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

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1202140F / <i>Service Support to SPACECOM Activities</i>
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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	-	11.429	8.983	6.737	0.000	6.737	-	-	-	-	-	-
672486: <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>	-	7.033	7.484	5.195	0.000	5.195	-	-	-	-	-	-
67A011: <i>Space Analysis and Application Development</i>	-	4.396	1.499	1.542	0.000	1.542	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The Space Analysis and Application Development program integrates space based effects into Department's 'Model of Record' for joint campaign analysis. Current modeling and simulation (M&S) models are inadequate to represent the contribution that U.S space capabilities make to the air, sea, and land fight and do not accurately portray current and future space threats. This line of effort integrates effects of space capabilities into mission and campaign-level M&S tools. Enhanced space M&S will enable the DoD to make informed decisions regarding the direction of U.S. Space Doctrine, Tactics, Techniques, Procedures, and Resource Decisions. The DoD requires the ability to conduct campaign-level analysis to quantify the holistic operational impacts of adversary space actions on military campaigns and U.S. global operations.

Navigation Warfare (NAVWAR) is deliberate defensive and offensive action to assure positioning, navigation, and timing (PNT) information through coordinated employment of space, cyberspace, and electronic warfare (EW) operations. Funds are used to create and maintain NAVWAR knowledge. NAVWAR expertise is developed in part by execution of PNT Operational Field Assessments (POFAs). GYPSY POFA's are linked to Combatant Commander's (CCMD) Tier 1 exercises (USSTRATCOM's Global Lightning and Global Thunder are examples) and provide operational realistic threat-representative, GPS-contested environments for analytical assessment of air, ground, maritime, space & cyberspace mission capability. FORTUNE POFAs are PNT capability and vulnerability assessments associated with a Service exercise or mission event. PRISM POFAs encompass all Operations, Actions, and Activities (OAAs) associated with events outside of specific CCMD and/or service exercises or mission events. Assessments inform service acquisition decisions, capability gaps, intelligence gaps and tactics, techniques and procedures (TTP) development and implementation to mitigate effects on warfighter operations in the anticipated theater NAVWAR threat environments. JNWC assesses Department wide PNT posture through the PNT Annual assessment IAW DoDI 4650.08.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Space Analysis and Application Development capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.0M was expended and in FY21 \$0.0M is forecasted for civilian pay expenses in this program element.

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

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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1202140F / <i>Service Support to SPACECOM Activities</i>
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B. Program Change Summary (\$ in Millions)	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>
Previous President's Budget	11.863	8.999	9.179	0.000	9.179
Current President's Budget	11.429	8.983	6.737	0.000	6.737
Total Adjustments	-0.434	-0.016	-2.442	0.000	-2.442
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-0.016			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.434	0.000	-2.442	0.000	-2.442

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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 1202140F / <i>Service Support to SPACE COM Activities</i>				Project (Number/Name) 672486 / <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>			
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
672486: <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>	-	7.033	7.484	5.195	0.000	5.195	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Navigation Warfare (NAVWAR) is deliberate defensive and offensive action to assure positioning, navigation, and timing (PNT) information through coordinated employment of space, cyberspace, and electronic warfare (EW) operations. Funds are used to create and maintain NAVWAR knowledge. NAVWAR expertise is developed in part by execution of PNT Operational Field Assessments (POFAs). GYPSY POFA's are linked to Combatant Commander's (CCMD) Tier 1 exercises (USSTRATCOM's Global Thunder and Global Lightning are examples) and provide operational realistic threat-representative, GPS-contested environments for analytical assessment of air, ground, maritime, space & cyberspace mission capability. FORTUNE POFAs are PNT capability and vulnerability assessments associated with a Service exercise or mission event. PRISM POFAs encompass all Operations, Actions, and Activities (OAAs) associated with events outside of specific CCMD and/or service exercises or mission events. Assessments inform service acquisition decisions, capability gaps, intelligence gaps and tactics, techniques and procedures (TTP) development and implementation to mitigate effects on warfighter operations in the anticipated theater NAVWAR threat environments. JNWC assesses department wide PNT posture through the PNT Annual assessment IAW DoDI 4650.08.

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

	FY 2020	FY 2021	FY 2022
Title: PNT Operational Assessments	7.033	7.484	5.195
Description: The JNWC will investigate, operationally assess, and simulate potential threats and mitigation strategies for denial of blue force PNT capabilities as well as preventing the hostile use of PNT information. Major Performers - Best value to the government selected contractors, universities, government facilities, federally funded research and development centers, laboratories, or other organizations			
FY 2021 Plans: Continuing Operational assessments - Modeling and simulation equipment, to simulate potential threats (Red force vs Blue Force capabilities) and develop mitigation strategies for potential denial of blue force PNT capabilities.			
Continued development, scenario build, specialized equipment, to prevent the hostile use of Positioning, Navigation and Timing (PNT) information.			

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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 1202140F / <i>Service Support to SPACE COM Activities</i>	Project (Number/Name) 672486 / <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>Planned exercises - GYPSY x2 for Combatant Command objectives, Fortune exercises x4 are for Service objectives, and PRISM events (undetermined) are for all others.</p> <p>FY 2022 Plans: Continuing Operational assessments - Modeling and simulation equipment, to simulate potential threats (Red force vs Blue Force capabilities)and develop mitigation strategies for potential denial of blue force PNT capabilities.</p> <p>Continued development, scenario build, specialized equipment, to prevent the hostile use of Positioning, Navigation and Timing (PNT) information.</p> <p>Planned exercises - GYPSY x2 for Combatant Command objectives, Fortune exercises x4 are for Service objectives, and PRISM events (undetermined) are for all others.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease in requirements</p>				
Accomplishments/Planned Programs Subtotals		7.033	7.484	5.195
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
New contracts will be awarded using competitive procedures to the maximum extent possible.				

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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 1202140F / Service Support to SPACE COM Activities	Project (Number/Name) 672486 / JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	0.000		0.000		0.000		-		0.000	-	-	-
Position Navigation and Timing Operational Field Assessments	PO	Multiple, Kirtland AFB NM : Kirtland, NM	-	7.033	Oct 2019	7.484	Oct 2020	5.195	Oct 2021	-		5.195	-	-	-
Subtotal			-	7.033		7.484		5.195		-		5.195	-	-	N/A

Remarks
Prior to the FY20 PB cycle, The Joint Navigation and Warfare Center (JNWC) was reported under PE 1201921F, WSC 672486. Beginning in FY20, the program will be reported under the newly created PE 1202140F, Service Support to U.S. SPACECOM Activities

	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	-	7.033	7.484	5.195	-	5.195	-	-	N/A

Remarks

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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 1202140F / <i>Service Support to SPACE COM Activities</i>	Project (Number/Name) 672486 / <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Navigation Warfare (NAVWAR)																												
NAVWAR Operational Field Assessments - Continuing																												
Create / Maintain NAVWAR Knowledge - Continuing																												
NAVWAR Operational and CONOPS Events - Continuing																												

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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 1202140F / <i>Service Support to SPACE COM Activities</i>	Project (Number/Name) 672486 / <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Navigation Warfare (NAVWAR)</i>				
NAVWAR Operational Field Assessments - Continuing	1	2020	4	2026
Create / Maintain NAVWAR Knowledge - Continuing	1	2020	4	2026
NAVWAR Operational and CONOPS Events - Continuing	1	2020	4	2026

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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 1202140F / Service Support to SPACE COM Activities				Project (Number/Name) 67A011 / Space Analysis and Application Development			
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
67A011: <i>Space Analysis and Application Development</i>	-	4.396	1.499	1.542	0.000	1.542	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Analysis and Application Development program integrates space based effects into Department's 'Model of Record' for joint campaign analysis. Current modeling and simulation (M&S) models are inadequate to represent the contribution that U.S space capabilities make to the air, sea, and land fight and do not accurately portray current and future space threats. This line of effort integrates effects of space capabilities into mission and campaign-level M&S tools. Enhanced space M&S will enable the DoD to make informed decisions regarding the direction of U.S. Space Doctrine, Tactics, Techniques, Procedures, and Resource Decisions. The DoD requires the ability to conduct campaign-level analysis to quantify the holistic operational impacts of adversary space actions on military campaigns and U.S. global operations.

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

	FY 2020	FY 2021	FY 2022
Title: Space Campaign Modeling and Simulation, Development/Modification/Verification/Validation	4.396	1.499	1.542
Description: Developed, modifies, verifies, and validates new models for Space mission areas and modifies existing models to portray new capabilities			
FY 2021 Plans:			
- Continue priority integration of 22 Joint Mission Threads, space-based capabilities, and counter-space effects on the Warfighter in STORM			
- Continue to develop change request proposals and submit to STORM Configuration Control Board (CCB) to improve instantiation of potential future and denied/degraded space-based capabilities and their effects on the Warfighter in STORM			
- In coordination with HAF A/9 (HQ Air Force Studies, Analysis, and Assessments), develop schedule to identify requirements toward implementation of approved change requests and instantiation of space and contested space capabilities in STORM			
- Develop and modify user-friendly, front-end campaign-level M&S software and tools supporting sufficiently accurate and very timely exploratory analytics to optimize more costly campaign-level STORM M&S, operational planning, gaming, and concept development			

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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 1202140F / <i>Service Support to SPACE COM Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> - Continue development of software and tools to model Red on Blue contested space (one versus one, many versus many, and space campaign-level) and analyze/assess results to determine impact/effects on U.S. military campaigns and global operations - Coordinate and update current and future Blue space order of battle data, Red counter-space order of battle data, Red counter-space CONOPS, future Blue and Red CONOPs to support integration of contested space into mission and campaign-level M&S - Continue updates to software, tools, models, and data at the mission- and campaign-level to inform senior leaders evolving inquiries and decisions on space investments, requirements, acquisition, operational COAs, operational risk, and future planning - Assess and integrate enterprise-level model data for SATCOM capabilities into campaign-level modeling - In coordination with European Command, Indo-Pacific Command, other combatant commands, and respective USSPACECOM Integrated Planning Elements; explore improved integrated risk analysis with new campaign-level M&S capabilities - Utilize updated tools and data to support analytical efforts in support of SPACECOM activities, new Space Analysis Consortium, and evolving space analytical capabilities; and collaborate with partners to inform senior leader forums and decisions on space investments, requirements, acquisition, and operational risk decisions - Support cost benefit analyses of Space Control activities with quantifiable impacts to warfighter operations - Provide analysis support to inform Air Force Space Command's Space Enterprise Vision (SEV) <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue priority integration of 22 Joint Mission Threads, space-based capabilities, and counter-space effects on the Warfighter in STORM - Continue to develop change request proposals and submit to STORM Configuration Control Board (CCB) to improve instantiation of potential future and denied/degraded space-based capabilities and their effects on the Warfighter in STORM - In coordination with HAF A/9 (HQ Air Force Studies, Analysis, and Assessments), develop schedule to identify requirements toward implementation of approved change requests and instantiation of space and contested space capabilities in STORM 				

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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 1202140F / <i>Service Support to SPACE COM Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> - Develop and modify user-friendly, front-end campaign-level M&S software and tools supporting sufficiently accurate and very timely exploratory analytics to optimize more costly campaign-level STORM M&S, operational planning, gaming, and concept development - Continue development of software and tools to model Red on Blue contested space (one versus one, many versus many, and space campaign-level) and analyze/assess results to determine impact/effects on U.S. military campaigns and global operations - Coordinate and update current and future Blue space order of battle data, Red counter-space order of battle data, Red counter-space CONOPS, future Blue and Red CONOPs to support integration of contested space into mission and campaign-level M&S - Continue updates to software, tools, models, and data at the mission- and campaign-level to inform senior leaders evolving inquiries and decisions on space investments, requirements, acquisition, operational COAs, operational risk, and future planning - Assess and integrate enterprise-level model data for SATCOM capabilities into campaign-level modeling - In coordination with European Command, Indo-Pacific Command, other combatant commands, and respective USSPACECOM Integrated Planning Elements; explore improved integrated risk analysis with new campaign-level M&S capabilities - Utilize updated tools and data to support analytical efforts in support of SPACECOM activities, new Space Analysis Consortium, and evolving space analytical capabilities; and collaborate with partners to inform senior leader forums and decisions on space investments, requirements, acquisition, and operational risk decisions - Support cost benefit analyses of Space Control activities with quantifiable impacts to warfighter operations - Provide analysis support to inform Air Force Space Command's Space Enterprise Vision (SEV) <p><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> Project varies by year</p>				
Accomplishments/Planned Programs Subtotals		4.396	1.499	1.542
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				

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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 1202140F / <i>Service Support to SPACE COM Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>

D. Acquisition Strategy

Any new projects funded in this program will be awarded using competitive procedures to the maximum extent possible.

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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 1202140F / Service Support to SPACE COM Activities	Project (Number/Name) 67A011 / Space Analysis and Application Development
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	0.000		0.000		0.000		-		0.000	-	-	-
Model Space effects for two mission tasks and integrate into STORM for joint campaign analysis	C/CPAF	TBD : TBD	-	4.396	Oct 2019	1.499	Oct 2020	1.542	Oct 2021	-		1.542	-	-	-
Subtotal			-	4.396		1.499		1.542		-		1.542	-	-	N/A

Remarks
Prior to the FY20 PB cycle, The Space Analysis and Application Development Program was reported under PE 1201921F, WSC 67A011. Beginning in FY20, the program will be reported under the newly created PE 1202140F, USSPACECOM

	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	-	4.396	1.499	1.542	-	1.542	-	-	N/A

Remarks
Prior to the FY20 PB cycle, The Space Analysis and Application Development Program was reported under PE 1201921F, WSC 67A011. Beginning in FY20, the program will be reported under the newly created PE 1202140F, USSPACECOM

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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 1202140F / <i>Service Support to SPACE COM Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Space Analysis Modeling and Simulation	
Identify and develop additional Joint Mission Threads for integration into mission and campaign level modeling	██████████
Identify and develop additional Joint Mission Threads and Space Mission Threads for integration into mission and campaign level modeling	██████████
Complete mission-level modeling and analysis for Joint Mission Threads and Space Mission Threads	██████████
Run improved STORM model and update integrated risk analysis with Combatant Commands	██████████
Develop software and tools to model Red on Blue contested space environment. Develop space playbook to define Red counter-space threat	██████████
Update mission and campaign level M&S to inform senior leaders evolving inquiries and decisions on innovation, space investments, rapid acquisition, operational COAs, risk, and planning	██

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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 1202140F / <i>Service Support to SPACE COM Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Space Analysis Modeling and Simulation</i>				
Identify and develop additional Joint Mission Threads for integration into mission and campaign level modeling	1	2020	4	2020
Identify and develop additional Joint Mission Threads and Space Mission Threads for integration into mission and campaign level modeling	1	2021	4	2021
Complete mission-level modeling and analysis for Joint Mission Threads and Space Mission Threads	1	2022	4	2022
Run improved STORM model and update integrated risk analysis with Combatant Commands	1	2023	4	2023
Develop software and tools to model Red on Blue contested space environment. Develop space playbook to define Red counter-space threat	1	2024	4	2024
Update mission and campaign level M&S to inform senior leaders evolving inquiries and decisions on innovation, space investments, rapid acquisition, operational COAs, risk, and planning	1	2025	4	2026

Note

Prior to the FY20 PB cycle, The Space Analysis and Application Development Program was reported under PE 1201921F, WSC 67A011. Beginning in FY20, the program will be reported under the newly created PE 1202140F, USSPACECOM