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

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604270F / <i>Electronic Warfare Development</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	6.849	7.222	13.804	0.000	13.804	18.230	18.687	19.069	60.125	Continuing	Continuing
653891: <i>Adv Infrared Counter Measures(Aircm)</i>	-	6.849	7.222	13.804	0.000	13.804	18.230	18.687	19.069	60.125	Continuing	Continuing

Note

This program, BA 5, PE 0604270F, project 653891, Cognitive Electromagnetic Warfare (EW), is a new start.
 This program, BA 5, PE 0604270F, project 653891, Threat Acquisition & Exploitation, is a new start.
 This program, BA 5, PE 0604270F, project 653891, Electromagnetic Battle Management (EMBM), is a new start.

A. Mission Description and Budget Item Justification

653891: The Advanced Infrared Countermeasure (AIRCm) project contains related aircraft self-protection efforts aimed at increasing aircraft survivability against the increasing threat of sophisticated surface-to-air and air-to-air missiles. These missiles may employ sophisticated next-generation Electro-Optics (EO), Infrared (IR), Radio Frequency (RF), dual-mode (i.e. IR and RF), or multi-mode seekers. AIRCm will provide advanced expendable countermeasures and/or techniques that will be functionally compatible with existing dispenser systems and employed across multiple USAF weapons systems. This also includes any and all flare, chaff, decoy, and associated component development and testing that may be demanded or needed in current and future operations regardless of aircraft platform. Similar activities that are supplementary to this effort may be accomplished ad hoc using platform specific funding or through other activities such as joint services or NATO test groups.

Funding increased in FY24 due to change in focus from defeating Counter Violent Extremist Organization relevant threats to closing capability gaps to defeat latest National Defense Strategy top priority threat systems.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831 F, 0605832F, 0605833F, 0605898F, 0606398F. In FY22, 0.00 was expended for civilian pay expenses in this program element, and in FY23 0.00 is forecasted for civilian pay expenses in this program element.

This program leverages Digital acquisition tenets of open, agile, and digital. Common component development, in collaboration with other weapon systems, to reduce redundant costs between systems with similar subsystems requirements. Invests in analytical, information management, data management, digital environments, networks, facilities, and security infrastructure upgrades directly supporting development and sustainment of this program's capabilities, while leveraging DoD and DAF enterprise IT solutions.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

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B. Program Change Summary (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	7.110	2.222	13.773	0.000	13.773
Current President's Budget	6.849	7.222	13.804	0.000	13.804
Total Adjustments	-0.261	5.000	0.031	0.000	0.031
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	5.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.261	0.000			
• Other Adjustments	0.000	0.000	0.031	0.000	0.031

Change Summary Explanation

FY23 Congressional increase for Next generation ultra wideband receiver for radar jammer

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force										Date: March 2023		
Appropriation/Budget Activity 3600 / 5					R-1 Program Element (Number/Name) PE 0604270F / <i>Electronic Warfare Development</i>				Project (Number/Name) 653891 / <i>Adv Infrared Counter Measures(Aircm)</i>			
COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
653891: <i>Adv Infrared Counter Measures(Aircm)</i>	-	6.849	7.222	13.804	0.000	13.804	18.230	18.687	19.069	60.125	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 5, PE 0604270F, project 653891, Cognitive Electromagnetic Warfare (EW), is a new start.
 This program, BA 5, PE 0604270F, project 653891, Threat Acquisition & Exploitation, is a new start.
 This program, BA 5, PE 0604270F, project 653891, Electromagnetic Battle Management (EMBM), is a new start.

A. Mission Description and Budget Item Justification

The Advanced Infrared Countermeasure (AIRCMM) project improves aircraft self-protection against the increasing threat of sophisticated surface-to-air and air-to-air missiles. Countermeasure improvements are the result of multiple related activities. First, enhanced understanding of advanced threats derived from intelligence and Threat Acquisition and Exploitation. Countermeasure Modeling and Simulation creates updated threat models, countermeasure models, and aircraft models. Modeling and Simulation is then used to digitally evaluate new techniques and products for improved effectiveness against current and emerging threat systems. Countermeasure Development yields new devices and capabilities aimed to defeat advanced threats. Countermeasure Testing collects data for updated digital models as well as tests devices and techniques to determine effectiveness. The project also provides for modernization and enhancement of tools and capabilities needed to perform Threat Acquisition and Exploitation, Countermeasure Modeling and Simulation, Countermeasure Development, and Countermeasure Testing. The project also evaluates novel countermeasure devices and techniques for potential significant capability gains against threats.

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Countermeasure Development and Testing	2.032	2.222	3.304	0.000	3.304
Description: Development, testing and qualification of EO, IR, and RF countermeasures on aircraft					
FY 2023 Plans: Activities include development, testing and qualification of expendable countermeasures or cocktails on various aircraft.					
FY 2024 Base Plans: Invest in threat exploitation activities through Air Force Research Laboratory. Fund Army DEVCOM to continue product development for an alternative to a currently sole source countermeasure type. Sustain current levels of effort for countermeasure modeling and simulation. Fund test activities leading to fielding recommendations.					
FY 2024 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force				Date: March 2023	
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604270F / <i>Electronic Warfare Development</i>		Project (Number/Name) 653891 / <i>Adv Infrared Counter Measures(Aircm)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
N/A					
<i>FY 2023 to FY 2024 Increase/Decrease Statement:</i> Funding increase due to restructure of project thrust area to better reflect increased AF emphasis on Flares/ Expendable Countermeasures (XCM); this is the first of a planned multi-year ramp up of investment to keep pace with the proliferation of advanced threat systems.					
<i>Title:</i> Ultra-Wideband Receiver (UWR) for Radar Jammer <i>Description:</i> Develop advanced algorithms and use open architecture hardware to significantly increase Electronic Warfare (EW) capability through higher Probability of Intercept to near instantaneous detection of enemy radar pulses. Support open architecture standards to enable rapid mission-ware reprogramming to leverage the improved radar detections. Capability provides a stare versus scan of the Electromagnetic Spectrum (EMS) allowing US forces to rapidly detect enemy radar pulses and improve situational awareness. <i>FY 2023 Plans:</i> Develop a direction-finding enhancement for the ultra-wideband receiver (UWR). The enhanced UWR system will perform real-time streaming containing UWR detection details, to include frequency, coarse pulse train and scan pattern details, and direction. Deliverables will include appropriate requirements, design, test specifications and product drawings. <i>FY 2024 Base Plans:</i> N/A <i>FY 2024 OCO Plans:</i> N/A <i>FY 2023 to FY 2024 Increase/Decrease Statement:</i> FY23 Funds are a Congressional Add.	4.817	5.000	0.000	0.000	0.000
<i>Title:</i> Cognitive Electromagnetic Warfare (EW) <i>Description:</i> Perform assessments and analyses for an Air Force capability to analyze adversaries' use of the electromagnetic spectrum, make real-time decisions assisted by machine learning/artificial intelligence, perform effective electromagnetic attack (EA) and share EA techniques and identification/targeting criteria to the warfighting force. <i>FY 2023 Plans:</i>	0.000	0.000	5.000	0.000	5.000

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Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604270F / <i>Electronic Warfare Development</i>	Project (Number/Name) 653891 / <i>Adv Infrared Counter Measures(Aircm)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
FY 2023 Plans: N/A					
FY 2024 Base Plans: Perform an Analysis of Alternatives.					
FY 2024 OCO Plans: N/A					
FY 2023 to FY 2024 Increase/Decrease Statement: New Start.					
Accomplishments/Planned Programs Subtotals	6.849	7.222	13.804	0.000	13.804

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024 Base</u>	<u>FY 2024 OCO</u>	<u>FY 2024 Total</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>FY 2028</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• PAAF 01 352010: <i>Cartridges</i>	26.483	-	-	-	-	-	-	-	-	0.000	26.483
• PAAF 01 356010: <i>Flares</i>	85.934	120.548	79.250	-	79.250	95.797	97.203	98.664	85.337	Continuing	Continuing

Remarks
Qualified flares, if not in AF inventory, will be procured under program 0208030F War Reserve Munitions, Flares.

D. Acquisition Strategy
Various acquisition approaches will be used. Government organic capabilities will be utilized to the greatest practicable extent to include threat acquisition and exploitation, modeling and simulation, testing, and development work. Portions of the program will be executed via Other Transactional Authorities which facilitate collaborative Government, Industry, and Academic ordnance technology development and prototyping initiatives. Other portions may be contracted via the Eglin Wide Agile Acquisition Contract, a multi-year indefinite delivery, indefinite quantity contract supporting munitions research, development, prototyping, and production.

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

Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604270F / <i>Electronic Warfare Development</i>	Project (Number/Name) 653891 / <i>Adv Infrared Counter Measures(Aircm)</i>
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Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
IR/UV: Black Body Thrusted Flare	C/CPPF	Cornerstone OTA : TBD, TN	-	1.032	Jun 2022	1.222	Jan 2023	-		-		-	Continuing	Continuing	-
Next Generation Ultra-Wide Band Receiver (UWR)	TBD	TBD : Warner Robins AFB, GA	-	4.724	Nov 2022	4.898	Apr 2023	-		-		-	Continuing	Continuing	-
Pyrophoric Alternative Material	MIPR	DEVCOM AC : Picatinny Arsenal, NJ	-	-		-		0.500	Jan 2024	-		0.500	Continuing	Continuing	-
High Frequency Chaff	TBD	TBD : TBD	-	-		-		0.350	Mar 2024	-		0.350	Continuing	Continuing	-
IR Advanced Countermeasure Prototyping and Design	Various	Various : TBD	-	-		-		0.500	May 2024	-		0.500	Continuing	Continuing	-
Cognitive Electromagnetic Warfare (EW)	Various	Air Combat Command : Langley AFB, VA	-	-		-		5.000	Oct 2023	-		5.000	Continuing	Continuing	-
Electromagnetic Battle Management (EMBM)	Various	Air Combat Command : Langley AFB, VA	-	-		-		5.000	Oct 2023	-		5.000	Continuing	Continuing	-
Subtotal			-	5.756		6.120		11.350		-		11.350	Continuing	Continuing	N/A

Remarks
 Develop Advanced Expendable Countermeasures to defeat currently fielded threats from which aircraft are not sufficiently protected.
 Perform assessments and analyses of proposed electromagnetic warfare (EW) capabilities.

Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
A&AS Support	C/FFP	EPASS: Hill AFB : UT	-	-		-		0.200	Feb 2024	-		0.200	Continuing	Continuing	-
Travel	Various	Not specified. : TBD	-	-		-		0.025		-		0.025	Continuing	Continuing	-
Subtotal			-	-		-		0.225		-		0.225	Continuing	Continuing	N/A

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Test and Evaluation (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Modeling and Simulation	MIPR	Air Force Research Lab : WPAFB, OH	-	1.000	Jun 2022	1.000	Jan 2023	-		-		-	Continuing	Continuing	-
Threat and Acquisition Exploitation	MIPR	Multiple : TBD	-	-		-		0.500	Feb 2024	-		0.500	Continuing	Continuing	-
IR Modeling and Simulation	MIPR	Various : TBD	-	-		-		1.729	Dec 2023	-		1.729	Continuing	Continuing	-
Subtotal			-	1.000		1.000		2.229		-		2.229	Continuing	Continuing	N/A

Remarks

Modeling and simulation

- This entails performance of modeling and simulation (to include threat hardware in-the-loop) which helps to predict advanced expendable countermeasure effectiveness and develop and define Air Force requirements
- Performing activity varies; conducted by AFRL and Georgia Tech Research Institute

Range Test

- This is the cost to use the range for testing (Radiometric, Captive Seeker, Flight, etc.)
- Performing Activity & Location varies; 96th Test Wing, Eglin AFB, FL, White Sands Missile Range, NM, Gila Bend, AZ

Test Support

- This includes but is not limited to Seeker Test Vans (multiple vans required for Captive Seeker), duo chrome camera, and other test equipment
- Activities/support during testing (i.e. communications/electric/security)
- Performing Activity & Location should remain "Various: TBD", multiple activities are included

Management Services (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Support Costs (formerly Program Management Administration costs) -- UWR	Various	AFMC AFLCMC : Robins AFB, GA	-	0.093	May 2022	0.102	Feb 2023	-		-		-	Continuing	Continuing	-
Subtotal			-	0.093		0.102		-		-		-	Continuing	Continuing	N/A

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Management Services (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
AATC provides all the management, preparation and coordination of advanced expendable countermeasure testing efforts for ACC/CAF (this does not include support for AMC or AFSOC)

	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	6.849	7.222	13.804	-	13.804	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604270F / <i>Electronic Warfare Development</i>	Project (Number/Name) 653891 / <i>Adv Infrared Counter Measures(Aircm)</i>

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

Advance IR Aircm	
Modeling and Simulation	
IR/UV: Black Body Thrusted Flare Development	
Threat Acquisition & Exploitation	
Pyrophoric Alternative Material	
High Frequency Chaff	
IR Advanced Countermeasure Prototyping and Design	
IR Modeling and Simulation	
Wideband Receiver for Radar Jammer	
Next Generation Wide Band Receiver	
Cognitive Electromagnetic Warfare (EW)	
Cognitive Electromagnetic Warfare (EW)	
Electromagnetic Battle Management (EMBM)	
Electromagnetic Battle Management (EMBM)	

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604270F / <i>Electronic Warfare Development</i>	Project (Number/Name) 653891 / <i>Adv Infrared Counter Measures(Aircm)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Advance IR Aircm</i>				
Modeling and Simulation	1	2022	1	2024
IR/UV: Black Body Thrusted Flare Development	1	2022	2	2024
Threat Acquisition & Exploitation	2	2024	4	2028
Pyrophoric Alternative Material	2	2024	3	2027
High Frequency Chaff	2	2024	2	2028
IR Advanced Countermeasure Prototyping and Design	3	2024	4	2028
IR Modeling and Simulation	1	2024	4	2028
<i>Wideband Receiver for Radar Jammer</i>				
Next Generation Wide Band Receiver	1	2023	4	2028
<i>Cognitive Electromagnetic Warfare (EW)</i>				
Cognitive Electromagnetic Warfare (EW)	1	2024	4	2028
<i>Electromagnetic Battle Management (EMBM)</i>				
Electromagnetic Battle Management (EMBM)	1	2024	4	2028