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Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Air Force	DATE: February 2012
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APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE							
3600: <i>Research, Development, Test & Evaluation, Air Force</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603270F: <i>Electronic Combat Technology</i>							
COST (\$ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
Total Program Element	16.029	22.231	32.941	-	32.941	49.028	54.563	54.685	54.882	Continuing	Continuing
632432: <i>Defensive System Fusion Technology</i>	4.981	6.180	1.320	-	1.320	0.633	-	-	-	Continuing	Continuing
633720: <i>EW Quick Reaction Capabilities</i>	-	-	10.000	-	10.000	25.000	35.000	39.000	39.000	Continuing	Continuing
63431G: <i>RF Warning & Countermeasures Tech</i>	3.686	5.403	15.508	-	15.508	19.493	15.009	11.091	11.156	Continuing	Continuing
63691X: <i>EO/IR Warning & Countermeasures Tech</i>	7.362	10.648	6.113	-	6.113	3.902	4.554	4.594	4.726	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program develops and demonstrates technologies to support Air Force electronic combat warfighting capabilities. The program focuses on developing components, subsystems, and technologies with potential aerospace combat, special operations, and airlift electronic combat applications in three project areas. The first project develops and demonstrates technologies for integrating electronic combat sensors and systems into a fused and seamless whole. The second project integrates and focuses research efforts in electronic warfare (EW), directed energy weapons (DEW), and cyber warfare to rapidly demonstrate a capability for rapid fielding. The third project develops and demonstrates advanced technologies for radio-frequency electronic combat suites. The fourth project develops and demonstrates advanced warning and countermeasure technologies to defeat electro-optical, infrared, and laser threats to aerospace platforms. This program has been coordinated through the Reliance 21 process to harmonize efforts and eliminate duplication. This program is in Budget Activity 3, Advanced Technology Development, since it develops and demonstrates technologies for existing system upgrades and/or new sensor and electronic combat system developments that have military utility and address warfighter needs.

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APPROPRIATION/BUDGET ACTIVITY 3600: <i>Research, Development, Test & Evaluation, Air Force</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603270F: <i>Electronic Combat Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
Previous President's Budget	16.992	22.268	23.325	-	23.325
Current President's Budget	16.029	22.231	32.941	-	32.941
Total Adjustments	-0.963	-0.037	9.616	-	9.616
• Congressional General Reductions	-	-0.037			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.509	-			
• SBIR/STTR Transfer	-0.354	-			
• Other Adjustments	-0.100	-	9.616	-	9.616

Change Summary Explanation

FY11: Other Adjustments include -0.100 Congressional General Reductions

FY13: Project 633720, EW Quick Reaction Capabilities, was added to PE 0603270F, and funded at \$10 million in FY13, and \$148 million over the FYDP.

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APPROPRIATION/BUDGET ACTIVITY 3600: Research, Development, Test & Evaluation, Air Force BA 3: Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603270F: Electronic Combat Technology				PROJECT 632432: Defensive System Fusion Technology			
COST (\$ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
632432: Defensive System Fusion Technology	4.981	6.180	1.320	-	1.320	0.633	-	-	-	Continuing	Continuing
A. Mission Description and Budget Item Justification											
This project develops and demonstrates technologies for integrating electronic combat sensors and electronic combat system fusion. It develops advanced algorithms and assessment techniques needed to evaluate and enable combat aircraft operations in multi-spectral threat and countermeasure environments. It also matures technologies required for command-and-control warfare, stand off jamming, and electronic support measures for the denial, disruption, and suppression of adversary air defense operations. Technologies include advanced components and techniques needed to jam enemy radars, advanced stand off jammer technologies, and electronic collection methods to inform field commanders of changes in the electronic environment.											
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2011	FY 2012	FY 2013	
Title: Major Thrust.								4.981	6.180	1.320	
Description: Develop affordable radio-frequency and electro-optical emitter warning and electronic warfare (EW) battle management technologies, integrating EW and information operations.											
FY 2011 Accomplishments: Initiated a critical experiment to demonstrate synergistic EW and information operations (IO) techniques against a representative integrated air defense system. Initiated an effort to develop a virtual EW/IO battlespace environment for future project demonstrations, experiments, and assessments. Conducted a demonstration of electronic warfare battle management techniques and algorithms. Developed a distributed (multi-node) electronic support/electronic attack architecture.											
FY 2012 Plans: Increase maturity and perform demonstrations of electronic warfare battle management (EWBM) capabilities. Focus efforts on Distributed Electronic Attack concepts for specific threats and radar classes. Initiate effort in understanding and countering traditional and non-traditional targets in support of irregular warfare (IW). Continue an effort to develop a virtual EW/IO battlespace environment for future project demonstrations, experiments, and assessments.											
FY 2013 Plans: Continue development of Distributed Electronic Attack concepts for specific threats and radar classes.											
Accomplishments/Planned Programs Subtotals								4.981	6.180	1.320	

UNCLASSIFIED

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C. Other Program Funding Summary (\$ in Millions)												
	<u>Line Item</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u> <u>Base</u>	<u>FY 2013</u> <u>OCO</u>	<u>FY 2013</u> <u>Total</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
•	N/A: N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
D. Acquisition Strategy N/A												
E. Performance Metrics Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.												

UNCLASSIFIED

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APPROPRIATION/BUDGET ACTIVITY 3600: Research, Development, Test & Evaluation, Air Force BA 3: Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603270F: Electronic Combat Technology				PROJECT 633720: EW Quick Reaction Capabilities			
COST (\$ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
633720: EW Quick Reaction Capabilities	-	-	10.000	-	10.000	25.000	35.000	39.000	39.000	Continuing	Continuing
A. Mission Description and Budget Item Justification											
This project establishes a Joint Capabilities Office (JCO) to integrate and focus technology research efforts in Electronic Warfare (EW), Directed Energy Weapons (DEW), and Cyber Warfare. The JCO will coordinate and shape investments in emergent science and applied technologies to yield long-term non-kinetic dominance of the electromagnetic spectrum. This office will work with Component research and acquisition organizations to formulate innovative concepts, technologies and delivery systems; build engineering models at a highly accelerated pace; and sponsor field demonstrations of disruptive EW capabilities to outpace adversary efforts.											
B. Accomplishments/Planned Programs (\$ in Millions)									FY 2011	FY 2012	FY 2013
Title: Major Thrust 1									-	-	4.000
Description: Develop disruptive EW and countermeasure concepts specifically selected for rapidly fieldable, high-impact effects and demonstrate them in an operational environment.											
FY 2011 Accomplishments: N/A											
FY 2012 Plans: N/A											
FY 2013 Plans: Initiate development of disruptive EW and countermeasure concepts specifically selected for rapidly fieldable, high-impact effects and demonstrate them in an operational environment.											
Title: Major Thrust 2									-	-	3.000
Description: Establish and maintain an all-source, physics-based, design-level, red-blue, comparative, threat-to-countermeasure database. The database will inform programmatic planning, highlight desirable research areas, and foster improved understanding of future concept contributions to EW warfighting capabilities.											
FY 2011 Accomplishments: N/A											
FY 2012 Plans:											

UNCLASSIFIED

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APPROPRIATION/BUDGET ACTIVITY 3600: <i>Research, Development, Test & Evaluation, Air Force</i> BA 3: <i>Advanced Technology Development (ATD)</i>			R-1 ITEM NOMENCLATURE PE 0603270F: <i>Electronic Combat Technology</i>			PROJECT 633720: <i>EW Quick Reaction Capabilities</i>					
B. Accomplishments/Planned Programs (\$ in Millions)							FY 2011	FY 2012	FY 2013		
N/A											
FY 2013 Plans: Initiate development of an all-source, physics-based, design-level, red-blue, comparative, threat-to-countermeasure database.											
Title: Major Thrust 3							-	-	3.000		
Description: Develop a core analytic function, supported by a simulation-based wargaming and engineering modeling capabilities, for evaluation, development, and demonstration of advanced EW, DEW, Cyber, and non-kinetic concepts to include special capability programs.											
FY 2011 Accomplishments: N/A											
FY 2012 Plans: N/A											
FY 2013 Plans: Initiate development of a core analytic function, supported by a simulation-based wargaming and engineering modeling capabilities, for evaluation, development, and demonstration of advanced EW, DEW, Cyber, and non-kinetic concepts to include special capability programs.											
Accomplishments/Planned Programs Subtotals							-	-	10.000		
C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u> <u>Base</u>	<u>FY 2013</u> <u>OCO</u>	<u>FY 2013</u> <u>Total</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• N/A: N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• N/A (1): N/A (1)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
D. Acquisition Strategy N/A											
E. Performance Metrics Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.											

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APPROPRIATION/BUDGET ACTIVITY 3600: Research, Development, Test & Evaluation, Air Force BA 3: Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603270F: Electronic Combat Technology				PROJECT 63431G: RF Warning & Countermeasures Tech			
COST (\$ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
63431G: RF Warning & Countermeasures Tech	3.686	5.403	15.508	-	15.508	19.493	15.009	11.091	11.156	Continuing	Continuing
A. Mission Description and Budget Item Justification											
This project develops and demonstrates advanced technologies for radio-frequency electronic combat suites to enhance the survivability of aerospace vehicles and to provide crew situational awareness. One major area addresses technologies for missile/threat warning, radio-frequency receivers, electronic combat pre-processors, advanced sorting/pre-processing algorithms, and expert software for applications on existing and future electronic combat systems. Another major technology area focuses on the development and demonstration of subsystems and components for generating on-board/off-board radio-frequency countermeasure techniques. This includes the development of electronic countermeasures techniques, as well as advanced electronic countermeasures technologies such as antennas, power amplifiers, and preamplifiers.											
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2011	FY 2012	FY 2013	
Title: Major Thrust.								3.686	5.403	15.508	
Description: Develop aerospace platform jamming technologies and techniques to counter advanced radio-frequency (RF) threats associated with current and future aerospace weapon systems.											
FY 2011 Accomplishments: Initiated next-generation electronic attack techniques concept definition studies. Initiated a distributed tactical electronic combat receiver development effort. Demonstrated cognitive and adaptable electronic combat techniques and algorithms. Provided active electronic protection architecture concepts for transition.											
FY 2012 Plans: Demonstrate adaptable electronic attack (EA) technique concepts against a modeled threat environment. Initiate effort to develop a Network electronic support/electronic attack (ES/EA) Experiments Lab. Demonstrate a cognitive jammer system concept in a laboratory environment. Define and analyze proactive electronic protection (EP) concepts. Continue effort to focus on next generation RF threats and potential EW concepts.											
FY 2013 Plans: Increase in FY 2013 funding is due to an increased emphasis in this effort. Continue to demonstrate adaptable electronic attack (EA) technique concepts against a modeled threat environment. Continue to develop and demonstrate a cognitive jammer system concept in a laboratory environment. Continue to assess and analyze proactive electronic protection (EP) concepts. Continue effort to focus on next generation RF threats and potential EW concepts.											
Accomplishments/Planned Programs Subtotals								3.686	5.403	15.508	

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C. Other Program Funding Summary (\$ in Millions)												
	<u>Line Item</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u> <u>Base</u>	<u>FY 2013</u> <u>OCO</u>	<u>FY 2013</u> <u>Total</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
•	N/A: N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
D. Acquisition Strategy N/A												
E. Performance Metrics Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.												

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COST (\$ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
63691X: EO/IR Warning & Countermeasures Tech	7.362	10.648	6.113	-	6.113	3.902	4.554	4.594	4.726	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project develops and demonstrates the advanced warning and countermeasure technologies required to negate electro-optical, infrared, and laser threats to aerospace platforms. Off-board (decoys and expendables) and on-board countermeasure technologies developed for aircraft self-protection will provide robust, affordable solutions for protection against infrared missiles with autonomous seekers, multi-spectral threats, laser-guided weapons, and electro-optical and infrared tracking systems used to direct electro-optical, infrared, and radar-guided missiles.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2011	FY 2012	FY 2013
<div><div>Title: Major Thrust 1.</div><div>Description: Analyze the vulnerabilities of current infrared missile systems and future imaging infrared sensors. Develop advanced countermeasure system technologies to exploit vulnerabilities for use against infrared and electro-optical guided missile threats. Develop advanced optical and infrared sensor systems for airborne and space situational awareness and threat warning.</div><div>FY 2011 Accomplishments: Developed, tested, and refined infrared countermeasures concepts and techniques against current and advanced threats including imaging threats. Demonstrated advanced concepts for full spectrum laser threat detection/geolocation for countermeasure hand-off. Evaluated the impact on countermeasures design, simulation and investigative processes presented by current and next generation seeker and sensor threats. Continued efforts to obtain imaging threats. Conducted Space Situational Awareness (SSA) sensor prototype experiments.</div><div>FY 2012 Plans: Continue to develop, test, and refine infrared countermeasures concepts and techniques against current infrared missile systems and future advanced threat sensors. Continue development of surrogate imaging sensors, processors, and track algorithms to test and evaluate countermeasure concepts against advanced threat systems. Continue to develop new laser warning concepts and simulation capability to address emerging directed energy threats to provide situational awareness and threat warning. Initiate SSA sensor prototype experiment phase II.</div><div>FY 2013 Plans: Continue to develop, test, and refine infrared countermeasures concepts and techniques against current infrared missile systems and future advanced threat sensors. Continue development of surrogate imaging sensors, processors, and track algorithms to test and evaluate countermeasure concepts against advanced threat systems. Perform advanced proactive infrared</div></div>	7.362	10.648	6.113

UNCLASSIFIED

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B. Accomplishments/Planned Programs (\$ in Millions)							FY 2011	FY 2012	FY 2013		
countermeasures (PIRCM) search, detect, and countermeasure research. Develop concepts for protection of postulated future threats to generation-6 aircraft including definition of component and subsystem requirements.											
Accomplishments/Planned Programs Subtotals							7.362	10.648	6.113		
C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u> <u>Base</u>	<u>FY 2013</u> <u>OCO</u>	<u>FY 2013</u> <u>Total</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• N/A: N/A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
D. Acquisition Strategy N/A											
E. Performance Metrics Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.											