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

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0305022F / <i>ISR Modernization &amp; Automation Dvmt (IMAD)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	19.000	19.265	0.000	19.265	19.171	19.265	19.362	19.719	Continuing	Continuing
675197: <i>Core Technology</i>	-	0.000	16.000	15.971	0.000	15.971	15.976	15.971	15.969	16.263	Continuing	Continuing
675306: <i>Analysis Enterprise</i>	-	0.000	3.000	3.294	0.000	3.294	3.195	3.294	3.393	3.456	Continuing	Continuing

**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//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>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	0.000	19.000	19.300	0.000	19.300
Current President's Budget	0.000	19.000	19.265	0.000	19.265
Total Adjustments	0.000	0.000	-0.035	0.000	-0.035
• 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	0.000	-0.035	0.000	-0.035

**Change Summary Explanation**

New start in FY20.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Air Force										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0305022F / <i>ISR Modernization &amp; Automation Dvmt (IMAD)</i>				<b>Project (Number/Name)</b> 675197 / <i>Core Technology</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675197: <i>Core Technology</i>	-	0.000	16.000	15.971	0.000	15.971	15.976	15.971	15.969	16.263	Continuing	Continuing
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)**

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> Algorithmic Warfare	0.000	16.000	15.971
<b>Description:</b> 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."			
<b>FY 2020 Plans:</b> Provides RDT&E funding to develop ISR Algorithmic Warfare - artificial intelligence, automation, machine learning, deep learning, and computer vision algorithms.			
<b>FY 2021 Plans:</b> Continuing to develop ISR Algorithmic Warfare - artificial intelligence, automation, machine learning, deep learning, and computer vision algorithms			
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b>			

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
Decrease due to other higher Air Force priorities			
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	16.000	15.971

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Air Force</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0305022F / <i>ISR Modernization &amp; Automation Dvmt (IMAD)</i>	<b>Project (Number/Name)</b> 675197 / <i>Core Technology</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

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

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Air Force		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0305022F / <i>ISR Modernization &amp; Automation Dvmt (IMAD)</i>	<b>Project (Number/Name)</b> 675197 / <i>Core Technology</i>

Schedule Details

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

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

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0305022F / <i>ISR Modernization &amp; Automation Dvmt (IMAD)</i>	<b>Project (Number/Name)</b> 675306 / <i>Analysis Enterprise</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675306: <i>Analysis Enterprise</i>	-	0.000	3.000	3.294	0.000	3.294	3.195	3.294	3.393	3.456	Continuing	Continuing
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 2019	FY 2020	FY 2021
<b>Title:</b> Kill Chain Automation	0.000	3.000	3.294
<b>Description:</b> AF's first ISR investment to work large data sets, automation, COTS IT tolls, and data aggregation.			
<b>FY 2020 Plans:</b> Funds 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.			
<b>FY 2021 Plans:</b> 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.			
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> increase in required funding			
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	3.000	3.294

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

N/A

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Air Force		<b>Date:</b> February 2020
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**C. Other Program Funding Summary (\$ in Millions)**

**Remarks**

**D. Acquisition Strategy**

N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2021 Air Force		<b>Date:</b> February 2020
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

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

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Air Force		<b>Date:</b> February 2020
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Schedule Details

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