Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force											Date: May 2021	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0604840F / *F-35 C2D2*							
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
Total Program Element	-	624.973	695.869	985.404	0.000	985.404	-	-	-	-	-	-
673501: *Air Vehicle - Tech Refresh 3*	-	0.000	0.000	86.327	0.000	86.327	-	-	-	-	-	-
673502: *Air Vehicle Block 4 Planning & Sys Eng*	-	0.000	0.000	324.233	0.000	324.233	-	-	-	-	-	-
673503: *Test and Evaluation (T&E)*	-	0.000	0.000	262.733	0.000	262.733	-	-	-	-	-	-
673504: *Propulsion (PP)*	-	0.000	0.000	33.091	0.000	33.091	-	-	-	-	-	-
673505: *Maintenance Systems (MxS)*	-	0.000	0.000	50.409	0.000	50.409	-	-	-	-	-	-
673506: *Combat Data Systems (CDS)*	-	0.000	0.000	60.039	0.000	60.039	-	-	-	-	-	-
673507: *Training Systems & Simulation*	-	0.000	0.000	72.712	0.000	72.712	-	-	-	-	-	-
673508: *Infrastructure & Support Costs*	-	0.000	0.000	67.860	0.000	67.860	-	-	-	-	-	-
673509: *DevSecOps*	-	0.000	0.000	28.000	0.000	28.000	-	-	-	-	-	-
675346: *F-35*	-	624.973	695.869	0.000	0.000	0.000	-	-	-	-	-	-

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 Navy, United States Air Force, United States Marine Corps and International Partners countries. There are three variants the F-35A Conventional Takeoff and Landing variant; F-35B Short Take Off and Vertical Landing variant; and the F-35C Aircraft Carrier suitable variant. Maximum commonality among the variants, consistent with National Disclosure Policy, will minimize total air system life cycle costs. Planning and pre-development systems engineering for Block 4 continues as Initial Operational Capability (IOC) is met for each variant during System Development and Demonstration (SDD).

The JSF Continuous Capability Development and 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 serve as the basis for the Block 4 (CDD), staffed through the Air Force Requirements Oversight Council (AFROC) and signed by the USAF Chief of Staff in

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force	Date: May 2021
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*

January 2015. Joint Requirements Oversight Council (JROC) approved the CDD 21 March 2017. Modernization activities in FY2017 and FY2018 included systems engineering, risk reduction, and infrastructure required to deliver full air system Block 4 capabilities to support initial fleet availability of Block 4 upgrades in FY 2020 with the fielding of Auto Ground Collision Avoidance System (AGCAS). Modernization activities in FY2021 and FY2022 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. Total funding for all Service and International Partners is reported at the accomplishment/planned program level since activities support all aircraft variants. Foreign Military Sales are ongoing separately.

PE 0604840F replacing PE 0604800F beginning in FY2019 due to budget being moved from BA05 to BA07.

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.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	642.371	785.336	549.279	0.000	549.279
Current President's Budget	624.973	695.869	985.404	0.000	985.404
Total Adjustments	-17.398	-89.467	436.125	0.000	436.125
• Congressional General Reductions	0.000	-1.271			
• Congressional Directed Reductions	0.000	-98.196			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	10.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-17.398	0.000	436.125	0.000	436.125

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2020	FY 2021
Project: 675346: *F-35*		
Congressional Add: *JASSM*	0.000	10.000
Congressional Add Subtotals for Project: 675346	0.000	10.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force	Date: May 2021
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2020	FY 2021
Congressional Add Totals for all Projects	0.000	10.000

Change Summary Explanation

The FY2021 request was reduced due to unjustified growth and included a plus-up for JASSM integration.

The FY2022 request was increased to meet warfighter requirements development and delivery timeline aligned to the May 2020 cost estimate. Specifically, the funding increase expands test capacity in order to fully support testing of Block 4 capabilities, supports the increase in development of Block 4 hardware upgrades, procures spare engines in support of the Flight Test Fleet, and invests in multiple training systems initiatives. Without the increased funding requested, needed warfighter capabilities will be delayed.

The FY2022 budget submission accomplishments/planned programs (R-2A) has been updated to mirror the Joint Strike Fighter's Program Management Office organizational structure in order to provide more transparency and visibility to development efforts across the F-35 enterprise. Also, the Project Cost Analysis (R-3) exhibit has been updated to include additional cost categories to better display executing efforts. FY2020 and FY2021 values have been updated based on actuals to date.

PE 0604840F replacing PE 0604800F beginning in FY2019 due to budget being moved from BA05 to BA07.

Technical: Not applicable.
Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
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*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
673501: *Air Vehicle - Tech Refresh 3*	-	0.000	0.000	86.327	0.000	86.327	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY2022, Air Vehicle - Technology Refresh 3 (TR-3) 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 Fiscal years FY2020 & FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

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.

FY22 funding totals include $38.415M requested for the Pacific Defense Initiative.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Technology Refresh 3 (TR-3)	0.000	0.000	86.327	0.000	86.327
Description: Reference Mission Description and Budget Item Justification. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** The TR-3 program will continue laboratory system integration and test, modify Developmental and Operational test aircraft with TR-3 and Next Gen Distributed Aperture System (NG DAS) hardware, perform ground test activities, and perform flight test through FY2022. This will include the necessary labor and non-recurring engineering to support Developmental and Operational test aircraft modifications, as well as the necessary mission planning systems to support flight test operations. Finally, this will include multiple software releases to					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
both lab and fight test, and will also result in the final software updates for Core Process Software (CPSW), Pilot Systems Software (PSSW), and TR-3 hardware. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The decrease in funding from FY2021 to FY2022 is due to development efforts with sub tier suppliers expected to decrease in FY2022, with the focus being on the completion of qualification and flight test activities. The significant technical development up through FY2021 will not continue at the same rate in FY2022.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	86.327	0.000	86.327

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
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*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TR-3 Prime LM Development	C/CPIF	LM/FORT WORTH TX : TBD	-	-		-		75.878	Oct 2021	-		75.878	-	-	-
TR-3 Prime LM Next GenDAS Shipsets Proc	C/CPIF	LM/FORT WORTH TX : TBD	-	-		-		6.146	Feb 2022	-		6.146	-	-	-
TR-3 Prime LM OT NRE	C/CPIF	LM/FORT WORTH TX : TBD	-	-		-		2.049	Nov 2021	-		2.049	-	-	-
TR-3 Prime LM OT NextGen DAS NRE	C/CPIF	LM/FORT WORTH TX : TBD	-	-		-		2.049	Nov 2021	-		2.049	-	-	-
		Subtotal	-	-		-		86.122		-		86.122	-	-	N/A

Remarks

1. Prime LM TR-3 Next Gen DAS Shipsets Proc - procuring shipsets in support of TR-3 development efforts

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TR-3 Project Support	MIPR	Various : TBD	-	-		-		0.205	Nov 2021	-		0.205	-	-	-
		Subtotal	-	-		-		0.205		-		0.205	-	-	N/A

Remarks

1. Government support at NSA/CERDEC in support of TR-3 development

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		86.327		-		86.327	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
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*

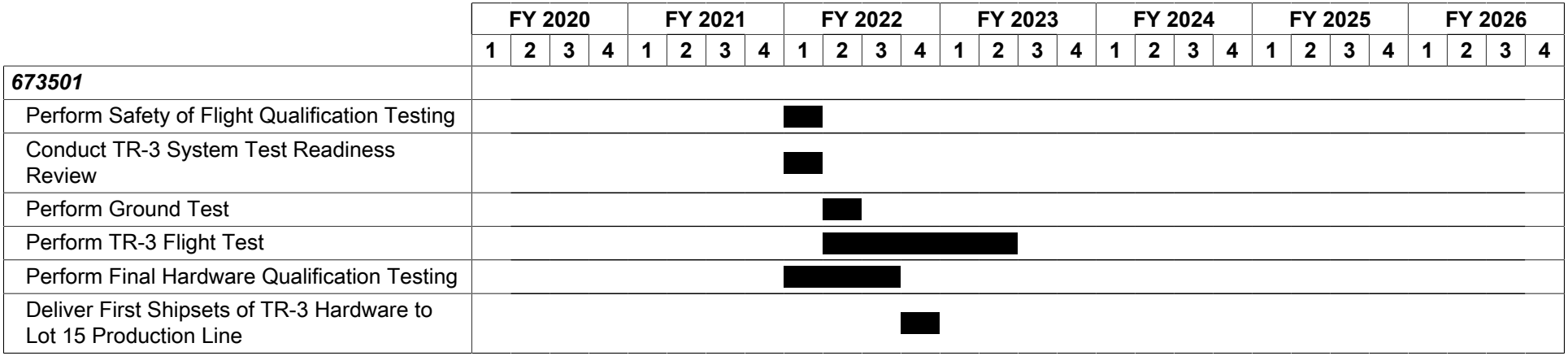

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673501 / *Air Vehicle - Tech Refresh 3*

Schedule Details

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

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
673502: *Air Vehicle Block 4 Planning & Sys Eng*	-	0.000	0.000	324.233	0.000	324.233	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY2022, Air Vehicle - Block 4 Planning & Sys Eng 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 Fiscal Years FY2020 & FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

A. Mission Description and Budget Item Justification

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. The AV PMO delivers these capabilities utilizing a Continuous Capability Development and Delivery (C2D2) strategy combining traditional hardware upgrades and agile software integration processes. As a function of the F-35 organizational pivot, this is the first budget cycle in which AV PMO budget requirements have been comprehensively and discretely defined within a dedicated BPAC.

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, 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.

FY22 funding totals include $144.283M requested for the Pacific Defense Initiative.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Air Vehicle Block 4 Planning & Sys Eng	-	0.000	324.233	0.000	324.233
Description: Reference Mission Description and Budget Item Justification. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** Continue with Agile development of capabilities through Flight Test. Continue requirements decomposition and preliminary design activities for advanced Block 4 capabilities. Continue Post-PDR risk reduction activities to include Air-Ship Integration and planning. Continue development and maturity of key long lead capabilities and service unique weapons. Complete development of software drops to be available for fielding to meet warfighter need. Support efforts for airframe, air vehicle systems, air-ship integration, mission systems, future capabilities studies and weapons integration efforts. Continue support for Block 4 Capabilities and support preliminary systems engineering efforts associated with obsolescence NRE, AARGM-ER, and increased air-to-air missile carriage. Continued engineering support for avionics, weapons, studies & analyses, and risk reduction efforts. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** This is the initial year of Air Vehicle (AV) / Block 4 Planning and Systems Engineering being established as a separate, distinct project within the Continuous Capability Development & Delivery (C2D2) Program Element. An increase in the R-2A category reflects the award of additional Block 4 scope, to include the design, development, and integration of remaining advanced Electronic Warfare hardware elements which enable F-35 dominance in the wide-band electronic spectrum. Additionally, the increase reflects initial costs of integration of advanced weapons functions including AARGM-ER, Increased Air-to-Air Missile Carriage, and Net Enabled Weapon functionality.					
Accomplishments/Planned Programs Subtotals	-	0.000	324.233	0.000	324.233

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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*

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AV Prime LM Phase II Cape/Development	C/CPIF	LM /Fort Worth TX : TBD	-	-		-		289.078	Oct 2021	-		289.078	-	-	-
AV Prime LM Phase II Fee	C/CPIF	LM /Fort Worth TX : TBD	-	-		-		10.244	Oct 2021	-		10.244	-	-	-
AV Prime LM Air Vehicle Integration	C/CPFF	LM /Fort Worth TX : TBD	-	-		-		2.500	Oct 2021	-		2.500	-	-	-
AV Systems Engineering	Various	Various : TBD	-	-		-		6.381	Dec 2021	-		6.381	-	-	-
		Subtotal	-	-		-		308.203		-		308.203	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AV Mission Systems Support	Various	Various : TBD	-	-		-		10.530	Nov 2021	-		10.530	-	-	-
AV Vehicle Systems Support	Various	Various : TBD	-	-		-		0.500	Nov 2021	-		0.500	-	-	-
AV CSO Development Support	Various	Various : TBD	-	-		-		5.000	Nov 2021	-		5.000	-	-	-
		Subtotal	-	-		-		16.030		-		16.030	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		324.233		-		324.233	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
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*

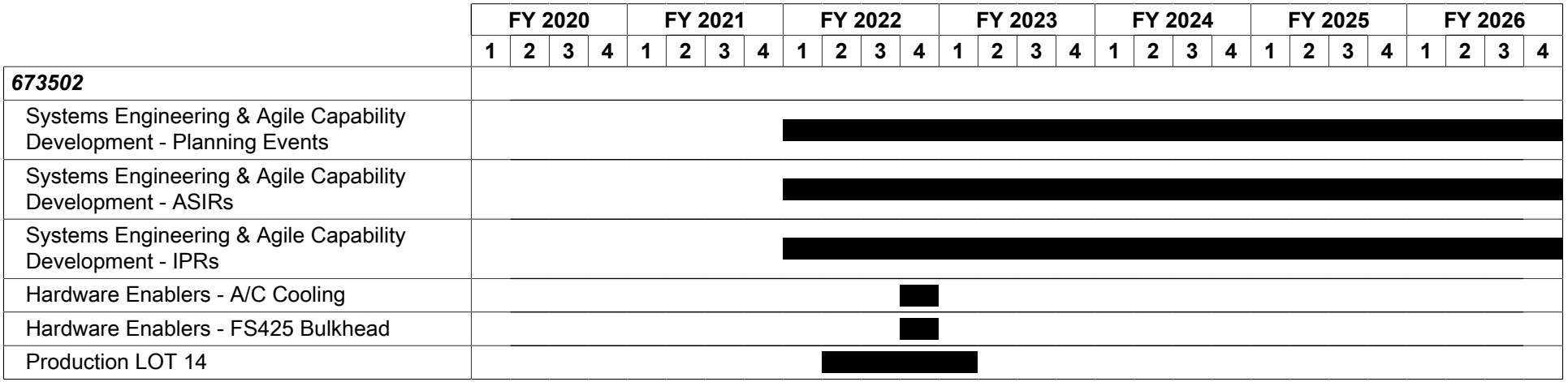

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673502 / *Air Vehicle Block 4 Planning & Sys Eng*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
673502				
Systems Engineering & Agile Capability Development - Planning Events	1	2022	4	2026
Systems Engineering & Agile Capability Development - ASIRs	1	2022	4	2026
Systems Engineering & Agile Capability Development - IPRs	1	2022	4	2026
Hardware Enablers - A/C Cooling	4	2022	4	2022
Hardware Enablers - FS425 Bulkhead	4	2022	4	2022
Production LOT 14	2	2022	1	2023

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
673503: *Test and Evaluation (T&E)*	-	0.000	0.000	262.733	0.000	262.733	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY2022, 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 Fiscal Years FY2020 & FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

A. Mission Description and Budget Item Justification

The F-35 Test and Evaluation (T&E) development portfolio is aligned with the program's Continuous Capability Development and Delivery (C2D2) efforts and is organized in five primary lines of effort; Development Foundation Contract, Development Test, Operational Test, Future Flight Test Capabilities/Investments, Ground Test and Simulation Infrastructure. This breakout is intended to categorize the developmental test efforts with more specificity and transparency.

Integrated Test activities in support of C2D2, to include Lockheed Martin support at all test sites. Non-recurring engineering required to plan for the service life extension of existing 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 Initial Capabilities Document (ICD), and the Block 4 Capability Development Document (CDD). Ground test and simulation infrastructure include efforts for laboratory developments of Improvement & Modernization (I&M) assets, development of Ground Test & Evaluation Capabilities for digital and non-digital installed systems verification, and cyber testing.

Costs in the Accomplishments/Planned and Program R-2A section have been broken out into the following categories: Development Foundation Contract, Development Test, Operational Test, Future Flight Test Capabilities/Investments, Ground Test and Simulation Infrastructure. This breakout is intended to categorize the developmental test efforts with more specificity and transparency.

FY22 funding totals include $116.915M requested for the Pacific Defense Initiative.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Development Foundation Contract (DFC) Flight Test and Tech Refresh	-	0.000	90.258	0.000	90.258
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					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
subcontractors (LM Aero). 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 activities, including Nimble Lightning efforts. Other costs in support of ranges, chase planes and DT site operations. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** Continue support to F-35 capability enhancements identified in approved requirements documents. This includes flight testing new software development builds and hardware capabilities. DFC will support C2D2 flight test, and implement technology refresh and modernization to upgrade, sustain, replace, and modify hardware and software at the module level. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY21 to FY22 increase due to planned program ramp up of Block 4 capabilities and development efforts such as technical refresh which includes previously deferred maintenance, replacing diminishing sourced equipment, and supplier modernization.					
Title: Developmental Test (DT) ***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, 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 NAWCAD Pax River, NAWCAD China Lake, and Edwards AFB.	-	0.000	33.599	0.000	33.599

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
FY 2021 Plans: N/A ***FY 2022 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 regression 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 bug fixes, integrated system evaluations, multi-ship operations, and mission effectiveness evaluations. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY2021 to FY2022 increase is due to ramping up test capacity to accommodate testing of TR-3 integration while continuing to evaluate Block 4 warfighter capabilities.					
Title: Operational Test (OT) ***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 facilitates, and service unique supporting capabilities. The sites to be funded include but are not limited to Nellis AFB and Yuma Air Station. ***FY 2021 Plans:*** N/A ***FY 2022 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 regression test capabilities as directed by the F-35 JPO. Major program testing includes TR-3 integration, Block 4 weapons integration,	-	0.000	23.974	0.000	23.974

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY2021 to FY2022 increase is due to ramping up test capacity to accommodate testing of TR-3 integration while continuing to evaluate C2D2 warfighter capabilities and retrofit of OT aircraft.					
Title: Future Flight Test Capabilities/Investments ***Description:*** F-35 Test fleet modifications, test mission equipment/assets, instrumentation capability, and data center investments are required to continue to support Block 4 capability development and integrated test requirements. TR-3 related capability requires current test aircraft and replacement test aircraft configurations to be modified to 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. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** Continue incremental funding of Lot 14 Undefinitized Contract Award for FTI design, procurement and installation (CF-84 & BF-154). 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 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:***	-	0.000	100.242	0.000	100.242

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
FY21 to FY22 increase due to growing hardware and capability requirement updates to test infrastructure mapped thru FY26. Efforts include engineering/design of instrumentation/data/test support equipment, instrumenting/retrofitting new test aircraft with up-to-date aircraft capabilities, integrating multiple test sites with a common data system to maximize verification, and integration/procurement of test assets to support flight testing.					
Title: Ground Test and Simulation Infrastructure (GTSI) ***Description:*** Ground Test & Simulation Infrastructure capabilities from Block 4 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 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. Ground Test & Simulation Infrastructure will also include capabilities for cyber testing for TR-3 assessments within three main areas: air vehicle, information systems, and supply chain. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** Continue Ground Test & Simulation Infrastructure improvements and modernization capabilities needed for Block 4 air system developments. Test infrastructure improvements include vendor lab needed capabilities to develop scheduled Block 4 software drop aircraft deliverables, and tech refresh efforts for aging equipment and OS migration to meet ATO needs. Develop F-35 mission threads for continued digital verification automated capabilities for early-on software development, and continue aircraft cyber improvements and testing efforts. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase due to build up F-35 specific capabilities for other government costs funding to USG Test Facilities to support ramp up of Block 4 capabilities, programmed expansion of Modeling & Simulation capabilities to	-	0.000	14.660	0.000	14.660

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
augment Flight Test and bring software quality escape discoveries into the Lab Infrastructure. Cyber Testing is also now captured under Ground Test & Simulation Infrastructure instead of under developmental testing.					
Accomplishments/Planned Programs Subtotals	-	0.000	262.733	0.000	262.733

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The new Test & Evaluation Project will make maximum use of existing F-35 contracts, where possible, for the various T&E related capabilities and investments outlined in the above Mission Description and Budget Item Justification. For example, provisions for new instrumentation on new flight test aircraft are being implemented 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 we waited to install instrumentation after aircraft delivery. Other modifications and/or non-recurring engineering (NRE) may be implemented via existing contracts being managed by the Air Vehicle Program Management Office 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 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 to expedite the right modifications as needed at the right time in order to avoid test aircraft grounding and maximize their availability. In addition, separate Basic Ordering Agreements or Indefinite Quantity/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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force			Date: May 2021
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)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DFC - Prime LM Developmental Foundation Contract	C/CPIF	LM; Fort Worth TX : TBD	-	-		-		90.258	Nov 2021	-		90.258	-	-	-
OT - Prime LM Operation Test Aircraft Modification	C/CPIF	LM; Fort Worth TX : TBD	-	-		-		4.540	Jun 2022	-		4.540	-	-	-
FI - Prime LM DT AC Viability	C/CPIF	LM; Fort Worth TX : TBD	-	-		-		24.584	Dec 2021	-		24.584	-	-	-
FI - Flight Test Asset	Various	LM; Fort Worth TX : TBD	-	-		-		56.072	Dec 2021	-		56.072	-	-	-
		Subtotal	-	-		-		175.454		-		175.454	-	-	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
GTS - 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)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DT - Developmental Test & Evaluation PAX	WR	NAWCAD: Pax River MD : TBD	-	-		-		17.209	Dec 2021	-		17.209	-	-	-
DT - Developmental Test & Evaluation CLK	WR	NAWCAD: China Lake, CA : TBD	-	-		-		0.820	Dec 2021	-		0.820	-	-	-
DT - Developmental Test & Evaluation EDW	MIPR	Edwards AFB, CA : TBD	-	-		-		15.570	Dec 2021	-		15.570	-	-	-
OT - Operational Test & Evaluation	MIPR	Nellis AFB, NV : TBD	-	-		-		10.378	Dec 2021	-		10.378	-	-	-
FI - Operational Test & Evaluation	MIPR	Nellis AFB, NV : TBD	-	-		-		19.586	Dec 2021	-		19.586	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force			Date: May 2021
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)*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
OT - IOT&E Completion	Various	Various : TBD	-	-		-		9.056	Dec 2021	-		9.056	-	-	-
GTS - Ground Test & Simulation (T&E) Capabilities	Various	Various : TBD	-	-		-		12.066	Apr 2022	-		12.066	-	-	-
GTS - Cyber Test & Evaluation	Various	Various : TBD	-	-		-		2.594	Dec 2021	-		2.594	-	-	-
		Subtotal	-	-		-		87.279		-		87.279	-	-	N/A

	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		262.733		-		262.733	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
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)*

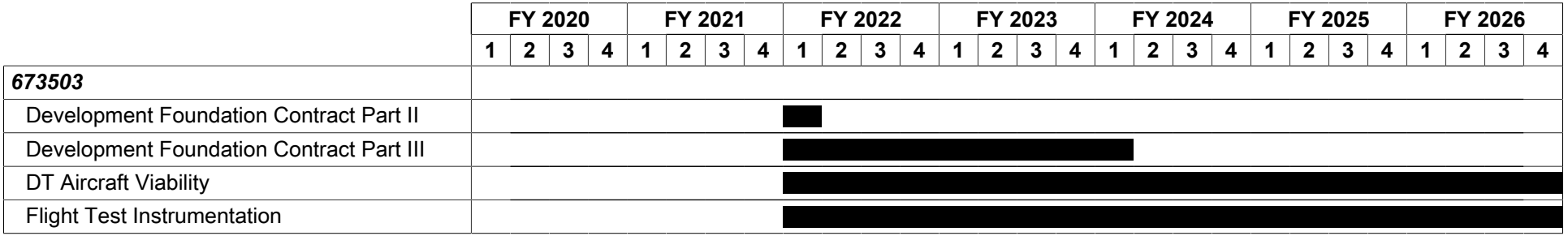

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673503 / *Test and Evaluation (T&E)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
673503				
Development Foundation Contract Part II	1	2022	1	2022
Development Foundation Contract Part III	1	2022	1	2024
DT Aircraft Viability	1	2022	4	2026
Flight Test Instrumentation	1	2022	4	2026

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
673504: *Propulsion (PP)*	-	0.000	0.000	33.091	0.000	33.091	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY2022, 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 Fiscal Years FY2020 & FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

A. Mission Description and Budget Item Justification

Propulsion F135 Block 4 Integrated Flight Test Support includes efforts such as Engine Flight Test Mechanics, Flight Test Engineers, Replacement Engine Hardware, Test Engine
Procurements, and other associated government costs. For C2D2 to be able to continue to test all three aircraft variants, engine propulsion support is required to enable continued flying.
Increased flights and flight hours are planned over the next two years to meet additional Block 4 flight test timelines, 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 Initial Service Release (ISR) engines to replace them. This replacement
effort is planned to occur over the next one to two years to enable continued flight capability. There are additional requirements to support the Air Vehicle modernization efforts in agile
software capability improvements, assessing bleed air/weight/thrust/performance capabilities, etc.

FY22 funding totals include $14.725M requested for the Pacific Defense Initiative.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Propulsion (PP)	0.000	0.000	33.091	0.000	33.091
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 Procurements, and other associated government costs. For C2D2 to be able to continue to test all three aircraft variants, engine propulsion support is required to enable continued flying. Increased flights and flight hours are planned over the next two years to meet additional Block 4 flight test timelines, 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 Initial Service Release (ISR) engines to replace them. This replacement effort is planned					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
to occur over the next one to two years to enable continued flight capability. There are additional requirements to support the Air Vehicle modernization efforts in agile software capability improvements, assessing bleed air/ weight/thrust/performance capabilities, etc. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** Continued Propulsion F135 Block 4 Integrated Flight Test Support to include efforts such as Engine Flight Test Mechanics, Flight Test Engineers, Replacement Engine Hardware, Test Engine Procurements, and other associated government costs. The Flight Test Fleet is planning to maintain elevated aircraft inventory at twelve aircraft in FY2022 (from 11 in FY2020). This again 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 FY2021 levels at 960 flights and 1920 flight hours. As the FFR engines have aged past their design life, it is necessary to purchase three ISR engines (two STOVL and one CTOL) to enable continued propulsion support of flight test. Continued incremental funding for two ISR engines, which has been funded with FY2020 and FY2021 dollars. An additional spare engine will be purchased in FY2022. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase from FY2021 to FY2022 is due to the continued incremental funding for the procurement of two spare engines in Lot 12-14 with bulk of funding in FY2021 and FY2022, as well as the procurement of an additional spare engine in FY2022. Increased flights and flight hours are planned over the next two years to meet additional Block 4 flight test timelines, requiring elevated propulsion support.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	33.091	0.000	33.091

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673504 / *Propulsion (PP)*

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force			Date: May 2021
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / *F-35 C2D2*	Project (Number/Name) 673504 / *Propulsion (PP)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PP Prime PW C2D2 Propulsion DT Aircraft Procurement Engines	C/CPIF	PW; East Hartford, CT : East Hartford, CT	-	-		-		11.739	Nov 2021	-		11.739	-	-	-
PP Prime PW C2D2 Propulsion Flight Test Support	C/CPIF	PW; East Hartford, CT : East Hartford, CT	-	-		-		16.533	Oct 2021	-		16.533	-	-	-
PP DevSecOps Emulation Lab	C/CPIF	PW; East Hartford, CT : East Hartford, CT	-	-		-		2.458	Oct 2021	-		2.458	-	-	-
PP F135 Engine Growth EEP 22 Bridge	C/CPIF	PW; East Hartford, CT : East Hartford, CT	-	-		-		2.049	Oct 2021	-		2.049	-	-	-
		Subtotal	-	-		-		32.779		-		32.779	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PP Program Management Support	Various	Various : TBD	-	-		-		0.312	Nov 2021	-		0.312	-	-	-
		Subtotal	-	-		-		0.312		-		0.312	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		33.091		-		33.091	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673504 / *Propulsion (PP)*

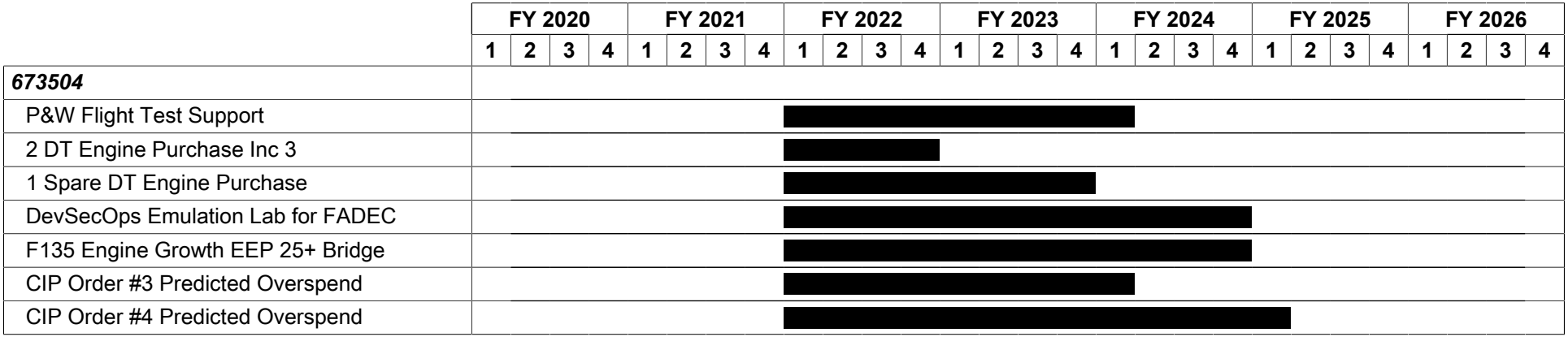

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673504 / *Propulsion (PP)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
673504				
P&W Flight Test Support	1	2022	1	2024
2 DT Engine Purchase Inc 3	1	2022	4	2022
1 Spare DT Engine Purchase	1	2022	4	2023
DevSecOps Emulation Lab for FADEC	1	2022	4	2024
F135 Engine Growth EEP 25+ Bridge	1	2022	4	2024
CIP Order #3 Predicted Overspend	1	2022	1	2024
CIP Order #4 Predicted Overspend	1	2022	1	2025

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / *F-35 C2D2*	Project (Number/Name) 673505 / *Maintenance Systems (MxS)*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
673505: *Maintenance Systems (MxS)*	-	0.000	0.000	50.409	0.000	50.409	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

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 Fiscal Years FY2020 & FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

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.

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.

FY22 funding totals include $22.432M requested for the Pacific Defense Initiative.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Operational Data Integrated Network (ODIN) ***Description:*** ODIN efforts will focus on building a modern architecture and the data platform/environment(s), conducting cybersecurity and user-focused testing, and developing user training. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** Program will 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. Program will continue maturing the ODIN infrastructure (hardware/cloud based development and production infrastructure). ODIN efforts will focus on building a modern architecture and the data platform/environment(s), conducting cybersecurity and user-focused testing, and developing user training. Program will execute initiatives that support enabling the ODIN requirements by modernizing ALIS applications where applicable; leveraging commercial and government off the shelf; and maximizing re-use from existing US Services logistics modernization efforts. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding increases from FY2021 to FY2022 as program focuses on ALIS to ODIN transition priorities such as evolving to a modern architecture, developing enhancements to reduce sustainment costs, and enabling infrastructure and data environments in FY2022.	-	0.000	47.131	0.000	47.131
Title: Prognostics and Health Management (PHM) ***Description:*** Develop PHM failure resolution improvements by analyzing Anomaly and Failure Resolution System (AFRS) technical data and increasing Assess Material Condition algorithm development and implementation. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** Develop PHM failure resolution improvements by analyzing Anomaly and Failure Resolution System (AFRS) technical data, as identified by the associated affordability war room initiatives and Performance-to-Plan metrics,	-	0.000	3.278	0.000	3.278

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
and increasing Assess Material Condition algorithm development and implementation. Develop government-hosted PHM data storage and analytics infrastructure. Begin Systems Engineering and architecture development of PHM Downlink capability. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding increases from FY2021 to FY2022 as priority AMC algorithm development and implementation continues and program initiates PHM downlink capability effort in FY2022.					
Accomplishments/Planned Programs Subtotals	-	0.000	50.409	0.000	50.409

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673505 / *Maintenance Systems (MxS)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total 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	-		22.997	-	-	-
MxS Prime PW ODIN	C/CPFF	PW; E Hartford, CT : TBD	-	-		-		4.835	Nov 2021	-		4.835	-	-	-
MxS Prime LM PHM	C/CPFF	LM; Ft Worth Tx : TBD	-	-		-		3.278	Nov 2021	-		3.278	-	-	-
		Subtotal	-	-		-		31.110		-		31.110	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MxS ODIN Development Support	Various	Various : TBD	-	-		-		19.299	Nov 2021	-		19.299	-	-	-
		Subtotal	-	-		-		19.299		-		19.299	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		50.409		-		50.409	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673505 / *Maintenance Systems (MxS)*

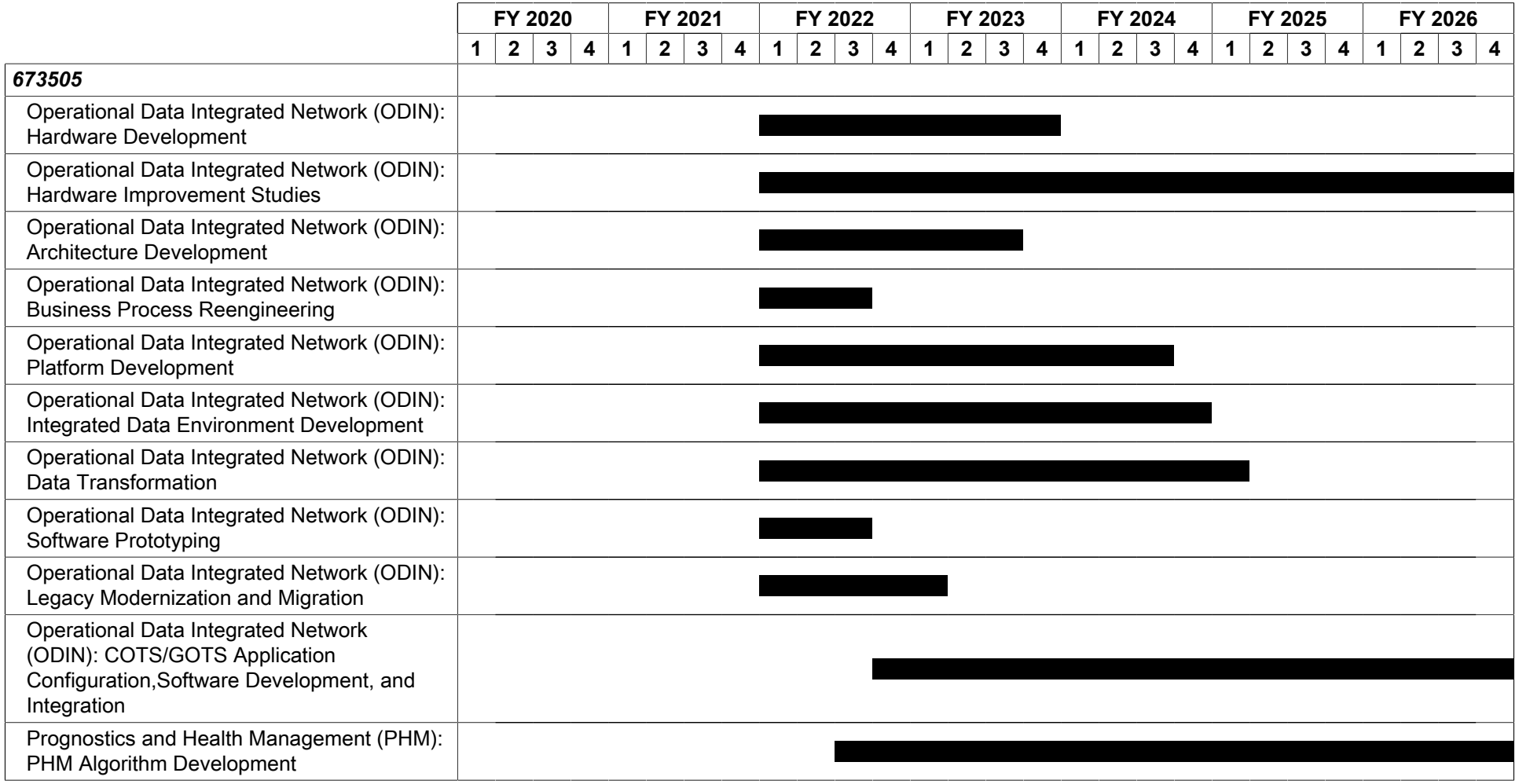

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673505 / *Maintenance Systems (MxS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
673505				
Operational Data Integrated Network (ODIN): Hardware Development	1	2022	4	2023
Operational Data Integrated Network (ODIN): Hardware Improvement Studies	1	2022	4	2026
Operational Data Integrated Network (ODIN): Architecture Development	1	2022	3	2023
Operational Data Integrated Network (ODIN): Business Process Reengineering	1	2022	3	2022
Operational Data Integrated Network (ODIN): Platform Development	1	2022	3	2024
Operational Data Integrated Network (ODIN): Integrated Data Environment Development	1	2022	4	2024
Operational Data Integrated Network (ODIN): Data Transformation	1	2022	1	2025
Operational Data Integrated Network (ODIN): Software Prototyping	1	2022	3	2022
Operational Data Integrated Network (ODIN): Legacy Modernization and Migration	1	2022	1	2023
Operational Data Integrated Network (ODIN): COTS/GOTS Application Configuration,Software Development, and Integration	4	2022	4	2026
Prognostics and Health Management (PHM): PHM Algorithm Development	3	2022	4	2026

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
673506: *Combat Data Systems (CDS)*	-	0.000	0.000	60.039	0.000	60.039	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY2022, Combat Data Systems (CDS) 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 Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

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.

FY22 funding totals include $26.717M requested for the Pacific Defense Initiative.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Joint Reprogramming Environment (JRE)	0.000	0.000	39.550	0.000	39.550
Description: 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.					
FY 2021 Plans: N/A					
FY 2022 Base 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 in decomposition of requirements and begin software coding to support development of the software tool. Continue effort to upgrade Reprogramming Verification & Validation Systems (RVVS) to meet the Block 4 capability requirements and meet next generation threats. RVVS plans to conduct					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673506 / *Combat Data Systems (CDS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
critical System Engineering Technical Review events to move forward in the design and delivery including acquiring equipment. Continue activities on the Capability Upgrade/Refresh Contract (CURC) to accomplish three main objectives including upgrading the Radar Stimulator Interface (RSI), provide Win10 compliance, and redesign the IT infrastructure. In addition, the refresh effort upgrades multiple United States Reprogramming Laboratory (USRL) computer systems for security compliance, and removes obsolete parts and deficient technology to form the new backbone of the USRL IT infrastructure for all future mission data production, test, and fielding. Continue ongoing efforts to support aircraft in relation to Technology Refresh-3 (TR-3), Continuous Capability Development and Delivery (C2D2), Capability Upgrade and Refresh, and Network Boundary Consolidation. Continue development support for defining, managing and acquiring the F-35 Reprogramming capability enhancements identified in approved requirements documents for Block 4 and modernization efforts and support efforts for joint reprogramming enterprise activities. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase due to planned increase to upgrade the RVVS to meet Block 4 capability requirements. Additionally, planned ramp-up in activities on the CURC to upgrade the RSI, provide Win10 compliance, and redesign the IT infrastructure. Finally, previously planned innovation projects (e.g., Software in the Loop) were partially delayed in FY2021 and requirements in FY2022.					
Title: Mission Planning Support Environment (MPSE) ***Description:*** 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. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** 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 Mission Planning System Environment (MPSE) software suite that is customized for each and every air vehicle Operational Flight Program (OFP) / 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	0.000	0.000	20.489	0.000	20.489

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673506 / *Combat Data Systems (CDS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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 redesign. 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. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase due to Joint Mission Planning Software framework end of life and transition to the Next Generation Open Mission System (NOMS). Increase due to NSA requirement to transition from GDR to a separate cross domain solution and inline field encryption device, as well as planned ramp-up in activities that will deliver the next-generation mission planning architecture to support current and future capabilities, address current and future cyber security risks, avoid the high costs of sustaining an obsolete architecture, and enable the Government to own portions of the F-35 software development / testing capabilities and reduce reliance on the prime contractor.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	60.039	0.000	60.039

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673506 / *Combat Data Systems (CDS)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CDS Prime JRE Development - CRT Increment 1	C/CPFF	LM; Ft Worth Tx : TBD	-	-		-		6.900	Oct 2021	-		6.900	-	-	-
CDS Prime JRE Development - RVVS	C/CPIF	LM; Ft Worth Tx : TBD	-	-		-		5.700	Jul 2022	-		5.700	-	-	-
CDS Prime JRE Development - CURC	C/CPFF	LM; Ft Worth Tx : TBD	-	-		-		12.750	Oct 2021	-		12.750	-	-	-
CDS Prime JRE Development - TR-3	C/CPAF	LM; Ft Worth Tx : TBD	-	-		-		2.987	Apr 2022	-		2.987	-	-	-
CDS Prime JRE Development - Capability Development	C/CPFF	LM; Ft Worth Tx : TBD	-	-		-		2.100	Dec 2021	-		2.100	-	-	-
CDS Prime MPSE Development F-35 Next Generation Mission Planning	Various	Various : TBD	-	-		-		15.750	Jul 2022	-		15.750	-	-	-
		Subtotal	-	-		-		46.187		-		46.187	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CDS JRE Development Support	Various	Various : TBD	-	-		-		9.113	Dec 2021	-		9.113	-	-	-
CDS MPSE Development Support	Various	Various : TBD	-	-		-		4.739	Dec 2021	-		4.739	-	-	-
		Subtotal	-	-		-		13.852		-		13.852	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		60.039		-		60.039	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673506 / *Combat Data Systems (CDS)*

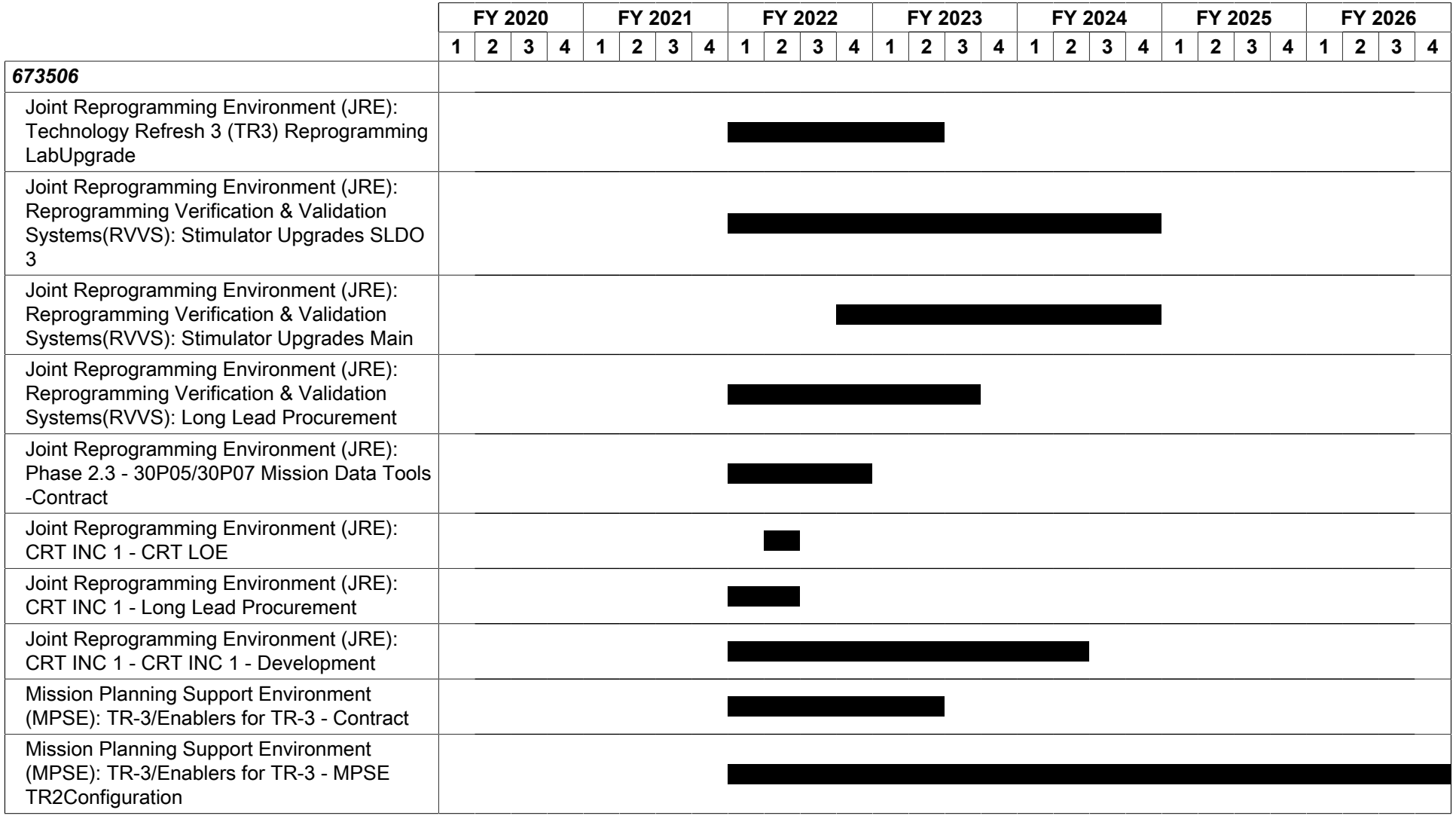

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673506 / *Combat Data Systems (CDS)*

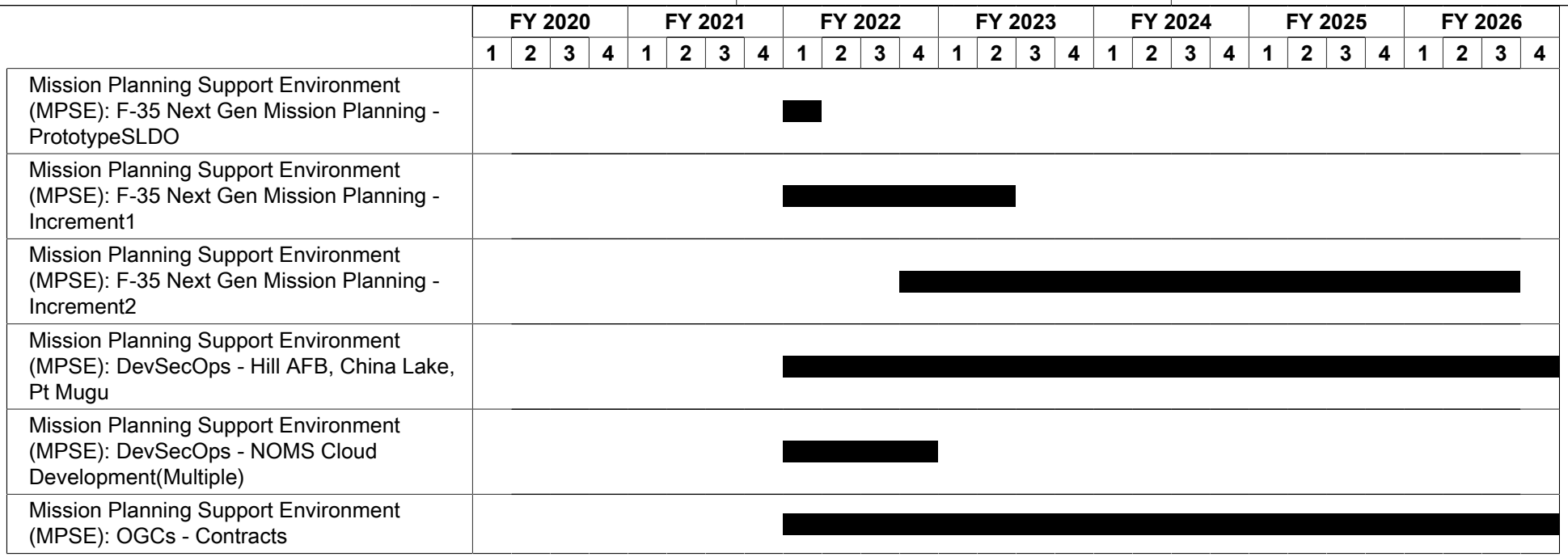

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673506 / *Combat Data Systems (CDS)*

Schedule Details

	Start		End	
Events by Sub Project	**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	4	2024
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	2022
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	2026
Mission Planning Support Environment (MPSE): F-35 Next Gen Mission Planning - PrototypeSLDO	1	2022	1	2022
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

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673506 / *Combat Data Systems (CDS)*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Mission Planning Support Environment (MPSE): DevSecOps - NOMS Cloud Development(Multiple)	1	2022	4	2022
Mission Planning Support Environment (MPSE): OGCs - Contracts	1	2022	4	2026

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
673507: *Training Systems & Simulation*	-	0.000	0.000	72.712	0.000	72.712	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY2022, 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 Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

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 and 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 BPAC.

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: Efforts will continue with a focus on implementation of the modernization activities outlined in the TSS PMO roadmaps that will target the requirement for higher fidelity training to the warfighter. Specific efforts will include software architecture modernization, hardware architecture modernization and Synthetic Threat Enhancement.

Joint Simulation Environment (JSE) Development: Efforts will continue with a focus on completion of F-35 IOT&E events at the NAS Patuxent River facility while upgrading JSE capabilities at NAS Patuxent River to enable effective verification of Block 4 capabilities. Additionally, efforts will continue toward development of Effects Based Simulation (EBS) capabilities as well as Virtual Warfare Center (VWC) events.

FY22 funding totals include $32.356M requested for the Pacific Defense Initiative.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Training Systems Capability Development (TSCD)	0.000	0.000	35.810	0.000	35.810

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total

Description: 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 capabilities (Capability Increments (CI) 1-3) 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 CI1-3 capabilities, continued development of Live-Virtual-Constructive (LVC) capabilities including Distributed Mission Training (DMT), and appropriate lab infrastructure to enable Training System development.

FY 2021 Plans:
N/A

FY 2022 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 a relevant capability upgrade (Pilot Training, Maintainer Training, Instructional Products) for release to the fleet in FY2022. 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 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.

FY 2022 OCO Plans:
N/A

FY 2021 to FY 2022 Increase/Decrease Statement:
The increase in funding from FY2021 to FY2022 is a direct function of the continued maturation of the F-35 organization pivot. Prior to FY2021, Training System capability development costs were factor-based and embedded in higher-level capability development budgets. FY2021 was the first budget cycle where Training System costs were broken out and identified discretely, but the FY2021 effort was based on limited/incomplete data and did not fully capture the true cost of
Training System capability development. In concert with the maturation of the TSS PMO, higher fidelity cost estimating models have evolved to comprehensively inform FY2022 (and beyond) budget requirements for Training System capability development. More specifically, the FY2022 budget increase accurately captures

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
the cost of Training System development lab infrastructure, development of Block 4 capabilities in the Training System, PRTS development and DMT development. These development requirements were unfunded/under-funded in FY2021 and are critical to ensure Training Systems are operationally relevant and aligned with other elements of the Air System.					
Title: Training Systems Investments (TSI) Roadmap ***Description:*** Efforts will continue with a focus on implementation of the modernization activities outlined in the TSS PMO roadmaps that will target the requirement for higher fidelity training to the warfighter. Specific efforts will include software architecture modernization, hardware architecture modernization and Synthetic Threat Enhancement. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** Efforts will continue to refine and implement TSS PMO investment roadmaps with the objective to enable operationally relevant and higher fidelity training to the warfighter with focus on training to support the high-end fight. Software architecture modernization efforts (FLITE) will continue with an intent to integrate FLITE into the PTD software baseline in FY2022 (objective) or FY2023 (threshold). Hardware architecture modernization efforts will continue with an intent to conduct tradeoff analyses of smaller footprint Pilot Training Device (PTD) rapid prototype activities to support eventual Program of Record production cut-in. Synthetic Threat Enhancement efforts will continue to improve the quantity, density and fidelity of relevant synthetic threat integration in the family of PTDs with intent to incrementally integrate synthetic threat improvement in each annual PTD capability upgrade to the fleet. Opportunities to leverage JSE synthetic threat investment toward a common threat environment across Training Systems and JSE architectures will continue to mature with an intent to minimize duplicative investment in multiple synthetic threat environments across the F-35 Enterprise. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The increase in funding from FY2021 to FY2022 is a direct function of the continued maturation of the F-35 organization pivot and the realities of a challenging FY2021 budget year. FY2021 was the first budget cycle where Training System Investments were broken out and identified discretely, but the FY2021 effort did not fully	0.000	0.000	15.717	0.000	15.717

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
capture details and associated cost of roadmap investments. Additionally, FY2021 budget challenges resulted in deferral of several roadmap investments (Hardware architecture modernization, Synthetic Threat Enhancement) to FY2022 and beyond. In concert with the maturation of the TSS PMO, roadmaps have been refined to more accurately inform FY2022 (and beyond) budget requirements for Training System roadmap investments. More specifically, the FY2022 budget increase accurately captures the cost of smaller footprint PTD prototype activities and enables synthetic threat enhancements that were deferred from FY2021. These roadmap investments are critical enablers to ensure that Training Systems remain affordable, operationally relevant, and aligned with other elements of the Air System across the FYDP and beyond.					
Title: Joint Simulation Environment (JSE) Development	0.000	0.000	21.185	0.000	21.185
Description: Efforts will continue with a focus on completion of F-35 IOT&E events at the NAS Patuxent River facility while upgrading JSE capabilities at NAS Patuxent River to enable effective verification of CI1-3 capabilities. Additionally, efforts will continue toward development of Effects Based Simulation (EBS) capabilities as well as Virtual Warfare Center (VWC) capabilities. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** Efforts will continue with a focus on completion of Verification, Validation and Accreditation (VV&A) activities enabling successful IOT&E Run-for-Score events. Concurrently, upgrading JSE capability will enable effective verification of Block 4 capabilities (sensor model fidelity, complex threat models and F-35 In-a-Box (FIAB) upgrades) (objective). Efforts will continue toward expansion of JSE capability to Wright Patterson AFB, Edwards AFB and Nellis AFB in FY2023 (objective). Effects Based Simulation (EBS) will continue design, development and integration activities to support requirements analysis and pilot training tasks. Efforts will continue to support F-35 participation in events at the Virtual Warfare Center (VWC), including Nimble Lightning. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The increase in funding from FY2021 to FY2022 is a direct function of the continued maturation of the F-35 organization pivot. Prior to FY2021, JSE development costs were immature and embedded in higher-level capability verification budgets. FY2021 was the first budget cycle where JSE costs were broken out and allocated to the TSS PMO, but the FY2021 effort was based on incomplete data and did not fully capture the true					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
cost of JSE development. In concert with the maturation of the TSS PMO, higher fidelity cost estimating models have evolved to comprehensively inform FY2022 (and beyond) budget requirements for JSE development. More specifically, the FY2022 budget increase is required to support increased personnel and resources, Government and Contractor, to enable successful completion of F-35 IOT&E events while also supporting continued development of EBS and F-35 software at VWC to implement Block 4 capabilities.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	72.712	0.000	72.712

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

For FY2021 and FY2022, 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force			Date: May 2021
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / *F-35 C2D2*	Project (Number/Name) 673507 / *Training Systems & Simulation*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TSS Prime LM Training System Alignment (TSCD)	C/CPAF	Lockheed Martin : Ft. Worth, TX	-	-		-		14.330	Nov 2021	-		14.330	-	-	157.972
TSS Prime LM PTD TR-3 Development (TSCD)	C/CPAF	Lockheed Martin : Ft. Worth, TX	-	-		-		11.448	Nov 2021	-		11.448	-	-	84.564
TSS Prime LM Training Lab Infrastructure (TSCD)	C/CPFF	Lockheed Martin : Ft. Worth, TX	-	-		-		8.780	Nov 2021	-		8.780	-	-	76.127
TSS Live-Virtual-Constructive (LVC) - DMT (TSCD)	C/CPFF	Lockheed Martin : Ft. Worth, TX	-	-		-		1.252	Nov 2021	-		1.252	-	-	35.717
TSS Hardware Rearchitecture (TSI)	Various	Not specified. : TBD	-	-		-		7.261	Nov 2021	-		7.261	-	-	15.166
TSS Software Re-architecture (TSI)	C/CPAF	Lockheed Martin : Ft. Worth, TX	-	-		-		5.955	Nov 2021	-		5.955	-	-	45.545
TSS Synthetic Threat Enhancement (TSI)	C/CPFF	Lockheed Martin : Ft. Worth, TX	-	-		-		2.501	Nov 2021	-		2.501	-	-	15.227
TSS JSE Prime LM FIAB Development	C/CPIF	Lockheed Martin : Ft. Worth, TX	-	-		-		9.105	Nov 2021	-		9.105	-	-	54.073
TSS JSE VWC Development	Various	Various : TBD	-	-		-		0.995	Nov 2021	-		0.995	-	-	7.696
		Subtotal	-	-		-		61.627		-		61.627	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TSS JSE Pax Development Support	Various	NAWCAD : NAS Patuxent River, MD	-	-		-		8.725	Nov 2021	-		8.725	-	-	51.671
TSS JSE Other Development Support	Various	Various : TBD	-	-		-		0.821	Nov 2021	-		0.821	-	-	16.383
TSS JSE EBS Development Support	Various	Various : TBD	-	-		-		1.539	Nov 2021	-		1.539	-	-	5.826
		Subtotal	-	-		-		11.085		-		11.085	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force			Date: May 2021
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / *F-35 C2D2*	Project (Number/Name) 673507 / *Training Systems & Simulation*	

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		72.712		-		72.712	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673507 / *Training Systems & Simulation*

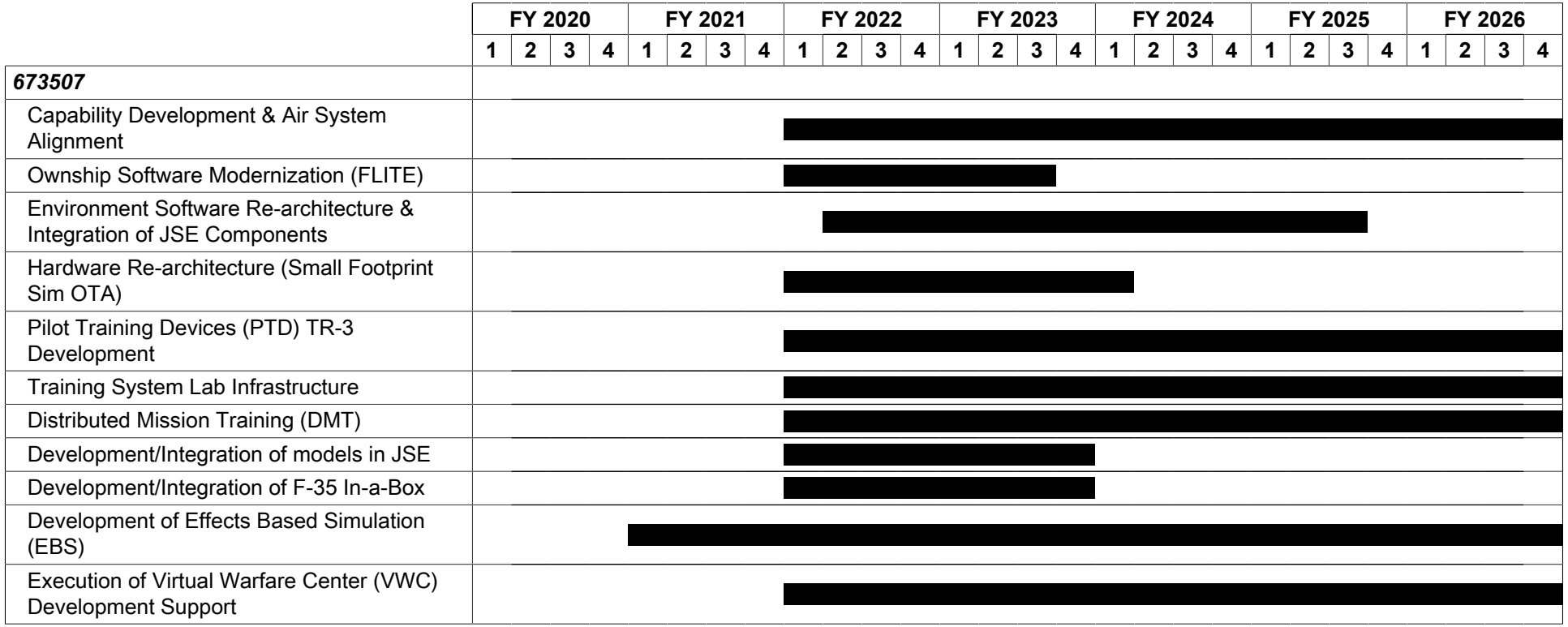

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673507 / *Training Systems & Simulation*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
673507				
Capability Development & Air System Alignment	1	2022	4	2026
Ownship Software Modernization (FLITE)	1	2022	3	2023
Environment Software Re-architecture & Integration of JSE Components	2	2022	3	2025
Hardware Re-architecture (Small Footprint Sim OTA)	1	2022	1	2024
Pilot Training Devices (PTD) TR-3 Development	1	2022	4	2026
Training System Lab Infrastructure	1	2022	4	2026
Distributed Mission Training (DMT)	1	2022	4	2026
Development/Integration of models in JSE	1	2022	4	2023
Development/Integration of F-35 In-a-Box	1	2022	4	2023
Development of Effects Based Simulation (EBS)	1	2021	4	2026
Execution of Virtual Warfare Center (VWC) Development Support	1	2022	4	2026

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / *F-35 C2D2*	Project (Number/Name) 673508 / *Infrastructure & Support Costs*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
673508: *Infrastructure & Support Costs*	-	0.000	0.000	67.860	0.000	67.860	-	-	-	-	-	-
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 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 Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 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 all phases of acquisition programs to include material solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. 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.

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.

FY22 funding totals include $30.197M requested for the Pacific Defense Initiative.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Core Program Support/CSS Support	-	0.000	67.860	0.000	67.860
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.					
FY 2021 Plans: N/A					
FY 2022 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673508 / *Infrastructure & Support Costs*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase from FY2021 to FY2022 by $2.492M is due to a new BPAC established for Infrastructure & Support Costs. The original BPAC where this effort was originally funded was 675346.					
Accomplishments/Planned Programs Subtotals	-	0.000	67.860	0.000	67.860

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673508 / *Infrastructure & Support Costs*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Core Program Support Cyber Risk Reduction	Various	Various : TBD	-	-		-		1.000	Dec 2021	-		1.000	-	-	-
Core Program Support Model-Based Systems Engineering	Various	Various : TBD	-	-		-		0.200	Dec 2021	-		0.200	-	-	-
		Subtotal	-	-		-		1.200		-		1.200	-	-	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
F-35 JPO AFLCMC Civilian Pay	MIPR	Wright Patterson AFB, OH : TBD	-	-		-		46.862	Oct 2021	-		46.862	-	-	-
CSS Support/Civ Support	Various	Various : TBD	-	-		-		7.070	Dec 2021	-		7.070	-	-	-
Core Program Support Off-Base Leases	MIPR	WHS: NCR : TBD	-	-		-		12.228	Oct 2021	-		12.228	-	-	-
Core Program Support Travel	Various	Various : TBD	-	-		-		0.500	Oct 2021	-		0.500	-	-	-
		Subtotal	-	-		-		66.660		-		66.660	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		67.860		-		67.860	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673508 / *Infrastructure & Support Costs*

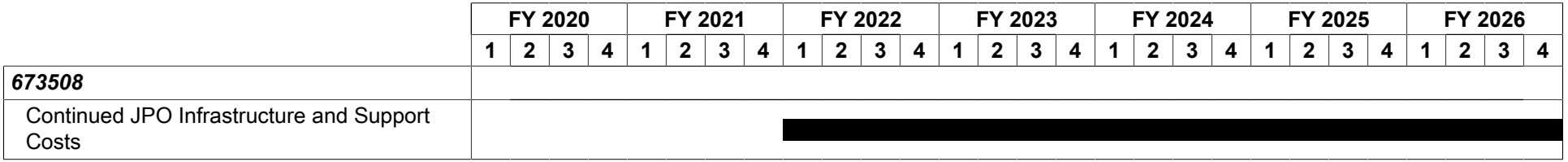

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673508 / *Infrastructure & Support Costs*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
673508				
Continued JPO Infrastructure and Support Costs	1	2022	4	2026

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
673509: *DevSecOps*	-	0.000	0.000	28.000	0.000	28.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY2022, 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 Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 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). This includes providing support to the Combat Data Systems (CDS), Air Vehicle (AV), Maintenance Systems (MxS), Propulsion (PP), and Training Systems and Simulation (TSS) PMOs. The mission of DevSecOps is to provide a centralized and consolidated F-35 software development environment, allowing for rapid release cycles to keep the F-35 ahead of its adversaries. Investment and modernization of DevSecOps include efforts to support F-35 Software Modernization efforts, develop organic government software and testing capabilities, enhance the security posture of the development pipeline, and support goals of reducing long-term on-premise infrastructure environments cost ultimately resulting in reducing fleet delivery timelines.

FY22 funding totals include $12.460M requested for the Pacific Defense Initiative.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: DevSecOps Support	-	0.000	28.000	0.000	28.000
Description: Reference Mission Description and Budget Item Justification. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** Continue development and support for DevSecOps infrastructure, platform, software development pipeline, and joint F-35 organizational connections. 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. 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					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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 and Multi-Factor Authentication and Compiler 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). ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase from FY2021 to FY2022 is due to a new BPAC established for DevSecOps. The original BPAC where this effort was originally funded was 675346.					
Accomplishments/Planned Programs Subtotals	-	0.000	28.000	0.000	28.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The DevSecOps Acquisition Strategy is based on the CSAF 180-day delivery sprint. 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. Production and 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673509 / *DevSecOps*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Dev Ops Development Support - Talent	MIPR	Various : TBD	-	-		-		16.000	Dec 2021	-		16.000	-	-	-
Dev Ops Development Support - Licenses	C/FFP	Various : TBD	-	-		-		7.000	Oct 2021	-		7.000	-	-	-
Dev Ops Development Support - Cloud Support	C/FFP	Various : TBD	-	-		-		5.000	Oct 2021	-		5.000	-	-	-
		Subtotal	-	-		-		28.000		-		28.000	-	-	N/A

Remarks

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

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		28.000		-		28.000	-	-	N/A

Remarks

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

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673509 / *DevSecOps*

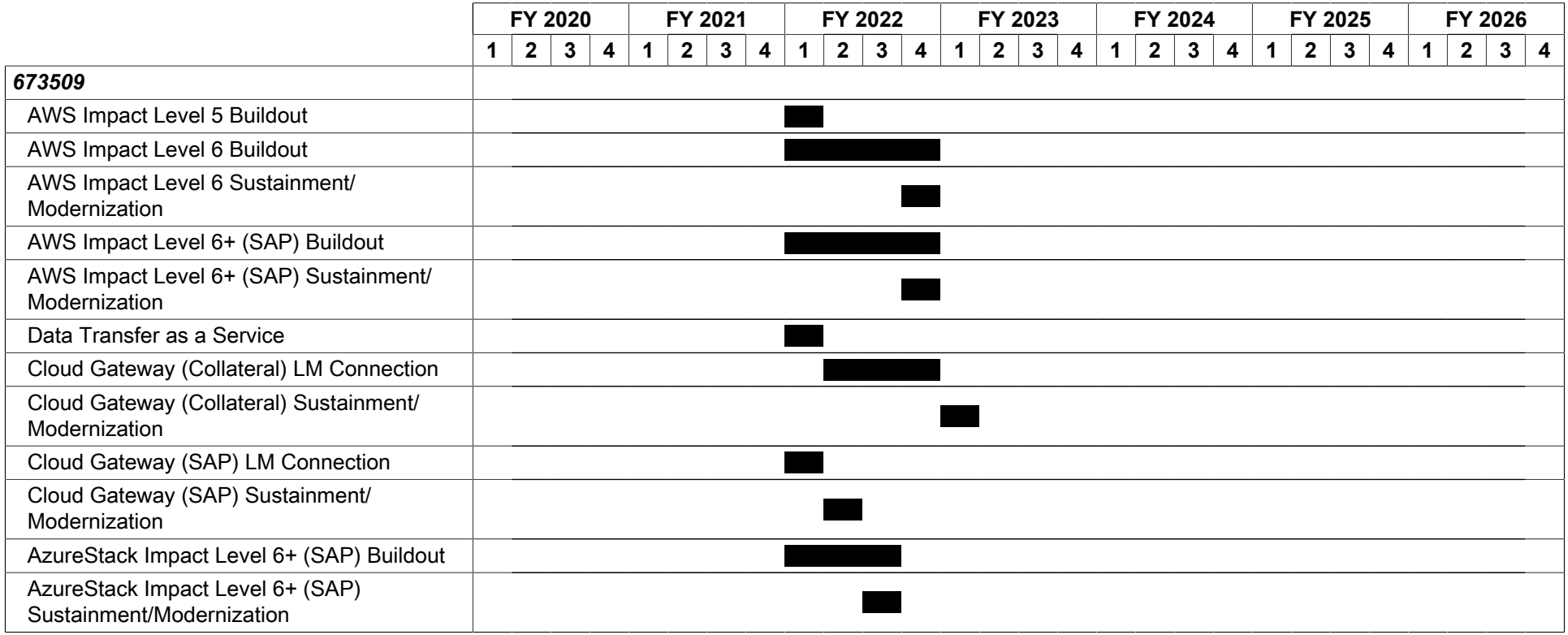

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 673509 / *DevSecOps*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
673509				
AWS Impact Level 5 Buildout	1	2022	1	2022
AWS Impact Level 6 Buildout	1	2022	4	2022
AWS Impact Level 6 Sustainment/Modernization	4	2022	4	2022
AWS Impact Level 6+ (SAP) Buildout	1	2022	4	2022
AWS Impact Level 6+ (SAP) Sustainment/Modernization	4	2022	4	2022
Data Transfer as a Service	1	2022	1	2022
Cloud Gateway (Collateral) LM Connection	2	2022	4	2022
Cloud Gateway (Collateral) Sustainment/Modernization	1	2023	1	2023
Cloud Gateway (SAP) LM Connection	1	2022	1	2022
Cloud Gateway (SAP) Sustainment/Modernization	2	2022	2	2022
AzureStack Impact Level 6+ (SAP) Buildout	1	2022	3	2022
AzureStack Impact Level 6+ (SAP) Sustainment/Modernization	3	2022	3	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force			Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
675346: *F-35*	-	624.973	695.869	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Total cost, including International partner contributions, USN, USMC, and USAF funding: FY2020:1,623.467, FY2021:1,938.386M, FY2022:2,367.088M.

R-2A table shown above reflects service funding only.

R-2A (section B)/R-3 displays combined program for JSF Continuous Capability Development and Delivery (C2D2).

JSF C2D2 Includes:
USAF PE 0207142F BPAC 675346
USAF PE 0604840F BPAC 675346
USN PE 0604840N/ Project Unit 2936
USMC PE 0604840M Project Unit 3410
USN PE 0604810N/ Project Unit 2936
USMC PE 0604810M Project Unit 2935
USN PE 0604800N Project Unit 9999 (FY14): 1.500M
USMC PE 0604800M Project Unit 9999 (FY14): 1.500M
International Partner Contributions

A. Mission Description and Budget Item Justification

F-35 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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Product Development - Air Vehicle (AV) / Block 4 Planning and Systems Engineering	232.868	204.120	0.000	0.000	0.000
Description: Block 4 Planning and Systems Engineering from preliminary design and requirements decomposition					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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 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 AARGM-ER, NRE for obsolescence, and 6 In The Bay early systems engineering. 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. Beginning in FY2022, 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 Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request. ***FY 2021 Plans:*** Continue Post-PDR risk reduction activities to include Air Ship Integration and planning. Continue with Agile development of capabilities through Flight Test. Continue development and maturity of key long lead capabilities and service unique weapons. Continue C2D2 capability development of software drops 30P6 (Q3 2021) and 30P7 (Q1 2022) to be available for fielding to meet warfighter need. C2D2 capability planning which includes an efficient transition from F-35 SDD to C2D2. ***FY 2022 Base Plans:*** Efforts continued in BPAC 673502. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
FY2021 to FY2022 increase is due to the continued effort with C2D2 DM90 Capability Development.					
Title: AV Product Development - Technology Refresh 3 (TR-3)	121.150	161.290	0.000	0.000	0.000
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 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 FY2022, 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 Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request. ***FY 2021 Plans:*** The TR-3 program will continue robust software development of the Core Processing Software (CPSW) and Pilot Systems Software (PSSW) to ensure and validate compatibility with current F-35 sensors and weapon loads, and will continue software development to integrate with the new Embedded Training and Next Generation Distributed Aperture System (NG DAS). In addition, the program will complete Safety of Flight (SoF) qualification on the ICP, AMS, PCD-EU, and PCDDU. Furthermore, the final hardware configurations will continue software development, as well as system integration and test activities. Finally, TR-3 will commence modifying developmental test aircraft, complete ground test, and start flight test. ***FY 2022 Base Plans:*** Efforts continued in BPAC 673501. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
The reduction in funding from FY2021 to FY2022 is due to development efforts with sub-tier suppliers which will curtail in FY22, with the focus being on the completion of qualification and flight test activities. The significant technical development up through FY21 will not continue at the same rate in FY22					
Title: Infrastructure and Support Costs	55.680	42.690	0.000	0.000	0.000
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 DT site operations. USAF only will fund additional 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 FY2022, 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 Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request. ***FY 2021 Plans:*** Continue development support for defining, managing and acquiring the F-35 capability enhancements identified in approved requirements documents. Support efforts for airframe, air vehicle systems, air ship integration, mission systems, weapons integration, offboard mission support, autonomic logistics development, modeling and simulation, training investments, and joint simulation environment activities to include Nimble Lightening. Continue integrated test focus on Block 4. Upgraded capabilities and improvements to include continuous upgrade of joint reprogramming enterprise labs, lab tooling, Mission Data File (MDF) development, and replacement of Ground Data Receptacle and Mission Planning system. ***FY 2022 Base Plans:*** Efforts continued in BPAC 673508. ***FY 2022 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY2021 to FY2022 increase is due to the increase of the requirements based on the revised cost estimate, which includes the addition of DevSecOps efforts.					
Title: Test and Evaluation (TE) ***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 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 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. Beginning in FY2022, 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 Fiscal Years FY2020 and FY2021. This project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request. ***FY 2021 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 Block 4 and other capabilities as directed by the F-35 JPO. Funding also supports investment planning and prioritization required for future development capabilities. This includes continuing work on instrumenting new test aircraft, delivery and installation of upgraded hardware (including production engines) as part of the DT aircraft viability effort. Additionally, this funding supports laboratory upgrades required to support development and verification of capabilities in a relevant environment, as well as meeting cyber security and testing requirements of Block 4 capabilities. Efforts also include non-recurring engineering and development of a test article to evaluate service life of F-35B Aircraft, which will then be used in flight test. ***FY 2022 Base Plans:***	103.960	141.760	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Efforts continued in BPAC 673503. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY2021 to FY2022 increase is due to ramping up test capacity to accommodate testing of Block 4 warfighter capabilities.					
Title: Maintenance Systems (MxS) Operational Data Integrated Network (ODIN) / Autonomic Logistics Information System (ALIS) Development ***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. 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. Beginning in FY2022, Maintenance Systems (MxS) 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 Fiscal Years FY2020 and FY2021. This project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.	38.644	20.772	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
FY 2021 Plans: Continue to mature initial ODIN infrastructure (hardware and cloud based development and production infrastructure), software, and data products with the goal of transitioning initial F-35 squadrons from ALIS to ODIN by the end of FY21. ODIN will develop initial unscheduled maintenance and disconnected operations capabilities and other capabilities detailed in the ODIN Capability Needs Statement (CNS), integrating government and contractor developed applications into a cohesive product. Product teams that delivered minimum viable products in FY20 will continue to develop software to fulfill user needs as defined in the ODIN CNS. ODIN will also deliver initial implementation of the Integrated Data Environment, conduct cybersecurity and user-focused testing, and develop user training. ALIS developmental efforts will be focused on low cost, high return on investment capabilities (e.g. Portable Maintenance Aid autoloader capability that will decrease the need for on-site administrators and provide immediate cost savings), and on maintaining alignment with the F-35 Air Vehicle Block 4 development. Support ALIS development environment at prime contractor site. ALIS cybersecurity improvements will be made if required. Develop and execute plans to transition aircraft, data, and operations from ALIS to ODIN. Develop improvements to Prognostic Health Management (PHM) and fault isolation and resolution with Anomaly and Failure Resolution System (AFRS) in addition to maintainer troubleshooting guides/instructions and sustainment tech data updates (e.g. Nuisance Filter Lists) as well as additional Assess Material Condition (AMC) algorithm development and implementation. ***FY 2022 Base Plans:*** Efforts continued in BPAC 673505. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY2021 to FY2022 cost decrease due to lower ODIN requirements in FY 2022 per approved Cost Estimate.					
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.	19.649	36.612	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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 FY2022, Combat Data Systems (CDS) 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 Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request. ***FY 2021 Plans:*** Continue development support for defining, managing and acquiring the F-35 Reprogramming and Mission Planning capability enhancements identified in approved requirements documents for Block 4 and modernization efforts. Support efforts for mission planning support and joint reprogramming enterprise activities. Initiate vital Mission Planning re-architecture efforts to support F-35 Operational Squadrons and replace Joint Mission Planning Software (JMPS) end of life and Ground Data Receptacle (GDR) replacement due to high cyber security risks. These updates are mandated to meet NSA Raise-the-bar requirements. Continue and expand 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. Continue and expand effort to upgrade Reprogramming Verification & Validation Systems (RVVS) to meet the Block 4 capability requirements and meet next generation threats. Continue ongoing efforts to support aircraft in relation to TR-3, Continuous Capability Development and Delivery (C2D2), Capability Upgrade and Refresh, and Network Boundary Consolidation. ***FY 2022 Base Plans:*** Efforts continued in BPAC 673506. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY2021 to FY2022 cost increase is due to a steady increase in the development of the overall Block 4 Hardware upgrades required to support the F-35 Joint Reprogramming Enterprise. In addition, the increase is associated with the ramp-up in development work associated with the F-35 Ground Data Receptacle architecture upgrade, and the planned transition of the F-35 platform to the Next Gen Open Mission System (NOMS) software					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
architecture in support of the F-35 Mission Planning Enterprise - both the GDR and NOMS development efforts make up the aircraft's Open Secure Collaboration Architecture (OSCAR) program.					
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 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. Beginning in FY2022, 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 Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request. ***FY 2021 Plans:*** The Flight Test Fleet is planned to grow to 12 aircraft in CY21 (from 11 in CY20). This includes 7 at Edwards Air Force Base and 5 at Patuxent River Naval Air Station. Flights are expected to grow from 880 in CY20 to 960 in CY21. This includes an expected increase in EFH from 1760 to 1920 hours. ***FY 2022 Base Plans:*** Efforts continued in BPAC 673504. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increased from FY2021 to FY2022 is due to the procurement of five spare engines in Lot 12-14 with bulk of incremental funding in FY21 and FY22.	23.843	18.975	0.000	0.000	0.000
Title: Training Systems (TSS) ***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	6.513	45.230	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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 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 FY2022, 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 Fiscal Years					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request. ***FY 2021 Plans:*** Continue Training System design and development activities enabling delivery of an aligned Air System in accordance with Block 4/C2D2 planning strategy. Leverage Mission Systems agile development activities as a risk-reducing measure to enable development of a relevant and robust training capability across the Block 4 capability spectrum. Continue design / development of Blade Server replacement focused on Pilot Training Device architecture upgrades that will enable and support future Block 4 modernization activities. Complete development of planned C2D2 capability updates planned for fielding in FY21. The DMT program will continue interface development for USN and USMC networks to ensure and validate compatibility with their network standards and other aviation platforms. Continued lab test and verification will ensure timely capability delivery to customers by their requested timelines. Key milestone events are Configured for Use (CFU) declarations for the USN at NAS Lemoore, and the USMC at MCAS Miramar. Continued capability and entity development and integration activities will advance the DMT training capability for all users. JSE will continue integration of initial FIAB software to allow for completion of IOT&E testing at Patuxent River NAS facility. JSE will begin development and receive delivery of updated FIAB software. JSE will continue efforts to upgrade capabilities to allow JSE to support future F-35 Block 4 needs, including beginning development of Communication, Navigation and Identification (CNI) Hardware-in-the-Loop (HITL) systems, development and integration of increased fidelity sensor models, and development and integration of Block 4 threat models. EBS will continue its design and development to support software releases and delivery to domestic and international partners and stakeholders. EBS will be used to support current and future initiatives including alignment with F-35 Training Community, rapid prototyping and requirements analysis, and other F-35 JPO high priority tasks. Support of events at the VWC involving the F-35, including upgrading of F-35 software at the VWC to include Block 4 capabilities. ***FY 2022 Base Plans:*** Efforts continued in BPAC 673507. ***FY 2022 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The increase in funding from FY2021 to FY2022 is due to increased investments in TSS Roadmap initiatives including, Synthetic Threat improvements, integration of JSE investments in the Training System, design/ development of small footprint Pilot Training Devices and hardware/software architecture improvements to enable effective delivery of future capabilities.					
Title: DevSecOps ***Description:*** Beginning in FY2022, 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 Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** Efforts continued in BPAC 673509. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** N/A	22.666	14.420	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	624.973	685.869	0.000	0.000	0.000

	FY 2020	FY 2021
Congressional Add: JASSM	0.000	10.000
FY 2020 Accomplishments: N/A ***FY 2021 Plans:*** F-35 Air System Integration Assessment (ASIA) study completed to determine feasibility of full integration of JASSM-ER on the F-35A. JASSM integration conducts preliminary integration analysis, risk reduction activities, and long lead test asset procurement for the JASSM family of weapons on F-35A/B/C		

Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 675346 / *F-35*

	FY 2020	FY 2021
variants. JASSM integration provides F-35 with a highly survivable long range precision strike capability against high value, well defended, fixed, and relocatable targets.		
Congressional Adds Subtotals	0.000	10.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• RDTE 07 0604840N: *BLI 2936: F-35C C2D2*	342.860	370.235	-	-	-	-	-	-	-	-	-
• RDTE 07 0604840M: *BLI 3410: F-35B C2D2*	380.232	341.179	-	-	-	-	-	-	-	-	-
• RDTE 07 International: *International Continuous Capability Development and Delivery*	258.004	359.626	-	-	-	-	-	-	-	-	-

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. Program Element 0604800N/0604800M continues USN development efforts budgeted in 0603800N prior to FY2002. 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 675346 / *F-35*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AV Prime LM Phase II Development	C/CPIF	Lockheed Martin : Ft Worth, TX	-	199.900	Nov 2019	187.144	Nov 2020	0.000		-		0.000	-	-	-
AV Prime LM TR-3 Development	C/CPIF	Lockheed Martin : Ft Worth, TX	-	121.150	Nov 2019	166.843	Nov 2020	0.000		-		0.000	-	-	-
TSS VWC Nimble Lightening	C/CPFF	Various : Various	-	0.050	Jan 2020	0.410	Jan 2021	0.000		-		0.000	-	-	-
TE Flight Test Assets	Various	Lockheed Martin : Ft Worth, TX	-	20.950	Dec 2019	9.760	Dec 2020	0.000		-		0.000	-	-	-
TE Prime LM TBD DT AC Viability	C/CPFF	Lockheed Martin : Ft Worth, TX	-	6.840	Dec 2019	6.000	Dec 2020	0.000		-		0.000	-	-	-
PP Prime PW Propulsion	SS/CPFF	Pratt Whitney : East Hartford, CT	-	23.840	Nov 2019	18.970	Nov 2020	0.000		-		0.000	-	-	-
TE Prime LM Developmental Foundation Contract	C/CPIF	Lockheed Martin : Ft Worth, TX	-	40.550	Nov 2019	79.250	Nov 2020	0.000		-		0.000	-	-	-
CDS Prime LM JRE Dev.	C/CPFF	Lockheed Martin : Ft Worth, TX	-	11.880	Dec 2019	25.010	Nov 2020	0.000		-		0.000	-	-	-
MxS Prime LM ALIS	C/CPFF	Lockheed Martin : Ft Worth, TX	-	3.940	Dec 2019	0.000	Dec 2020	0.000		-		0.000	-	-	-
MxS Prime LM ODIN	C/CPIF	Lockheed Martin : Ft Worth, TX	-	4.160	Dec 2019	6.710	Nov 2020	0.000		-		0.000	-	-	-
AV Prime LM Air Vehicle Integration	C/CPIF	Lockheed Martin : Ft Worth, TX	-	10.000	Nov 2019	0.000	Nov 2020	0.000		-		0.000	-	-	-
TE Prime LM F-35B Fatigue Test Article	C/CPIF	Lockheed Martin : Ft Worth, TX	-	0.000	Jan 2020	0.000	Dec 2020	0.000		-		0.000	-	-	-
TSS Prime LM Training Investments	C/CPIF	Lockheed Martin : Ft Worth, TX	-	5.060	Dec 2019	8.000	Dec 2020	0.000		-		0.000	-	-	-
AV Systems Engineering	Various	Various : Various	-	17.160	Jan 2020	7.120	Jan 2021	0.000		-		0.000	-	-	-
TSS Prime LM - JSE	C/CPIF	Lockheed Martin : Ft Worth, TX	-	0.500	Dec 2020	6.920	Dec 2020	0.000		-		0.000	-	-	-
CDS Prime LM Mission Planning Software Environment (MPSE)	C/CPIF	Lockheed Martin : Ft Worth, TX	-	0.250		3.250	Dec 2020	0.000		-		0.000	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 675346 / *F-35*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
JASSM LM Integration	TBD	TBD : TBD	-	0.000		10.000	Jun 2021	-		-		-	-	-	-
		Subtotal	-	466.230		535.387		0.000		-		0.000	-	-	N/A

Remarks

Changed Prime LM Nimble Lightening to TSS VWC Nimble Lightening, added PMO identifiers to Cost Category Item Name description, added TSS Prime LM - JSE, CDS Prime LM Mission
Planning Software Environment (MPSE).
R-2A Categories include:
Air Vehicle / Block 4 Planning & Systems Engineering: AV Prime LM Phase II Development, Prime LM Air Vehicle Integration, AV Systems Engineering.
Technology Refresh 3 (TR-3): Prime LM TR-3 Development
Test and Evaluation (TE): Flight Test Asset, Prime LM DT AC Viability, Prime Development Foundation Contract, Prime LM F-35B Fatigue Test Article
Maintenance Systems (MxS): Prime LM ALIS, Prime LM ODIN
Combat Data Systems (CDS): Prime TBD JRE Dev, Prime LM MPSE
Propulsion (PP): Prime PW Propulsion
Training Systems (TSS): Prime LM Training Investments, Prime LM - JSE, VWC Nimble Lightening
Prime LM Phase II Development Contract is a hybrid CPIF/CPAF contract.
Prime LM F-35B Fatigue Test Article is a hybrid CPIF/CPFF contract.
Per USD(A&S) announcement, changing ALIS Next to ALIS / ODIN.
Prime LM ALIS / ODIN Contract is a hybrid CPFF/CPIF contract.
Flight Test assets include weapons procurement to support Test and assets needed for flight test instrumentation

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TSS Development Support - JSE	WR	Various : Various	-	0.900	Dec 2019	8.300	Dec 2020	0.000		-		0.000	-	-	-
AV Mission Systems Support	Various	Various : Various	-	2.440	Dec 2019	4.140	Dec 2020	0.000		-		0.000	-	-	-
AV Vehilce Systems Support	Various	Various : Various	-	0.000	Dec 2019	0.000	Dec 2020	0.000		-		0.000	-	-	-
TSS Development Support - Training Systems	Various	Various : Various	-	0.000	Dec 2019	4.090	Dec 2020	0.000		-		0.000	-	-	-
AV CSO Development support	Various	Various : Various	-	8.370	Dec 2019	1.270	Dec 2020	0.000		-		0.000	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 675346 / *F-35*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CDS JRE IPT Development Support	Various	Various : Various	-	6.250	Dec 2019	25.010	Dec 2020	0.000		-		0.000	-	-	-
MxS Dev Ops Development Support	Various	Various : Various	-	23.720	Dec 2019	2.500	Dec 2020	0.000		-		0.000	-	-	-
MxS ALIS / ODIN Development Support	Various	Various : Various	-	6.070	Dec 2019	1.730	Dec 2020	0.000		-		0.000	-	-	-
CDS MPSE Re-Arch Development Support	Various	Various : Various	-	1.270	Dec 2019	3.580	Dec 2020	0.000		-		0.000	-	-	-
PP Propulsion Development Support	Various	Various : Various	-	0.000	Dec 2019	0.000	Dec 2020	0.000		-		0.000	-	-	-
		Subtotal	-	49.020		50.620		0.000		-		0.000	-	-	N/A

Remarks

Changed JSE/IPT Development Support to TSS Support Cost - JSE and to various, changed ALIS DevOps Development Support to MxS Dev Ops Development Support, changed JRE
Development Support to CDS JRE IPT Development Support, changed IPT Development Support to AV Mission Systems Support and changed to various, changed IPT Development Support to
AV Vehicle Systems Support and changed to various, changed ALIS/ODIN Development support to MxS ALIS/ODIN Development Support, added CDS MPSE Re-Arch Development Support,
added PP Propulsion Development Support, and changed IPT Support to TSS Development Support - Training Systems.
R-2A Categories include:
Air Vehicle (AV) / Block 4 Planning & Systems Engineering: Missions Systems Support, Vehicle Systems Support, IPT Development Support, Tech Planning
Maintenance Systems (MxS)Dev Ops Development Support, Maintenance Systems Development Support, ALIS/ODIN Development Support
Combat Data Systems (CDS) : MPSE Re-Arch Development Support, JRE IPT Development Support
Propulsion (PP): Propulsion Development Support
Training Systems (TSS): Development Support - JSE, Development Support - Training Systems
Per USD(A&S) announcement, changing ALIS Next to ALIS / ODIN.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TE Developmental Test & Evaluation - PAX	WR	NAWCAD : Patuxent River, MD	-	9.415	Dec 2019	6.523	Dec 2020	0.000		-		0.000	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force			Date: May 2021
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / *F-35 C2D2*	Project (Number/Name) 675346 / *F-35*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TE Developmental Test & Evaluation - CL	WR	NAWCWD : China Lake, CA	-	9.415	Dec 2019	6.523	Dec 2020	0.000		-		0.000	-	-	-
TE Developmental Test & Evaluation - Edwards AFB	MIPR	Edwards AFB : Edwards AFB, CA	-	9.415	Dec 2019	6.523	Dec 2020	0.000		-		0.000	-	-	-
TE Developmental Test & Evaluation - Various	Various	Various : Various	-	9.415	Dec 2019	6.523	Dec 2020	0.000		-		0.000	-	-	-
TE Operational Test & Evaluation - UOTT	MIPR	Nellis AFB : Nellis AFB, NV	-	16.780	Dec 2019	20.670	Dec 2020	0.000		-		0.000	-	-	-
TE USMC Operational Test & Evaluation - VMX-1	WR	Yuma Air Station : Yuma Air Station, NV	-	0.000	Nov 2019	0.000	Dec 2020	0.000		-		0.000	-	-	-
TE USN Operational Test & Evaluation - VX-9	WR	Various : Various	-	0.000	Nov 2019	0.000	Nov 2020	0.000		-		0.000	-	-	-
TE Ground Test	Various	Various : Various	-	0.000	Jul 2020	0.000		0.000		-		0.000	-	-	-
		Subtotal	-	54.440		46.762		0.000		-		0.000	-	-	N/A

Remarks

Added TE Ground Test line and added PMO Specific identifier in front of Cost Category Item Name description.
All lines total to Test and Evaluation (TE) R-2A.
Added USMC Operational Test & Evaluation line, USMC added funding for service unique Operational Test support, broken out from Operational Test & Evaluation line.
Added USN Operational Test & Evaluation line, USN added funding for service unique Operational Test support, broken out from Operational Test & Evaluation line.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AFLCMC Civilian Pay	C/CPAF	AFLCMC Civ Pay : Wright Patterson AFB, OH	-	40.260	Oct 2019	34.730	Oct 2020	0.000		-		0.000	-	-	-
Financial Mgmt Database Support IDS	C/CPAF	Various : Various	-	0.500	Dec 2019	0.250	Dec 2020	0.000		-		0.000	-	-	-
Earned Value/Finance/ Cost ACT-I	C/CPAF	Various : Various	-	0.505	Dec 2019	0.500	Dec 2020	0.000		-		0.000	-	-	-
Operating Core Support	C/FP	Various : Various	-	8.820	Dec 2019	1.910	Dec 2020	0.000		-		0.000	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 675346 / *F-35*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Other Core Contractor Support	C/CPAF	NAWCAD/WD : Vatious	-	0.000		0.000		0.000		-		0.000	-	-	-
Travel	Various	Not specified. : TBD	-	0.880	Dec 2019	0.020	Dec 2020	0.000		-		0.000	-	-	-
DevSecOps	Various	Not specified. : TBD	-	4.318	Oct 2019	25.690	Oct 2020	0.000		-		0.000	-	-	-
		Subtotal	-	55.283		63.100		0.000		-		0.000	-	-	N/A

Remarks

All lines total to Infrastructure and Support.
Beginning in FY20 HPSI will be in a separate BPAC and no longer included in USAF C2D2 budget docs.

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	624.973		695.869		0.000		-		0.000	-	-	N/A

Remarks

Subtotals and totals may not add due to rounding.
Prior Year reflects only PE 0604840M/N due to PE 0604810M/N ending in FY18 and being replaced by PE 0604840M/N in FY19 as budget moves from BA05 to BA07.
Prior Years reflects $414.998M USAF/$215.366M USN/$222.644 USMC/$209.763M International/Total $1,062.771M
FY 2020 reflects $642.371M USAF/$342.8600M USN/$380.232M USMC/$258.004M International/Total $1,623.467M
FY 2021 reflects $785.336M USAF/$413.875M USN/$379.549M USMC/$359.626M International/Total $1,938.386M
FY 2022 reflects $549.279M USAF/$328.999M USN/$349.197M USMC/$224.501M International/Total $1,451.976M
R-2A (section B)/R-3 displays total combined program (i.e. not Service-specific), including International partners.
JSF Continuous Capability Development and Delivery (C2D2) Includes:
USAF PE 0207142F BPAC 675346
USAF PE 0604840F BPAC 675346
USN PE 0604810N Project Unit 2936 - ends FY18
USMC PE 0604810M Project Unit 2935 - ends FY18

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 675346 / *F-35*

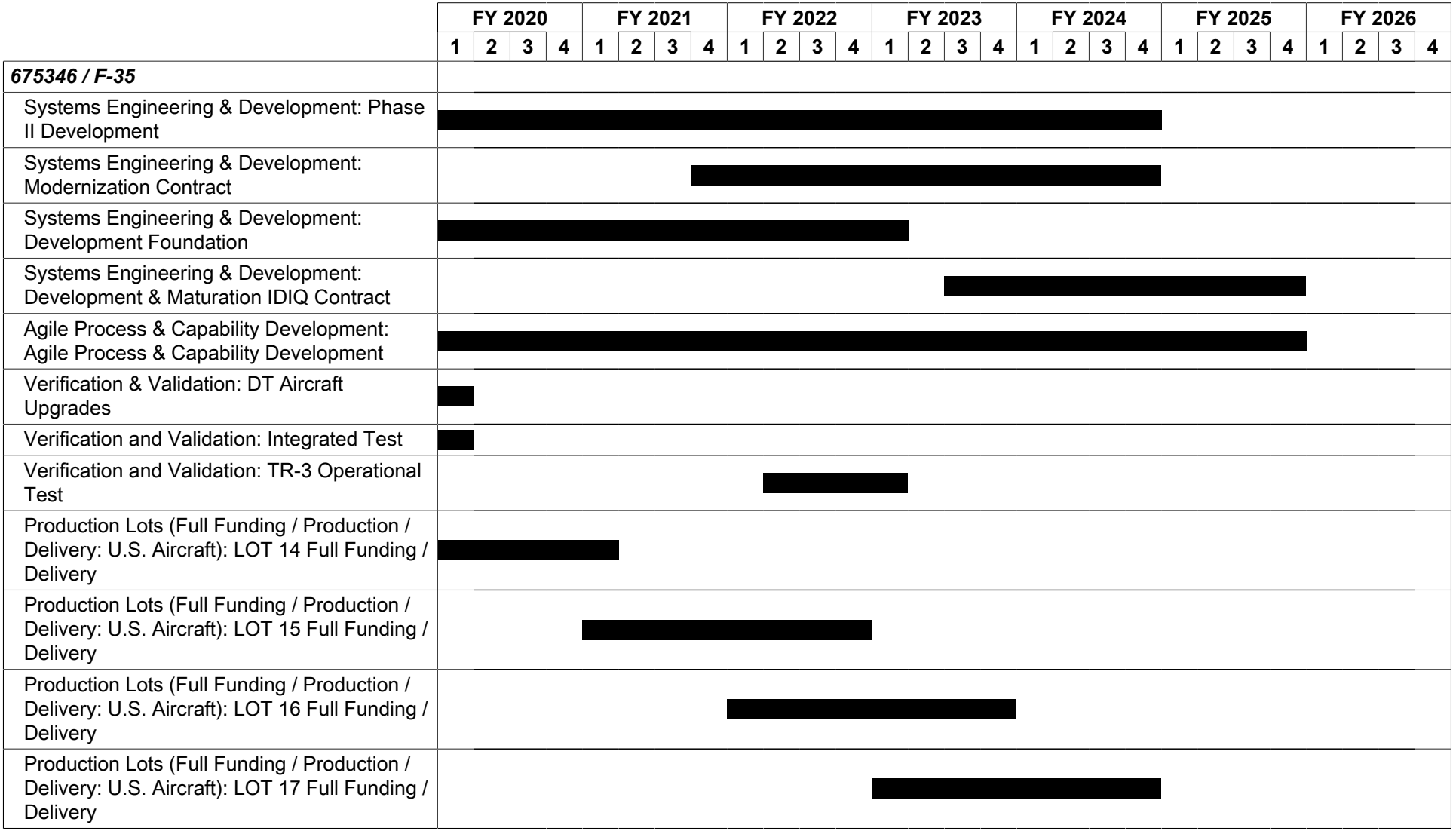

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 675346 / *F-35*

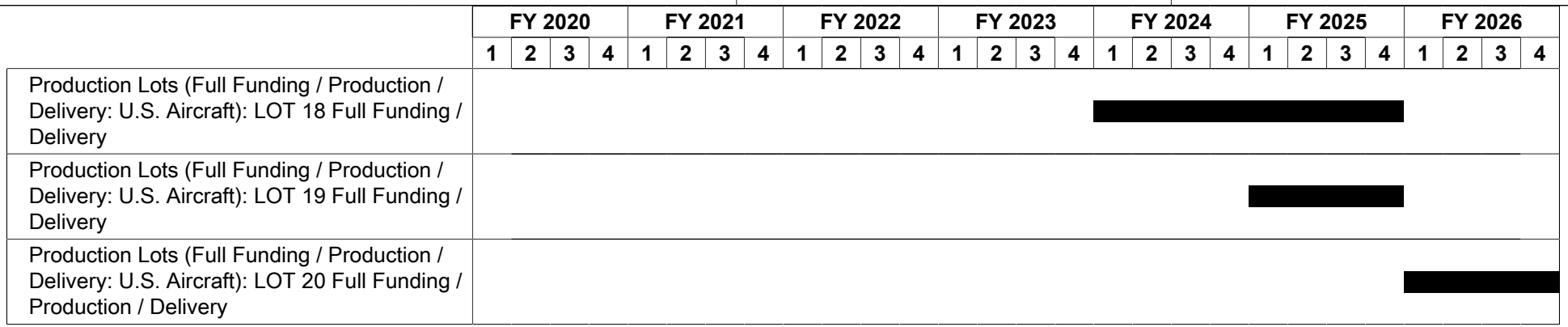

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604840F / *F-35 C2D2*	**Project (Number/Name)** 675346 / *F-35*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
675346 / F-35				
Systems Engineering & Development: Phase II Development	1	2020	4	2024
Systems Engineering & Development: Modernization Contract	4	2021	4	2024
Systems Engineering & Development: Development Foundation	1	2020	1	2023
Systems Engineering & Development: Development & Maturation IDIQ Contract	3	2023	4	2025
Agile Process & Capability Development: Agile Process & Capability Development	1	2020	4	2025
Verification & Validation: DT Aircraft Upgrades	1	2020	1	2020
Verification and Validation: Integrated Test	1	2020	1	2020
Verification and Validation: TR-3 Operational Test	2	2022	1	2023
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 14 Full Funding / Delivery	1	2020	1	2021
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 15 Full Funding / Delivery	1	2021	4	2022
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 16 Full Funding / Delivery	1	2022	4	2023
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 17 Full Funding / Delivery	1	2023	4	2024
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 18 Full Funding / Delivery	1	2024	4	2025
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 19 Full Funding / Delivery	1	2025	4	2025
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 20 Full Funding / Production / Delivery	1	2026	4	2026