capability Development	
F-35 In-A-Box (FIAB) Block 4 Capability Development	

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673507 / Training Systems & Simulation

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
673507				
Training System Capability Development	1	2022	4	2028
Training System Lab Infrastructure	1	2022	4	2028
Production Run-Time Server (PRTS) TR-3 Development	1	2022	3	2025
Effects Based Simulation (EBS) Capability Development	1	2022	4	2028
Distributed Mission Training (DMT)	1	2022	4	2028
F-35 Lightning Integrated Training Environment (FLITE)	1	2022	3	2025
Weapon Service Development	1	2022	3	2025
Common Training Services	1	2022	3	2025
Synthetic Threat Enhancement	1	2024	3	2026
Joint Simulation Environment, Capability Development & Air System Alignment	1	2022	4	2028
JSE IOT&E Execution	1	2022	4	2023
JSE Block 4 Capability Development	1	2023	4	2028
F-35 In-A-Box (FIAB) Block 4 Capability Development	1	2023	4	2028

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673508 / Infrastructure & Support Costs
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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
673508: Infrastructure & Support Costs	-	67.860	74.101	73.600	0.000	73.600	75.456	78.847	80.878	83.804	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY2022, Infrastructure and Support Costs was established as a separate, distinct project within the Continuous Capability Development & Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from Project Units 3410 (USMC) 2936 (USN) and 675346 (USAF), which is still included at the end of the R-2A for fiscal years FY2021. This Project Unit has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2024 request.

A. Mission Description and Budget Item Justification

The F-35 Joint Program Office equips U.S. and allied forces with operational F-35 weapon systems in support of military and national security operations. The acquisition and product support workforce provides cutting edge weapon systems, sustainment capabilities, and is charged with providing management, tools, and technical and business capabilities needed to oversee acquisition programs throughout their life cycle. The acquisition workforce funded in this program element will support development phases of acquisition programs to include material solution analysis, technology development, engineering and manufacturing development. This funding does not include costs for base operating support civilian personnel. This program element supports both civilian pay and non-pay support requirements. Additional infrastructure and program management support costs include travel, supplies, contractor support, off-base leases, program office IT, cybersecurity, model-based systems engineering, and risk reduction studies directly related to C2D2 development efforts.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY22, \$54.5M was expended for civilian pay expenses in this project element, and in FY23, \$58.7M is forecasted for civilian pay expenses in this project element.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: F-35 JPO AFLCMC Civilian Pay	0.000	50.862	55.500	0.000	55.500
Description: The acquisition and product support workforce provides cutting edge weapon systems, sustainment capabilities, and is charged with providing management, tools, and technical and business capabilities needed to oversee F-35 acquisition programs throughout its life cycle.					
FY 2023 Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force	Date: March 2023
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673508 / Infrastructure & Support Costs
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
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Continue to fund the F-35 Joint Program Office acquisition and product support workforce.

FY 2024 Base Plans:

Continue to fund the F-35 Joint Program Office acquisition and product support workforce.

FY 2024 OCO Plans:

N/A

FY 2023 to FY 2024 Increase/Decrease Statement:

Funding increased due to actual FY2023 Average Work Year Cost (AWYC) adjustments and/or inflation.

Title: Core Program Support/Contract Support Services (CSS) Support

67.860	23.239	18.100	0.000	18.100
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Description: Includes off-base leases, Advisory and Assistance Services (A&AS), travel, supplies, Navy Working Capital fund subject matter expert support, program office IT, cybersecurity, model-based systems engineering, and risk reduction studies directly related to C2D2 development efforts.

FY 2023 Plans:

Continue to support program office efforts, including Arlington, VA program unique off-base lease costs, CSS support, travel, supplies, Navy working capital technical SME labor, program office IT, cybersecurity, model-based systems engineering, and risk reduction studies directly related to C2D2 development efforts.

FY 2024 Base Plans:

Continue to support program office efforts, including Arlington, VA program unique off-base lease costs, CSS support, travel, supplies, Navy working capital technical SME labor, program office IT, cybersecurity, model-based systems engineering, and risk reduction studies directly related to C2D2 development efforts.

FY 2024 OCO Plans:

N/A

FY 2023 to FY 2024 Increase/Decrease Statement:

Funding decreased due to Air Force investment offset.

Accomplishments/Planned Programs Subtotals	67.860	74.101	73.600	0.000	73.600
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C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673508 / Infrastructure & Support Costs

D. Acquisition Strategy

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673508 / Infrastructure & Support Costs
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Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Core Program Support Cyber Risk Reduction	Various	Various : TBD	-	1.000	Dec 2021	1.200	Dec 2022	1.200	Dec 2023	-		1.200	Continuing	Continuing	-
Core Program Support Model-Based Systems Engineering	Various	Various : TBD	-	0.200	Dec 2021	0.500	Dec 2022	0.500	Feb 2024	-		0.500	Continuing	Continuing	-
Core Program Support Air Worthiness Support and Cyber Safe Support	C/FFP	DTIC : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Subtotal			-	1.200		1.700		1.700		-		1.700	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
F-35 JPO AFLCMC Civilian Pay	MIPR	Wright Patterson AFB, OH : TBD	-	46.862	Oct 2021	50.862	Oct 2022	55.500	Oct 2023	-		55.500	Continuing	Continuing	-
CSS Support/Civ Support	Various	Various : TBD	-	7.070	Dec 2021	7.570	Dec 2022	5.300	Dec 2023	-		5.300	Continuing	Continuing	-
Core Program Support Off-Base Leases	MIPR	WHS : NCR	-	12.228	Oct 2021	12.569	Oct 2022	9.500	Oct 2023	-		9.500	Continuing	Continuing	-
Core Program Support Travel	Various	Various : TBD	-	0.500	Oct 2021	0.900	Oct 2022	1.200	Oct 2023	-		1.200	Continuing	Continuing	-
Core Program Support GPC	Various	GPC - Arlington, VA : TBD	-	-		0.500	Dec 2022	0.400	Oct 2023	-		0.400	Continuing	Continuing	-
Subtotal			-	66.660		72.401		71.900		-		71.900	Continuing	Continuing	N/A

	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		-	67.860	74.101	73.600	-	-	73.600	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673508 / Infrastructure & Support Costs
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FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

673508	
Continued JPO Infrastructure and Support Costs	

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673508 / Infrastructure & Support Costs

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
673508				
Continued JPO Infrastructure and Support Costs	1	2023	4	2028

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force										Date: March 2023		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2				Project (Number/Name) 673509 / DevSecOps			
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
673509: DevSecOps	-	25.442	19.871	22.886	0.000	22.886	23.499	24.594	4.406	4.565	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY2022, DevSecOps was established as a separate, distinct project within the Continuous Capability Development & Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from Project 675346, which is still included at the end of the R-2A for fiscal years FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2024 request.

A. Mission Description and Budget Item Justification

The F-35 Software Development, Security & Operations (DevSecOps) Cloud platform environment allows for US Government and contracted software development teams to produce, test and deploy capabilities for F-35 supported Project Management Offices (PMO) and Directorates. This includes providing support to the Combat Data Systems (CDS), Air Vehicle (AV), Maintenance Systems (MxSYS), Propulsion, Training Systems and Simulation (TSS) PMOs, and Directorate of Engineering. The mission of DevSecOps is to provide a centralized F-35 Data repository, a consolidated F-35 software development environment, and support for system development lifecycle (SDLC) of the F-35 platform, allowing for rapid release cycles to keep the F-35 ahead of its adversaries. Investment in, and modernization of, DevSecOps include efforts to support F-35 Software modernization efforts, develop organic government software capabilities, support SDLC and flight-testing capabilities, enhance the security posture of the software development pipeline, and support goals of reducing long-term on-premise infrastructure environments cost, ultimately resulting in reducing fleet delivery timelines.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY22, \$54.5M was expended for civilian pay expenses in this project element, and in FY23, \$58.7M is forecasted for civilian pay expenses in this project element.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: DevSecOps Support	25.442	19.871	22.886	0.000	22.886
Description: Continue development and support for DevSecOps infrastructure, platform, software development pipeline, and joint F-35 organizational connections. Continue to develop a transition plan to stand-up a team consisting of industry and government software development in support of software modernization and DevSecOps Cloud transition. Establish initial capabilities and expand existing software development efforts with the goal of transitioning dispersed and separated software development environments into model-based systems engineering and a fully collaborative requirements to development environment. Capabilities include software development environment for Maintenance Systems ODIN, ALIS to ODIN migration, Combat Data System's					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force	Date: March 2023
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673509 / DevSecOps
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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>Mission Planning, Propulsion's Offboard Management System, and Air Vehicle Mission System domains. Additional goals of delivering flight-worthy rapid prototyping of capability, virtual test capability, and transitioning workloads to lower cost software sustainment efforts. New requirements from PMOs are expected. Prepare environment for on-boarding, as well as transitioning the PMOs from separate pillars to a centralized JPO-managed cloud environment. Includes software licensing for PMO tool sets and associated applications. Major cost drivers include requirements tool, and collaboration tools, authentication tools - supporting Single Sign On, Multi-Factor Authentication and development tools. For software tooling efforts, working towards an eventual consolidation of tools across the PMOs (i.e., application rationalization) with an end goal of a standardized compiler tool sets and Cybersecurity compliance. Accordingly, talent/consumption (hardware and software to run the environment) contracts must be renewed and expanded. Cybersecurity requirements must also be met, meaning additional resources for security processes, monitoring, scanning, vulnerability identification plus mitigation, and meeting all requirements for DoD compliance to obtain ongoing/continuous Authority to Operate (ATO) and continuous Authority to Operate (cATO).</p> <p>FY 2023 Plans: Mature DevSecOps environment into an operational platform for F-35 Software Development supporting US Government, contracted and partner nation applications plus Project Management Offices (PMO) software application development, model-based system engineering. Continue transition of PMOs into centralized JPO-managed cloud environment. Continue obtaining appropriate software Cloud development environment, talent, licensing and tools. Maintain Cloud, talent and consumption contracts. Continue meeting cyber security requirements. Develop continuous Authority to Operate (cATO) DevSecOps pipeline and tools to meet compliance requirements and software modernization initiatives for all DevSecOps environments.</p> <p>FY 2024 Base Plans: Continue development and support for DevSecOps infrastructure, platform, software development pipeline, and joint F-35 organizational connections. Continue to develop a transition plan to stand-up a team consisting of Industry and Government personnel in support of software modernization and DevSecOps Cloud transition. Establish initial capabilities and expand existing software development efforts with the goal of transitioning dispersed and separated software development environments into model based systems engineering and fully collaborative requirements to development environment. Capabilities include software development environment for Maintenance Systems ODIN, ALIS to ODIN transition, Combat Data System's Mission Planning, Propulsion's Offboard Management System, and Air Vehicle Mission System domains. Additional goals of delivering flight-worthy rapid prototyping of capability, virtual test capability, and transitioning workloads to lower cost software sustainment efforts. New requirements from PMOs are expected. The team will prepare the environment for on-</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673509 / DevSecOps

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>boarding, as well as transition the PMOs from separate pillars to a centralized JPO-managed cloud environment. Major cost drivers include requirements, collaboration, and authentication tools - supporting Single Sign On, Multi-Factor Authentication and development tools. For software tooling efforts, working towards an eventual consolidation of tools across the PMOs (i.e. application rationalization) with an end goal of standardized compiler tool sets and Cybersecurity compliance. Accordingly, talent/consumption (hardware and software to run the environment) contracts must be renewed and expanded. Cybersecurity requirements must also be met, meaning additional resources for security processes, monitoring, scanning, vulnerability identification plus mitigation, and meeting all requirements for DoD compliance to obtain ongoing Authority to Operate (ATO) and cATO.</p> <p>FY 2024 OCO Plans: N/A</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increased due to the emerging requirements to move DevSecOps development to a centralized Cloud environment and an update to the Cloud estimate based on component and service data actuals.</p>					
Accomplishments/Planned Programs Subtotals	25.442	19.871	22.886	0.000	22.886

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

N/A

Remarks

D. Acquisition Strategy

The DevSecOps Phase 1 demonstrates prototype designs, integration of Defense Industry Base partners and PMOs, appropriate set of technology stacks to be integrated, identifying ROI and buying down technical risk. Technology maturation: putting in place the necessary contracts for talent, licenses and Cloud consumption to support software pipeline delivery for F-35. Development; building, testing and deploying Cloud ecosystems Impact Level (IL) 2 - 6+ and software development pipeline utilizing contracted and government support. Operation and Support; maintain Cloud ecosystem utilizing industry research, resources, talent and technology modernization methodologies with the focus on reducing long-term costs for the program.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673509 / DevSecOps
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Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Dev Ops Development Support - Talent	C/FFP	Various : TBD	-	16.000	Dec 2021	10.021	Dec 2022	12.034	Jan 2024	-		12.034	Continuing	Continuing	-
Dev Ops Development Support - Licenses	C/FFP	August Schell Enterprises : TBD	-	3.642	Oct 2021	5.250	Oct 2022	5.452	Jun 2024	-		5.452	Continuing	Continuing	-
Dev Ops Development Support - Cloud Support	C/FFP	Amazon Web Services : TBD	-	5.800	Oct 2021	2.850	Oct 2022	2.700	Dec 2023	-		2.700	Continuing	Continuing	-
Dev Ops Development Support - Industry Stand-up	C/FFP	TBD : TBD	-	-		1.750	Mar 2023	2.700	Mar 2024	-		2.700	Continuing	Continuing	-
Subtotal			-	25.442		19.871		22.886		-		22.886	Continuing	Continuing	N/A

Remarks
DevSecOps Ecosystem Standup used for centralized software development in JPO-managed cloud.

	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	-	25.442	19.871	22.886	-	22.886	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673509 / DevSecOps
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FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Project Milestones																												
Contract Award: DevSecOps Infrastructure/ Platform/Tools																												
Contract Award: DevSecOps FENCES																												
Contract Award: DevSecOps Cloud																												
Contract Award: DevSecOps Industry Standup																												
System Development																												
AWS Impact Level 2 Research, Development and Test																												
AWS Impact Level 5 Buildout																												
AWS Impact Level 5 Research, Development and Test																												
AWS Impact Level 6 Buildout																												
AWS Impact Level 6 Research, Development and Test																												
AWS Impact Level 6+ (SAP) Buildout																												
AWS Impact Level 6+ (SAP) Research, Development and Test																												
Data Transfer as a Service																												
Cloud Gateway (Collateral) LM Connection																												
Cloud Gateway (Collateral) Research, Development and Test																												
Cloud Gateway (SAP) LM Connection																												
Cloud Gateway (SAP) Research, Development and Test																												
AzureStack Impact Level 6+ (SAP) Buildout																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673509 / DevSecOps
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Project Milestones				
Contract Award: DevSecOps Infrastructure/Platform/Tools	4	2022	2	2026
Contract Award: DevSecOps FENCES	4	2022	2	2026
Contract Award: DevSecOps Cloud	1	2022	2	2026
Contract Award: DevSecOps Industry Standup	4	2022	4	2028
System Development				
AWS Impact Level 2 Research, Development and Test	1	2022	3	2023
AWS Impact Level 5 Buildout	1	2022	1	2022
AWS Impact Level 5 Research, Development and Test	1	2022	4	2023
AWS Impact Level 6 Buildout	1	2022	3	2025
AWS Impact Level 6 Research, Development and Test	4	2022	4	2023
AWS Impact Level 6+ (SAP) Buildout	1	2022	2	2024
AWS Impact Level 6+ (SAP) Research, Development and Test	4	2022	4	2024
Data Transfer as a Service	1	2022	2	2023
Cloud Gateway (Collateral) LM Connection	2	2022	2	2023
Cloud Gateway (Collateral) Research, Development and Test	1	2023	4	2024
Cloud Gateway (SAP) LM Connection	1	2022	3	2025
Cloud Gateway (SAP) Research, Development and Test	2	2022	4	2023
AzureStack Impact Level 6+ (SAP) Buildout	1	2022	1	2024
AzureStack Impact Level 6+ (SAP) Research, Development and Test	3	2022	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force										Date: March 2023		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2				Project (Number/Name) 673510 / <i>Utility and Subsystem Support to Mission Systems</i>			
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
673510: <i>Utility and Subsystem Support to Mission Systems</i>	-	0.000	0.000	16.263	0.000	16.263	27.203	27.306	16.356	10.916	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 7, PE 0604840F, project , PTMS Upgrade, is a new start.

As the United States and its allies add new capabilities to outpace the growing threat of China, increased cooling and electrical power capacity will be required to support these new capabilities. Current power extractions from the current F135 engine before any capability upgrades is reducing engine life. In order to address increased thermal loads from new Mission Systems requirements, an upgrade to the Power Thermal Management System (PTMS) and Fuel Thermal Management System (FTMS) is required.

A. Mission Description and Budget Item Justification

This is a NEW START. Current Mission System planning estimates due to Block 4 capabilities and beyond indicate that additional cooling is required for aircraft beginning in Lot 22 (FY2028). This upgrade/modification consists of an upgrade to the current Honeywell PTMS that includes larger heat exchangers, shifting some systems from the cold liquid loop to the hot liquid loop, increasing system pressure, increasing pump speeds and raising compressor discharge temperatures. This modification upgrades components that are relatively low cost and already at a high technical readiness level. All PTMS changes for this level of cooling would be accomplished within the existing PTMS bay and there are not expected to be any necessary changes to the capacity of the cold liquid loop or the hot liquid loop. This work includes nonrecurring engineering for the development, test, and certification of the upgraded PTMS system to ensure suitable cooling is available for future capacities. The Government has assessed that EMD phase would take 5-6 years.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY22, \$54.5M was expended for civilian pay expenses in this project element, and in FY23, \$58.7M is forecasted for civilian pay expenses in this project element.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: PTMS Upgrade	0.000	0.000	16.263	0.000	16.263
Description: This is a NEW START. Current Mission System planning estimates due to Block 4 capabilities and beyond indicate that additional cooling is required for aircraft beginning in Lot 22 (FY28). This upgrade/modification consists of an upgrade to the current Honeywell PTMS that includes larger heat exchangers,					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673510 / Utility and Subsystem Support to Mission Systems

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>shifting some systems from the cold liquid loop to the hot liquid loop, increasing system pressure, increasing pump speeds and raising compressor discharge temperatures. This modification upgrades components that are relatively low cost and already at a high technical readiness level. All PTMS changes for this level of cooling would be accomplished within the existing PTMS bay and there are not expected to be any necessary changes to the capacity of the cold liquid loop or the hot liquid loop. This work includes nonrecurring engineering for the development, test, and certification of the upgraded PTMS system to ensure suitable cooling is available for future capacities.</p> <p>FY 2023 Plans: N/A</p> <p>FY 2024 Base Plans: The PTMS Upgrade program will begin nonrecurring engineering effort to increase PTMS Upgrade cooling requirements. This work includes the necessary labor and nonrecurring engineering to support development of the cooling PTMS system and a detailed schedule of EMD to include the necessary operational testing and flight tests.</p> <p>FY 2024 OCO Plans: N/A</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increased due to the PTMS Upgrade requirements needed to meet Mission Systems Capabilities.</p>					
Accomplishments/Planned Programs Subtotals	0.000	0.000	16.263	0.000	16.263

<p>C. Other Program Funding Summary (\$ in Millions) N/A</p> <p>Remarks</p> <p>D. Acquisition Strategy N/A</p>

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force			Date: March 2023		
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2		Project (Number/Name) 673510 / Utility and Subsystem Support to Mission Systems	

	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<i>PTMS Upgrade</i>																												
PTMS Upgrade EMD																												
NRE PTMS Upgrade: Production/Mod Retrofit Plan																												
EMD Contract Award																												
PDR																												
CDR																												
Safety of Flight Qualification																												
Full Qualification																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673510 / Utility and Subsystem Support to Mission Systems

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>PTMS Upgrade</i>				
PTMS Upgrade EMD	1	2024	1	2027
NRE PTMS Upgrade: Production/Mod Retrofit Plan	1	2025	1	2027
EMD Contract Award	1	2025	1	2025
PDR	3	2025	3	2026
CDR	3	2026	1	2027
Safety of Flight Qualification	1	2027	1	2027
Full Qualification	1	2028	4	2028

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 674871 / Information Operations Technology
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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
674871: Information Operations Technology	-	0.000	0.000	0.342	0.000	0.342	0.000	0.000	0.000	0.000	0.000	0.342
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
This program, BA 7, PE 0604840F, project , Information Operations Technology, is a new start.

A. Mission Description and Budget Item Justification

This is a New Start to procure Microsoft 365 Enterprise Licensing Upgrades for Improved Zero Trust (ZT) Capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY22, \$54.5M was expended for civilian pay expenses in this project element, and in FY23, \$58.7M is forecasted for civilian pay expenses in this project element.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Information Operations Technology	-	0.000	0.342	-	0.342
Description: This is a New Start to procure Microsoft 365 Enterprise Licensing Upgrades for Improved Zero Trust (ZT) Capabilities.					
FY 2023 Plans: N/A					
FY 2024 Base Plans: This is a New Start to procure Microsoft 365 Enterprise Licensing Upgrades for Improved Zero Trust (ZT) Capabilities.					
FY 2023 to FY 2024 Increase/Decrease Statement: Funding increased due to the New Start to procure Microsoft 365 Enterprise Licensing Upgrades for Improved Zero Trust (ZT) Capabilities.					
Accomplishments/Planned Programs Subtotals	-	0.000	0.342	-	0.342

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 674871 / Information Operations Technology

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

N/A

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force			Date: March 2023				
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2			Project (Number/Name) 674871 / Information Operations Technology		

	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Information Operations Technology																												
Enterprise Software Agreement (ESA)																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 674871 / Information Operations Technology

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Information Operations Technology				
Enterprise Software Agreement (ESA)	1	2024	4	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force										Date: March 2023		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2				Project (Number/Name) 675346 / F-35			
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
675346: F-35	-	0.000	0.000	1.038	0.000	1.038	0.828	0.845	0.863	1.427	0.000	5.001
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2022, PE 0604840F Project 675346 was reduced to zero due to breakout of new Projects per Congressional mandate. In FY2024, a clerical error added civilian pay funding to Project 675346. A tech adjustment will be made to move the FY2024 funding to the Infrastructure & Support Costs Project 673508.

A. Mission Description and Budget Item Justification

F-35 Continuous Capability Development and Delivery (C2D2) provides continuing incremental upgrades of the three F-35 variants and associated ground equipment. Upgrades are essential capabilities for Air Interdiction and Strategic Attack, Close Air Support, Suppression and Destruction of Enemy Air Defenses, Offensive and Defensive Counter Air and expanded Surface Warfare. The C2D2 acquisition strategy is based upon incremental deliveries of capabilities. The strategy includes periodic deliveries with a focus on hardware, tech refresh and software. C2D2 capability planning includes an efficient transition from F-35 SDD to C2D2. As SDD development activities ramp down C2D2 will assume responsibility for improvements and modernization efforts.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Clerical Error for Infrastructure and Support Costs	-	0.000	1.038	-	1.038
Description: In FY2024, a clerical error added civilian pay funding to Project 675346. A tech adjustment will be made to move the funding to the Infrastructure & Support Costs Project 673508.					
FY 2023 Plans: N/A					
FY 2024 Base Plans: In FY2024, a clerical error added civilian pay funding to Project 675346. A tech adjustment will be made to move the funding to the Infrastructure & Support Costs Project 673508.					
FY 2023 to FY 2024 Increase/Decrease Statement: Funding increased due to a clerical error.					
Title: Product Development - Air Vehicle (AV) / Block 4 Planning and Systems Engineering	0.000	0.000	0.000	0.000	0.000
Description: Block 4 Planning and Systems Engineering from preliminary design and requirements decomposition through completion of Developmental Flight Test for all variants of the F-35 aircraft. Modernization efforts include Requirements Decomposition and continuous development and release of capabilities identified as Block 4 upgrades. This is a continuation of the previous Block 4 developmental					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 675346 / F-35

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>contracts, which will include activities leading to successful completion of Developmental Flight Test, to include select facility upgrades required for Block 4 research, development, test and evaluation. Included in Block 4 are upgraded capabilities and continuous improvements to maintain Air System viability against evolving threats indicated in the Electronic Warfare Initial Capabilities Document (ICD), the Fifth Generation Fighter Modernization ICD, and the Block 4 Capability Development Document (CDD), reduce life cycle cost, and improve operational suitability. Continuous risk reduction activities to include Air System Integration, preplanning for subsequent Block 4 Modernization events, and investments to deliver the full Block 4 Air System capabilities as needed. Efforts also included are Advanced Anti-Radiation Guided Missile Extended Range (AARGMER), non-recurring engineering (NRE) for obsolescence, and 6 In The Bay early systems engineering. C2D2 capability planning includes an efficient transition from F-35 System Development and Demonstration (SDD) to C2D2. As SDD development activities ramp down C2D2 will assume responsibility for improvements and modernization efforts.</p> <p>Beginning in FY 2022, Air Vehicle - Block 4 Planning & Sys Eng was established as a separate, distinct project within the Continuous Capability Development & Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for FY 2020 and FY 2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY 2022 request.</p> <p>FY 2023 Plans: N/A</p> <p>FY 2024 Base Plans: N/A</p> <p>FY 2024 OCO Plans: N/A</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: N/A</p>					
<p>Title: AV Product Development - Technology Refresh 3 (TR-3)</p> <p>Description: Technology Refresh 3 (TR-3) conducts post Critical Design Review (CDR) design activities. This effort will develop and deliver a TR-3 system through full flight-worthy certification and production readiness review for Lot 15. The design of TR-3 subsystems Integrated Core Processor (ICP), Aircraft Memory System (AMS), and Panoramic Cockpit Display Electronics Unit and Display Unit (PCD-EU, PCD-DU) configurations will contain new backplane technology, commercial operating systems, and modified middleware necessary</p>	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force	Date: March 2023
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 675346 / F-35
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B. Accomplishments/Planned Programs (\$ in Millions)

to support Block 3F functionality and incorporation of all Block 4 capabilities. This work includes nonrecurring engineering for the developing, test, and certification of the ICP, AMS, PCD-EU, and PCD-DU, and includes processing capacity to ensure long term viability for future capabilities.
Beginning in FY 2022, Air Vehicle - Technology Refresh 3 (TR-3) was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for FY 2020 and FY 2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY 2022 request.

FY 2023 Plans:

N/A

FY 2024 Base Plans:

N/A

FY 2024 OCO Plans:

N/A

FY 2023 to FY 2024 Increase/Decrease Statement:

N/A

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>Title: Infrastructure and Support Costs</p> <p>Description: Funding will support infrastructure investment planning and other test planning activities required for Block 4 development, integration, test and evaluation. Funding related to the Integrated Test Force, government, and contractor labor. Support efforts for airframe, air vehicle systems, air ship integration, mission systems, weapons integration, offboard mission support, autonomic logistics development, joint reprogramming enterprise and modeling and joint simulation environment activities, including Nimble Lightning efforts. Other costs in support of ranges, chase planes and Developmental Test (DT) site operations. USAF only will fund additional Program Management Activities (PMA) to transition to a final hybrid product support integrator (HPSI) which will support sustainment analysis with product support managers, focused on long term strategic planning and transition to a final integrated support plan. Other costs support Technology Investment for Modernization, Cloud based DevSecOps infrastructure, and COCOM Requirements for Coalition Mission Data Files (CMDx) to reduce fratricide in coalition environments. Beginning in FY 2022, Infrastructure and Support Costs was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for FY 2020 and FY 2021. This</p>	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 675346 / F-35

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.</p> <p>FY 2023 Plans: N/A</p> <p>FY 2024 Base Plans: N/A</p> <p>FY 2024 OCO Plans: N/A</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: N/A</p>					
<p>Title: Test and Evaluation (TE)</p> <p>Description: : Integrated Test activities in support of Block 4, to include Lockheed Martin and Pratt & Whitney support at all test sites. Non-recurring engineering required to plan for the service life extension of existing Developmental Test (DT) aircraft and modification necessary to bring DT aircraft fleet to a more production representative and sustainable configuration, and to develop flight test instrumentation and release test software to meet Block 4 requirements. Additional upgrades required to support development and evaluation of improvements driven by changes in the threat environment and as identified in the Electronic Warfare Initial Capabilities Document (ICD), the Fifth Generation Fighter Modernization ICD, and the Block 4 Capability Development Document (CDD). Efforts include non-recurring engineering and procurement of a test article to evaluate service life of F-35B STOVL Aircraft.</p> <p>Beginning in FY 2022, Test and Evaluation (T&E) was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for FY 2020 and FY 2021. This project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY 2022 request.</p> <p>FY 2023 Plans: N/A</p> <p>FY 2024 Base Plans:</p>	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 675346 / F-35

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
N/A					
FY 2024 OCO Plans: N/A					
FY 2023 to FY 2024 Increase/Decrease Statement: N/A					
<p>Title: Maintenance Systems (MxS) Operational Data Integrated Network (ODIN) / Autonomic Logistics Information System (ALIS) Development</p> <p>Description: The F-35 Operational Data Integrated Network (ODIN) is the F-35 program solution for delivering core maintenance and logistics information system solutions to F-35 warfighters. Leveraging agile and modern software development practices, ODIN will replace ALIS to serve as the primary logistics tool to support F-35 warfighter operations, health and diagnostics, mission planning, supply chain management, maintenance, and training. ODIN will substantially decrease F-35 administrator and maintainer workload, increase readiness rates for all F-35 variants, and allow software engineers to rapidly develop and deploy updates in response to changing warfighter requirements and improve data management, quality and integrity. ODIN is intended to provide the data to enable holistic fleet management, improve performance, enhance readiness, and reduce costs to the F-35 program. It comprises both hardware and software, and supports the flow of Unclassified and Classified aircraft and maintenance-related data.</p> <p>Autonomic Logistics Information System (ALIS) will continue to deliver the core logistics and maintenance infrastructure requirements for the F-35 enterprise until ODIN is fielded at all sites. ALIS includes features such as aircraft scheduling, training delivery, record keeping, technical data delivery, supply chain management, maintenance management, pilot and maintenance debriefing, and mission planning. ALIS development is only focused on low cost and high return investments that provide a high confidence return on investment in the short term, significant warfighter impact, and/or offer synergy with ODIN development efforts.</p> <p>Beginning in FY2022, Maintenance Systems (MxS) was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for FY 2020 and FY 2021. This project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY 2022 request.</p> <p>FY 2023 Plans: N/A</p> <p>FY 2024 Base Plans:</p>	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 675346 / F-35			
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
N/A FY 2024 OCO Plans: N/A FY 2023 to FY 2024 Increase/Decrease Statement: N/A					
Title: Combat Data Systems (CDS) Description: Investment and modernization activities required for Block 4 development, integration, test and evaluation of Mission Data Tools, Verification & Validation Systems, and Mission Planning Software/Hardware. Funding related to key deliveries to Electronic Warfare Squadrons and F-35 Operational Squadrons and enables government and contractor labor for mission planning and joint reprogramming enterprise. Beginning in FY 2022, Combat Data Systems (CDS) was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for FY 2020 and FY 2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY 2022 request. FY 2023 Plans: N/A FY 2024 Base Plans: N/A FY 2024 OCO Plans: N/A FY 2023 to FY 2024 Increase/Decrease Statement: N/A	0.000	0.000	0.000	0.000	0.000
Title: Propulsion (PP) Description: Propulsion F135 Block 4 Integrated Flight Test Support includes efforts such as Engine Flight Test, Test Engine Procurements, and other associated government costs. For C2D2 to be able to continue to test all three aircraft variants, propulsion support is required to enable continued flying. Increased flights and flight hours are planned over the next 2 years, requiring elevated propulsion support. All of the current Full Flight Release (FFR) engines supporting Flight Test are at or nearing their life limits, requiring the purchase of new	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 675346 / F-35

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>Initial Service Release (ISR) engines to replace them. This replacement effort is planned to occur over the next few years to enable continued flight capability.</p> <p>Beginning in FY 2022, Propulsion (PP) was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for FY 2020 and FY 2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY 2022 request.</p> <p>FY 2023 Plans: N/A</p> <p>FY 2024 Base Plans: N/A</p> <p>FY 2024 OCO Plans: N/A</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: N/A</p>					
<p>Title: Training Systems (TSS)</p> <p>Description: Training System efforts include continuous development and release of capabilities identified as Block 4 upgrades integral to an aligned Air System. This is a continuation of previous Block 4 developmental efforts, which will include: capability development, architecture upgrades to support capability delivery, enhanced synthetic threat integration, opportunities to leverage JSE investments toward Training System requirements, and facility/lab upgrades required for research, development, test, and evaluation. Included in Block 4 are upgraded capabilities and continuous improvements to maintain Air System viability and alignment against evolving threats indicated in the Electronic Warfare Initial Capabilities Document (ICD), Fifth Generation Fighter Modernization ICD, Block 4 Capability Development Document (CDD), and TSS PMO Roadmap. Distributed Mission Training (DMT) Development and Test from preliminary design through completion of development, testing and fielding of the initial DMT capability for the United States Air Force, United States Navy, and United States Marine Corps. The DMT effort is developing the Joint Interoperability Interface (JII) as the filter for the F-35 simulator to interface with the various network standards. The DMT hardware and software components will be added to the Pilot Training Device (PTD) configuration baseline, yielding a fielded training capability for all F-35 services and customers with distributed training network capability. This is a continuation of previous DMT efforts. Included in DMT are upgraded capabilities and continuous improvements to maintain</p>	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 675346 / F-35
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B. Accomplishments/Planned Programs (\$ in Millions)

Air System viability against evolving threats, reduce life cycle cost, and improve operational suitability. Funding will support hardware purchase and planning for installation and test activities required for DMT development, integration, test, and evaluation. Funding related to contractor labor. Support efforts for Full Mission Simulator, Deployable Mission Rehearsal Trainer, and Tactical Environment Simulator capability developments. The Joint Simulation Environment (JSE) will continue efforts to allow for completion of F-35 IOT&E events at the Patuxent River NAS facility. Efforts to upgrade JSE capabilities at Patuxent River NAS to support future F-35 Block 4 needs will continue and efforts to bring future JSE facilities at Wright Patterson AFB, Edwards AFB, and Nellis AFB online in FY23. Efforts to determine feasibility of integrating the JSE, F-35 In-a-Box (FIAB) and the F-35 Effects Based Simulator (EBS) with F-35 Training software to move towards a common software architecture will begin. F-35 EBS will continue development of unclassified and classified capabilities, and deliver formal software releases to current and new domestic and international partners and stakeholders. Continuation of efforts to support events involving the F-35, including Nimble Lightning, at the Virtual Warfare Center (VWC). Beginning in FY 2022, Training Systems and Simulation (TSS) was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for FY 2020 and FY 2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY 2022 request.

FY 2023 Plans:

N/A

FY 2024 Base Plans:

N/A

FY 2024 OCO Plans:

N/A

FY 2023 to FY 2024 Increase/Decrease Statement:

N/A

Title: DevSecOps

Description: Beginning in FY 2022, DevSecOps was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for FY 2020 and FY 2021. This Project has also been updated to reflect the directed project categories to provide traceability between current

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force	Date: March 2023
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 675346 / F-35
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
execution and the FY 2022 request.					
FY 2023 Plans: N/A					
FY 2024 Base Plans: N/A					
FY 2024 OCO Plans: N/A					
FY 2023 to FY 2024 Increase/Decrease Statement: N/A					
Accomplishments/Planned Programs Subtotals	0.000	0.000	1.038	0.000	1.038

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks
This is a joint program with no executive service. Service Acquisition Executive (SAE) authority alternates between the Department of the Navy and the Department of the Air Force and currently resides with the Navy. The United Kingdom, Italy, Netherlands, Canada, Australia, Denmark, and Norway are participants in the SDD phase of JSF.

D. Acquisition Strategy
The C2D2 acquisition strategy is to employ both Cost and Fixed Price Incentive contracts for the Block 4 engineering and development efforts. A new modernization contract structure will be established for all post SDD Block 4 efforts. In addition, a separate Basic Ordering Agreement or Indefinite Quantity/Indefinite Delivery contract is planned to provide a long term approach to upgrading and maintaining laboratories and test aircraft and supporting technology maturation for future C2D2 capabilities.

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 675346 / F-35
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FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

675346	
Funds allocated to this BPAC in error. Placeholder event.	

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 675346 / F-35

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
675346				
Funds allocated to this BPAC in error. Placeholder event.	1	2024	4	2024