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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 0305022F / <i>ISR Modernization & Automation Dvmt (IMAD)</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	-	19.000	19.230	18.888	0.000	18.888	-	-	-	-	-	-
675197: <i>Core Technology</i>	-	16.000	15.936	15.740	0.000	15.740	-	-	-	-	-	-
675306: <i>Analysis Enterprise</i>	-	3.000	3.294	3.148	0.000	3.148	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

(U) AF ISR must adapt large data sets and condition it into mission ready data sets, allowing personnel to discover, manage, and analyze data and transform it into living intelligence.

(U) Kill Chain Automation applies new methodologies; advanced artificial intelligence and machine learning; ensures data is accessible, discoverable, and interoperable; and delivers decision advantage from detection to mission execution.

(U//FOUO) Algorithmic Warfare encompasses efforts to develop, employ, or field artificial intelligence, automation, machine learning, deep learning, and computer vision algorithms. This critical shift to the digital age will transition ISR analysis from the "what" to the "why" of analysis via human-machine teaming. Algorithmic Warfare can provide world-class ISR support to Joint Operations at the scale and speed required in modern warfare against our adversaries.

(U//FOUO) Algorithmic Warfare reshapes current sense, identify, attribute, share (SIAS, previously known as PED - processing, exploitation, and dissemination) models because the current models will be unsustainable and ineffective in developing ISR digital solutions to find efficiencies and thrive in a complex operating environment. This funding is a first step to address ISR analysts' struggles with data overload; they currently spend 80 percent of their time searching for data and 20 percent of their time making sense of the information.

(U) Supports National Defense Strategy priority of operating at the "speed of relevance."

(U) Supports Next Generation ISR Dominance Flight Plan.

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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B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	19.000	19.265	19.171	0.000	19.171
Current President's Budget	19.000	19.230	18.888	0.000	18.888
Total Adjustments	0.000	-0.035	-0.283	0.000	-0.283
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• 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	0.000	-0.035	-0.283	0.000	-0.283

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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 0305022F / <i>ISR Modernization & Automation Dvmt (IMAD)</i>	Project (Number/Name) 675197 / <i>Core Technology</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
675197: <i>Core Technology</i>	-	16.000	15.936	15.740	0.000	15.740	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

(U//FOUO) Algorithmic Warfare encompasses efforts to develop, employ, or field artificial intelligence, automation, machine learning, deep learning, and computer vision algorithms. This critical shift to the digital age will transition ISR analysis from the "what" to the "why" of analysis via human-machine teaming. Algorithmic Warfare can provide world-class ISR support to Joint Operations at the scale and speed required in modern warfare against our adversaries.

(U//FOUO) Algorithmic Warfare reshapes current sense, identify, attribute, share (SIAS, previously known as PED - processing, exploitation, and dissemination) models because the current models will be unsustainable and ineffective in developing ISR digital solutions to find efficiencies and thrive in a complex operating environment. This funding is a first step to address ISR analysts' struggles with data overload; they currently spend 80 percent of their time searching for data and 20 percent of their time making sense of the information.

(U) Supports National Defense Strategy priority of operating at the "speed of relevance."

(U) Supports Next Generation ISR Dominance Flight Plan.

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

	FY 2020	FY 2021	FY 2022
Title: Algorithmic Warfare	16.000	15.936	15.740
Description: SECAF directed the AF to invest in a more automated environment to relieve strain on manpower in the out years. Algorithmic Warfare can provide world-class ISR support to Joint Operations at the scale and speed required in modern warfare against our adversaries. This effort supports National Defense Strategy of operating at the "speed of relevance."			
FY 2021 Plans: Continuing to develop ISR Algorithmic Warfare - artificial intelligence, automation, machine learning, deep learning, and computer vision algorithms			
FY 2022 Plans: Continue to develop ISR Algorithmic Warfare - artificial intelligence, automation, machine learning, deep learning, and computer vision algorithms			
FY 2021 to FY 2022 Increase/Decrease Statement:			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Decreased development activities			
Accomplishments/Planned Programs Subtotals	16.000	15.936	15.740

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

N/A

Remarks

D. Acquisition Strategy

N/A

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

<i>Algorithmic Warfare</i>																												
Begin Algorithm Development																												

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

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Algorithmic Warfare</i>				
Begin Algorithm Development	1	2020	4	2026

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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
675306: <i>Analysis Enterprise</i>	-	3.000	3.294	3.148	0.000	3.148	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

(U) AF ISR must adapt large data sets and condition it into mission sets, allowing personnel to discover, manage, and analyze data and transform it into living intelligence. Kill Chain Automation applies new methodologies; advances automation and machine learning; ensures data is accessible, agreeable, and interoperable; and delivers decision advantage.

(U) Supports National Defense Strategy priority of operating at the "speed of relevance."

(U) Supports Next Generation ISR Dominance Flight Plan.

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

	FY 2020	FY 2021	FY 2022
Title: Kill Chain Automation	3.000	3.294	3.148
Description: AF's first ISR investment to work large data sets, automation, COTS IT tolls, and data aggregation.			
FY 2021 Plans: Continuing to fund software development to automate ISR analyst workflows; analysts currently spend 80 percent of their time searching for data and 20 percent of their time making sense of information. Human-machine teaming allows humans and machines to focus on activities they each do best.			
FY 2022 Plans: Continue to fund software development to automate ISR analyst workflows; analysts currently spend 80 percent of their time searching for data and 20 percent of their time making sense of information. Human-machine teaming allows humans and machines to focus on activities they each do best			
FY 2021 to FY 2022 Increase/Decrease Statement: Decreased to fund other higher Air Force priorities			
Accomplishments/Planned Programs Subtotals	3.000	3.294	3.148

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

N/A

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

Remarks

D. Acquisition Strategy
N/A

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

<i>Kill Chain Automation</i>	
Begin automation development	

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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Kill Chain Automation</i>				
Begin automation development	1	2020	4	2026