Exhibit R-2, **RDT&E Budget Item Justification:** PB 2016 Air Force										**Date:** February 2015	

Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					**R-1 Program Element (Number/Name)** PE 0603742F *I Combat Identification Technology*						

COST ($ in Millions)	**Prior Years**	**FY 2014**	**FY 2015**	**FY 2016 Base**	**FY 2016 OCO**	**FY 2016 Total**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**Cost To Complete**	**Total Cost**
Total Program Element	-	12.938	10.980	21.790	-	21.790	24.661	24.562	23.873	24.300	Continuing	Continuing
642597: *Non-cooperative Identification Subsystems*	-	10.993	9.104	19.893	-	19.893	22.730	22.594	21.869	22.260	Continuing	Continuing
642599: *Cooperative Identification Techniques*	-	1.945	1.876	1.897	-	1.897	1.931	1.968	2.004	2.040	Continuing	Continuing

Note
 In FY 2016, Project 642597 Non-cooperative Identification Subsystems includes new start efforts for Radio ID (RID).

A. Mission Description and Budget Item Justification

 The Combat Identification (CID) Technology program element analyzes, develops, demonstrates and evaluates promising target identification technologies to facilitate platform transition decisions prior to Engineering and Manufacturing Development (EMD). The Joint Capability Document (JCD) for CID BFT (Blue Force Tracking), operational documents, lessons learned, and NATO requirements state the need for positive CID. High confidence CID increases combat effectiveness, prevents fratricide, and reduces collateral damage. It also enables combatant commanders to effectively command and control their forces in all weather, day or night. This program element focuses on the cooperative and non-cooperative technologies that have the capability to positively identify surface and air targets in both air-to-surface and air-to-air engagements.

 In order to rapidly make available promising CID technologies for platform EMD decisions, the program element funds design studies, engineering analysis, and other efforts associated with demonstration of prototype CID related technologies and subsystems on platforms. It also supports the development, testing, and implementation of international standards (to include NATO standardization agreements) to ensure joint, Allied, and coalition interoperability.

 Non-cooperative CID employs a number of sensing technologies and signal processing techniques. The observations may be compared to a database of known objects to identify surface or air threats from air platforms. These technologies include: (1) Laser Vision, an Electro-Optical/Infrared (EO/IR) imaging system that significantly increases ID ranges;(2) Radar Vision, an air-to-ground radar imaging technique to identify stationary and moving targets using their radar signatures; including passive techniques and electronic warfare identification technologies; (3) Hydra Vision, a balanced (robust) amalgamation of sensor data from multiple sources to provide warfighters with higher confidence CID results on surface or air targets potentially including fusion with intelligence sources, identification of non-traditional targets, fusion to counter camouflage, concealment and deception (CCD), and multi-phenomenology features for sustainable databases; (4) Compact ATR (Aided Target Recognition) and Sustainable Environments (CASE), a CID approach that focuses on tailoring algorithms to utilize smaller, more efficient databases that are faster and less expensive to generate and maintain; and (5) X-Patch, a validated set of prediction codes and analysis tools that predicts realistic far-field radar signatures from 3-D (3 dimensional) target models in order to predict 1D and/or 2D data. (6) A new program called Radio ID (RID) will develop methods for utilizing advances in radio technologies such as software defined radios to provide a low cost ID solutions for situational awareness and fratricide prevention potentially fusing non cooperative techniques and cooperative technologies.

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force		**Date:** February 2015
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603742F *I Combat Identification Technology*	

Cooperative CID employs technologies required to rapidly identify friendly platforms. The program develops, integrates and evaluates technologies that provide AF platforms with a means of positively identifying an air or ground platform as a friendly, via active or passive cooperative ID capabilities. Development funded by this program element ensures availability of Automatic Dependent Surveillance - Broadcast (ADS-B) as well as Mode 5 IFF (Identification Friend or Foe) upgrade path for implementing ground and air platforms across the Air Force fleet. Activities also include studies and analysis to support both current program planning and execution and future program planning.

Fund Air Traffic Control Radar Beacon Systems Identification Friend or Foe Mark XIIA System (AIMS)Program Office test engineers. The DoD International AIMS PO has system level interoperability testing and certification responsibilities for the present Mark XII system, development and integration of Mark XIIA (Mode 5) and transition to Mark XIIA Mode S systems. AIMS PO will continue to test and certify IFF equipment for the services now as long as IFF is used for combat identification.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

The FY2016 funding request was reduced by $2.981 million to account for the availability of prior execution balances.

B. Program Change Summary ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	13.386	10.980	24.915	-	24.915
Current President's Budget	12.938	10.980	21.790	-	21.790
Total Adjustments	-0.448	-	-3.125	-	-3.125
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.448	-			
• Other Adjustments	-	-	-3.125	-	-3.125

Change Summary Explanation
The FY2016 funding request was reduced to account for the availability of prior execution balances.

PE 0603742F: *Combat Identification Technology*
Air Force

R-1 Line #30

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force										Date: February 2015	
Appropriation/Budget Activity 3600 I 4				**R-1 Program Element (Number/Name)** PE 0603742F I Combat Identification Technology				**Project (Number/Name)** 642597 I Non-cooperative Identification Subsystems			

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
642597: *Non-cooperative Identification Subsystems*	-	10.993	9.104	19.893	-	19.893	22.730	22.594	21.869	22.260	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2016, Project 642597 Non-cooperative Identification Subsystems includes new start efforts for Radio ID (RID).

A. Mission Description and Budget Item Justification

Non-cooperative Combat Identification (CID) employs a number of sensing technologies and signal processing techniques. The observations may be compared to a database of known objects to identify surface or air threats from air platforms. These technologies include: (1) Laser Vision, an electro-optical/infrared (EO/IR) imaging system that significantly increases identification ranges and includes exploiting synergies between non-cooperative and cooperative ID systems (radio, millimeter wave, infrared, and laser); (2) Radar Vision, an air-to-ground radar imaging technique to identify stationary and moving targets using their radar signatures; including passive techniques and electronic warfare identification technologies; (3) Hydra Vision, a balanced (robust) amalgamation of sensor data from multiple sources to provide warfighters with higher confidence CID results on surface or air targets potentially including fusion with intelligence sources, identification of non-traditional targets, fusion to counter camouflage, concealment and deception (CCD), and multi-phenomenology features for sustainable databases; (4) Compact ATR (Aided Target Recognition) and Sustainable Environments (CASE), a CID approach that focuses on tailoring algorithms to utilize smaller, more efficient databases that are faster and less expensive to generate and maintain; and (5) X-Patch, a validated set of prediction codes and analysis tools that predicts realistic far-field radar signatures from 3-D (3 dimensional) target models in order to predict 1D and/or 2D data. X-Patch is vital for development of radar signatures of potential high-threat weapons systems; it is a critical capability of database production centers which support Joint Sensors Signature Database (JSSD) pathfinders.

Activities also include studies and analysis to support both current program planning and execution and future program planning.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: Laser Vision/3-D Ladar	-	0.800	1.800	-	1.800

Description: Laser Vision, a family of electro-optical (EO) systems that significantly increase ID ranges. Provides the demonstration and evaluation data necessary to support decisions on future EO technologies supporting CID. Includes 3-D (3 dimensional) imaging laser radar (Ladar) and exploration of advanced concepts.
The 3-D ladar technology provides a display of an 3-D EO image to the pilot for high confidence combat identification and is a potential for the next generation targeting pods for the USAF.

FY 2014 Accomplishments:

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force		**Date:** February 2015
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Non-cooperative Identification Subsystems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total

N/A

FY 2015 Plans:
- The 3D video human perception research begins to quantify the enhancement to CID.
- Discoveries can be used to optimize the display of 3D information on 2D video displays.
- Using a spiral development approach, this work results in quantitative measure of improvement to CID and advanced 3D video modes for use in the flight demonstration.

- A laboratory-class flight experiment can be initiated to provide early flight evaluation of the technology and provide critical data for other demonstration activities, such as flight measurement of real target signatures, benchmarking CIDS-3D, and supporting the development of advanced signal processing algorithms and display modes.
- As in the FY 2014 AFRL test, the baseline is to use the DARPA program receiver.

- The CIDS-3D performance modeling tool should be completed.
- Components of this tool can be used to support the construction of the human perception research tool.
- Results from the AFRL experiment and the laboratory-class flight tests can be used to benchmark CIDS-3D predictions.

- A new procurement is initiated to begin integration of the 2D/3D receiver into the LITENING pod.
- This work is expected to include mechanical, optical, electrical, firmware, and software modifications.
- The integration activity can be followed by ground and flight evaluation of 3D sensing in the CID mission

FY 2016 Base Plans:
- 3DTO laboratory demonstration: (Cost: $0.8M) this demonstration will provide a ground test of 3D ladar technology for targeting pods.
- This FY16 demonstration will most likely be a short range tower demonstration prior to full up flight demonstration.
- This will be a critical demonstration for a flight test of 3D ladar technology.
- This technology not only has the potential for pilot/weaponeer interpretation but the (Assisted Target Recognition) AiTR capability for 3D ladar information is mature and will provide a high confidence target ID into the cockpit.
- The initial capability will be for high confidence ground target recognition but also has the potential for air target recognition.

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force		Date: February 2015
Appropriation/Budget Activity 3600 I 4	**R-1 Program Element (Number/Name)** PE 0603742F I *Combat Identification Technology*	**Project (Number/Name)** 642597 I *Non-cooperative Identification Subsystems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Pod integration of the 2D/3D receiver will continue. *FY 2016 OCO Plans:* N/A					
Title: Laser Vision/Siren *Description:* Description: Design, fabricate, and evaluate a tactical range laser vibrometry sensor in a targeting pod. Leverage ability of active electro-optic sensors to sense micro-displacements of operating machinery in order to measure the resulting frequency spectrum. Assess utility for air-to-ground combat identification. Begin research into advanced algorithms for processing data provided by vibrometry sensors in order to develop and demonstrate prototype pilot Aided Target Recognition software(VAMP). *FY 2014 Accomplishments:* - Material procurement was completed. - Fabrication of sensor active and passive electro-optical components has been initiated. - Modifications to targeting pod wiring harness have been completed. - Software development has been initiated and demonstrations of initial software components in operation were completed. - Testing of pod fiber raceway and compensation software approach assessment was completed. - Additional vibration contact measurement tests have been conducted and vibration feature selection algorithm research were continued for Aided Target Recognition (AiTR) software(VAMP). *FY 2015 Plans:* - Conduct subsystem verification experiments. - Conduct laboratory calibration and system tests. - Targeting pod system level tower testing at WPAFB tentatively scheduled for June 2015. - Test will utilize canonical and military targets. - Initiate flight test planning and add work. - Initiate SEEK EAGLE certification. - Continue AiTR development(VAMP). *FY 2016 Base Plans:* - This demonstration will demonstrate the vibrometry sensing technology for targeting Pod demonstration.	3.616	2.664	4.355	-	4.355

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force		Date: February 2015
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Non-cooperative Identification Subsystems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- This technology will provide a valuable target recognition capability for ground targets determining engine type, with potential to counter enemy Camouflage, Concealment and Deception (CC&D) techniques as well as a valuable battle damage assessment tool. - This capability will provide a critical complement to image based ID tools and has the potential for air target ID as well as ground target ID. - This demonstration will provide the necessary funds to have AATC demonstrations with modified LITENING Pod flying on a test F-16 (Cost: $3.5M). ***FY 2016 OCO Plans:*** N/A					
Title: Hydra Vision ***Description:*** Hydra Vision (Multi-Sensor Enhanced ID) is a family of balanced (robust) amalgamation of sensor data from multiple sources to provide warfighters with higher confidence CID results on surface or air targets. ***FY 2014 Accomplishments:*** - Air to Air: The air to air hydravision effort pushed the state of the art for air target ID in both more sustainable target insertion and dramatically increased database size. - Air to Ground: Conducted a real-time flight test and an assessment of system and ATR performance evaluation. - Initiated ATR and system updates to enhance robustness. ***FY 2015 Plans:*** - Air to Air: Continue to refine fusion algorithms to maximize performance. - Demonstrate 2 feature fusion with ground based radar and investigate additional feature fusion for higher confidence ID performance. - Air to Ground: Complete ATR/system updates and transition away from surrogate sensors. - Plan and execute an engineering flight test and evaluate the ATR results. ***FY 2016 Base Plans:*** - Air to Air: Will perform a real time flight demonstration of a two feature air target Identification. - This demonstration will implement next generation air target identification for 5th generation fighter radar and upgraded 4th generation fighter radars.	3.533	2.715	6.700	-	6.700

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force		**Date:** February 2015
Appropriation/Budget Activity 3600 I 4	**R-1 Program Element (Number/Name)** PE 0603742F I *Combat Identification Technology*	**Project (Number/Name)** 642597 I *Non-cooperative Identification Subsystems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- These demos will be done on fighter aircraft radars on one of the prime radar developers (Raytheon or Northrup Grumman) surrogate platforms (Cost: $3.1M). - Air to Ground: Will participate in a suitable operational demonstration such as Bold Quest to demonstrate Assisted Target Recognition (AiTR) for a MQ-9 (Reaper). - This critical capability will provide an operator the ability to quickly identify multiple targets of interests (automatically) or to focus an analyst to the most important targets. - This will benefit both ACC and AFSOC MQ-9's assuring more effective close in ID capabilities (Cost: $2.5M). ***FY 2016 OCO Plans:*** N/A					
Title: Compact ATR and Sustainable Environment (CASE) ***Description:*** CASE is a family of efforts to address efficiency and sustainability issues associated with the development, operation and maintenance of non-cooperative ATR technology. Develop sustainable multi-phenomenology ATR based on low fidelity, compact, and inexpensive database technology. ***FY 2014 Accomplishments:*** - Started initial design with an analysis of a breadth of technologies to determine the most promising overall system to provide compact data with continued identification performance. - Downselected to two contractors from five proposed contractor designs. - This technology promises a more sustainable technology for long term combat ID systems. ***FY 2015 Plans:*** - Continue technology development in compact feature ATR initiated in Hydra Vision study. - Analyze feature extraction / uncertainty using low fidelity / physical feature target models. - Create compact feature ATR database and assess saliency and target discrimination utility. - FY15 will begin development towards a FY17 demonstration of the technology. ***FY 2016 Base Plans:*** - Testing of the system will begin utilizing cost and performance metrics. ***FY 2016 OCO Plans:*** N/A	0.994	1.925	3.475	-	3.475
Title: Enhanced Combat Identification (ECID)	-	-	0.500	-	0.500

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force		Date: February 2015
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / Combat Identification Technology	**Project (Number/Name)** 642597 / Non-cooperative Identification Subsystems

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Description: Develop a robust ability to quantitatively evaluate promising CID technologies using enhanced modeling and simulation (M&S) capabilities. *FY 2014 Accomplishments:* N/A *FY 2015 Plans:* N/A *FY 2016 Base Plans:* - ECIDs modeling and simulation tools will be provided to larger system of system simulations providing both mission and campaign level campaign level combat ID simulations. - This effort will provide valuable tools to support CID investments. *FY 2016 OCO Plans:* N/A					
Title: Studies *Description:* Conduct CID-related studies/demos. *FY 2014 Accomplishments:* - Continued study projects leading to new concepts for non-cooperative and cooperative CID efforts. *FY 2015 Plans:* - Continue study projects leading to new concepts for non-cooperative and cooperative CID efforts. *FY 2016 Base Plans:* - Will continue study projects leading to new concepts for non-cooperative and cooperative CID efforts. *FY 2016 OCO Plans:* N/A	0.350	0.500	0.450	-	0.450
Title: X-Patch *Description:* X-Patch consists of software code refinement based on feedback from the X-Patch user community. *FY 2014 Accomplishments:*	2.500	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force		Date: February 2015
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / Combat Identification Technology	**Project (Number/Name)** 642597 / Non-cooperative Identification Subsystems

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continued funding X-Patch RDT&E tool development and sustainment. **FY 2015 Plans:** N/A **FY 2016 Base Plans:** N/A **FY 2016 OCO Plans:** N/A					
Title: Passive RF ID Environment (PRIDE) **Description:** Develop passive RF target ID capability for denied access environment utilizing passive RF and EW information with potential non-traditional ISR capabilities. Passive RF ID is a new start in FY15. **FY 2014 Accomplishments:** n/a **FY 2015 Plans:** - Explore concepts for RF-based CID to include bistatic / multi-static, passive incorporation of electronic warfare techniques and multi-mode applications. **FY 2016 Base Plans:** - Passive Radar Identification Environment (PRIDE) will develop the technology to provide a passive radar based ID capability to the warfighter. - This technology development and demonstration will be critical to keep the stealth capabilities of the strike fighter fleet which will be necessary to operate in the Anti Access/ Area Denial environment. **FY 2016 OCO Plans:** N/A	-	0.500	1.819	-	1.819
Title: Radio ID (RID) **Description:** RID will develop technologies to integrate radio based cooperative technologies with non-cooperative technologies into the cockpit. The benefits will be increased confidence target ID and situational awareness as well as reduced fratricides. RID will be a new start in FY16. **FY 2014 Accomplishments:**	-	-	0.794	-	0.794

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force		Date: February 2015
Appropriation/Budget Activity 3600 *I* 4	**R-1 Program Element (Number/Name)** PE 0603742F *I Combat Identification Technology*	**Project (Number/Name)** 642597 *I Non-cooperative Identification Subsystems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
N/A ***FY 2015 Plans:*** N/A ***FY 2016 Base Plans:*** - Radio ID (RID) will develop methods for utilizing advances in radio technologies such as software defined radios to provide a low cost ID solutions for situational awareness and fratricide prevention potentially fusing non cooperative techniques and cooperative technologies. - Future funding years will provide a laboratory and real time demonstrations. ***FY 2016 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	10.993	9.104	19.893	-	19.893

C. Other Program Funding Summary ($ in Millions)
 N/A
Remarks

D. Acquisition Strategy
 Award multiple, competitive contract vehicles emphasizing off-the-shelf technology and maximizing the use of non-developmental items (NDIs).

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force												Date: February 2015	
Appropriation/Budget Activity 3600 / 4				**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*						**Project (Number/Name)** 642597 / *Non-cooperative Identification Subsystems*			

Product Development ($ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total			
Cost Category Item	**Contract Method & Type**	**Performing Activity & Location**	**Prior Years**	**Cost**	**Award Date**	**Cost**	**Award Date**	**Cost**	**Award Date**	**Cost**	**Award Date**	**Cost**	**Cost To Complete**	**Total Cost**	**Target Value of Contract**
Hydra Vision (Air-to-Air) - L	C/CPFF	Leidos : Reston, VA	-	0.550	Mar 2014	0.525	Mar 2015	0.600	Feb 2016	-		0.600	Continuing	Continuing	-
Hydra Vision (Air-to-Air) - N	C/CPFF	Northrop Grumman : Linthicum Heights, MD	-	0.288	Feb 2014	0.175	Mar 2015	1.550	Feb 2016	-		1.550	-	2.013	-
Hydra Vision (Air-to-Air) - R	C/CPFF	Raytheon Company : El Segundo, CA	-	0.250	Jun 2014	0.200	Mar 2015	1.550	Feb 2016	-		1.550	-	2.000	-
SIREN	C/CPFF	Northrop Grumman : Rowling Meadows, IL	-	3.516	Apr 2014	2.175	Feb 2015	3.811	Feb 2016	-		3.811	-	9.502	-
VAMP - EO X DWARVES	C/CPFF	Etegent : Cincinnati, OH	-	0.100	Oct 2014	0.100	Mar 2015	0.494	Feb 2016	-		0.494	-	0.694	-
3-D Ladar	C/CPAF	TBD : TBD,	-	-		0.700	Apr 2015	1.800	Dec 2015	-		1.800	Continuing	Continuing	-
Hydra Vision, Target Recognition & Tracking Technology/CASE	MIPR	Sandia : Albuquerque, NM	-	0.400	May 2014	0.200	Mar 2015	0.250	May 2016	-		0.250	-	0.850	-
Studies - ECID	MIPR	Booz Allen Hamilton : McLean, VA	-	-	Jun 2014	-	Apr 2015	0.400	Dec 2015	-		0.400	-	0.400	-
Hydra Vision - Air to Ground	C/CPFF	BAE Systems : Burlington, MA	-	0.600	Aug 2014	0.600	Mar 2015	-		-		-	-	1.200	-
Hydra Vision- Ops Demo	C/CPFF	General Atomics : San Diego, CA	-	0.625	Dec 2014	0.450	Dec 2014	2.750	Feb 2016	-		2.750	-	3.825	-
Hydra Vision - SCEPTIC	C/CPFF	Intelligent Software Solutions : Colorado Springs, CA	-	0.075	Dec 2014	0.040	Mar 2015	-		-		-	-	0.115	-
X-Patch	MIPR	GSA : Atlanta, GA	-	1.607	May 2014	-		-		-		-	-	1.607	-
Hydra Vision - Core Database	C/CPFF	McAulay Brown : Dayton, OH	-	0.045	Mar 2014	0.024	Mar 2015	-		-		-	-	0.069	-
Hydra Vision - Air-to-Ground	C/CPFF	Jacobs : Ft Walton Beach, FL	-	0.070	Jan 2015	0.100	Feb 2015	-		-		-	Continuing	Continuing	-
Hydra Vision - Compact ATR and Sustainable Environment Agile CEM	C/CPFF	Signal Innovations Group : Durham, NC	-	0.150	Sep 2014	0.250	Dec 2014	0.250	Jan 2016	-		0.250	-	0.650	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force													Date: February 2015
Appropriation/Budget Activity 3600 / 4									**R-1 Program Element (Number/Name)** PE 0603742F / Combat Identification Technology				**Project (Number/Name)** 642597 / Non-cooperative Identification Subsystems

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Hydra Vision - Compact ATR and Sustainable Environment Reliable ATR Features	C/CPFF	Matrix Research & Engineering : Dayton, OH	-	0.250	Apr 2014	0.150	Feb 2015	0.250	Feb 2016	-		0.250	-	0.650	-
Hydra Vision - Compact ATR and Sustainable Environment Analysis - L	C/CPFF	Leidos : Mclean, VA	-	0.230	Sep 2014	1.100	Mar 2015	1.360	Feb 2016	-		1.360	-	2.690	-
Hydra Vision - Compact ATR and Sustainable Environment Analysis - R	C/CPFF	Raytheon : El Segundo, CA	-	0.230	Oct 2014	1.100	Mar 2015	1.360	Feb 2016	-		1.360	-	2.690	-
Passive Radar Identification Environment (PRIDE)	C/TBD	TBD : TBD,	-	-		0.050	Sep 2015	1.500	Dec 2015	-		1.500	-	1.550	-
Radio Identification (RID)	C/TBD	TBD : TBD,	-	-		0.050	Sep 2015	0.718	Dec 2015	-		0.718	-	0.768	-
		Subtotal	-	8.986		7.989		18.643		-		18.643	-	-	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Systems Engineering Support	MIPR	MITRE : Rome, NY	-	0.025	Jan 2014	0.025	Dec 2014	-		-		-	-	0.050	-
Studies & Analysis	MIPR	GSA : Denver, CO	-	0.350	Jun 2015	0.250	Apr 2015	0.350	Apr 2016	-		0.350	Continuing	Continuing	-
X-Patch (Robins AFB)	MIPR	402 MXW/OBWB : Robins AFB, GA	-	0.792	Apr 2014	-		-		-		-	-	0.792	-
		Subtotal	-	1.167		0.275		0.350		-		0.350	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		Subtotal	-	-		-		-		-		-	-	-	-

Exhibit R-3, **RDT&E Project Cost Analysis:** PB 2016 Air Force												**Date:** February 2015		

Appropriation/Budget Activity 3600 **I** 4	**R-1 Program Element (Number/Name)** PE 0603742F **I** *Combat Identification Technology*	**Project (Number/Name)** 642597 **I** *Non-cooperative Identification Subsystems*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AFRL PMA	MIPR	GSA : Denver, CO	-	0.840	Aug 2014	0.840	Jul 2015	0.900	Mar 2016	-		0.900	-	2.580	-
Subtotal			-	0.840		0.840		0.900		-		0.900	-	2.580	-

	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	10.993	9.104	19.893	-	19.893	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2016 Air Force		Date: February 2015
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Non-cooperative Identification Subsystems*

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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
LASER VISION - Siren																												
LASER VISION - Siren POD Demo BoldQuest 16 ACTD																												
LASER VISION - VAMP																												
LASER VISION - VAMP Lab Demo																												
LASER VISION - VAMP POD Demo																												
LASER VISION - 3D Ladar (3DTO)																												
LASER VISION - 3D Ladar (3DTO) Lab Demo																												
LASER VISION - 3D Ladar (3DTO) POD Demo																												
Passive RF ID (PRIDE)																												
Passive RF ID (PRIDE) Lab Demo																												
Passive RF ID (PRIDE) OPS Demo																												
RID (Radio ID)																												
RID (Radio ID) Lab Demo																												
RID (Radio ID) - Flight Demo																												
Hydra Vision - Air to Air																												
Hydra Vision - Air to Air 2 Feature RT Demo																												
Hydra Vision - Air to Air 3 Feature RT Demo																												
Hydra Vision - Increment 1 - Air-to-Ground																												
Hydra Vision - Increment 1 - Air-To-Ground OPS Demo																												
Hydra Vision - Increment 2 - Air-To-Ground																												
Hydra Vision - Increment 2 - Air-to-Ground Flight Demo																												
Compact ATR - Compact Feature ATR																												

Exhibit R-4, **RDT&E Schedule Profile:** PB 2016 Air Force		**Date:** February 2015
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Non-cooperative Identification Subsystems*

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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
Compact ATR - Compact Feature ATR Lab Demo															▇													
Compact ATR- Compact Feature ATR - Flight Demo																										▇		
Enhanced CID									▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇						
Studies	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	▇	
X-Patch Development	▇	▇	▇																									

Exhibit R-4A, RDT&E Schedule Details: PB 2016 Air Force		Date: February 2015	
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Non-cooperative Identification Subsystems*	

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
LASER VISION - Siren	1	2014	4	2016
LASER VISION - Siren POD Demo BoldQuest 16 ACTD	3	2016	3	2016
LASER VISION - VAMP	1	2015	2	2018
LASER VISION - VAMP Lab Demo	3	2016	3	2016
LASER VISION - VAMP POD Demo	1	2018	1	2018
LASER VISION - 3D Ladar (3DTO)	1	2015	2	2018
LASER VISION - 3D Ladar (3DTO) Lab Demo	4	2016	4	2016
LASER VISION - 3D Ladar (3DTO) POD Demo	2	2018	2	2018
Passive RF ID (PRIDE)	3	2016	4	2020
Passive RF ID (PRIDE) Lab Demo	2	2018	2	2018
Passive RF ID (PRIDE) OPS Demo	3	2020	3	2020
RID (Radio ID)	1	2016	3	2020
RID (Radio ID) Lab Demo	1	2019	1	2019
RID (Radio ID) - Flight Demo	3	2020	3	2020
Hydra Vision - Air to Air	1	2014	2	2020
Hydra Vision - Air to Air 2 Feature RT Demo	1	2016	1	2016
Hydra Vision - Air to Air 3 Feature RT Demo	2	2020	2	2020
Hydra Vision - Increment 1 - Air-to-Ground	1	2014	4	2016
Hydra Vision - Increment 1 - Air-To-Ground OPS Demo	3	2016	3	2016
Hydra Vision - Increment 2 - Air-To-Ground	1	2017	4	2020
Hydra Vision - Increment 2 - Air-to-Ground Flight Demo	3	2020	3	2020
Compact ATR - Compact Feature ATR	1	2014	4	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Air Force				Date: February 2015

Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603742F / Combat Identification Technology	Project (Number/Name) 642597 / Non-cooperative Identification Subsystems

Events	Start		End	
	Quarter	Year	Quarter	Year
Compact ATR - Compact Feature ATR Lab Demo	3	2017	3	2017
Compact ATR- Compact Feature ATR - Flight Demo	3	2020	3	2020
Enhanced CID	1	2016	4	2019
Studies	1	2014	4	2020
X-Patch Development	1	2014	4	2014

PE 0603742F: *Combat Identification Technology*
Air Force

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force											Date: February 2015	
Appropriation/Budget Activity 3600 / 4				**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*					**Project (Number/Name)** 642599 / *Cooperative Identification Techniques*			
COST ($ in Millions)	**Prior Years**	**FY 2014**	**FY 2015**	**FY 2016 Base**	**FY 2016 OCO**	**FY 2016 Total**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**Cost To Complete**	**Total Cost**
642599: *Cooperative Identification Techniques*	-	1.945	1.876	1.897	-	1.897	1.931	1.968	2.004	2.040	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Cooperative Combat Identification (CID) employs technologies required to rapidly identify friendly platforms. The program develops, integrates and evaluates technologies that provide AF platforms with a means of positively identifying an air or ground platform as a friendly, via active or passive cooperative identification capabilities. Development funded by this project ensures availability of a Mode 5 upgrade path for implementing ground and air platforms across the Air Force fleet.

Within the air-to-air domain, programs funded to meet this intent include:

Mode 5 Technology Insertion Program (TIP): This project funds preliminary RDT&E for Mark XIIA, the next generation Identification Friend or Foe (IFF) standard for the DoD and NATO. Mark XIIA represents a substantial enhancement to the Mark XII IFF system. It is expected to achieve Joint Initial Operational Capability in 2014. The "A" denotes the addition of Mode 5 (an encrypted challenge-and-reply mode) to the other Mark XII system modes (Modes 1, 2, 3/A, C, S, and 4). The Mode 5 secure IFF program is a DoD-wide, Navy-led development and acquisition program. The Mode 5 TIP specifically addresses implemention for air platforms by integrating Mode 5 into APX-119, APX-114, APX-113 and the UPX-40 transponder systems.

Within the air-to-ground domain, development funded by this project ensures development, integration, test and evaluation of friendly identification systems focused on reducing air-to-ground fratricide. CID efforts include investigation of radio based identification technologies; including the exploitation of state of the art digital radios and software defined radios and integration of cooperative and non-cooperative technologies for improved target recognition which could be incorporated into targeting pods or directly into the cockpit.

Fund Air Traffic Control Radar Beacon Systems Identification Friend or Foe Mark XIIA System (AIMS)Program Office test engineers. The DoD International AIMS PO has system level interoperability testing and certification responsibilities for the present Mark XII system, development and integration of Mark XIIA (Mode 5) and transition to Mark XIIA Mode S systems. AIMS PO will continue to test and certify IFF equipment for the services now as long as IFF is used for combat identification.

B. Accomplishments/Planned Programs ($ in Millions)

	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: AIMS Program Office ***Description:*** Fund Air Traffic Control Radar Beacon Systems Identification Friend or Foe Mark XIIA System (AIMS)Program Office test engineers. The DoD International AIMS PO has system level interoperability testing	1.945	1.876	1.897	-	1.897

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Exhibit R-2A, **RDT&E Project Justification:** PB 2016 Air Force | | **Date:** February 2015
| Appropriation/Budget Activity | R-1 Program Element (Number/Name) | Project (Number/Name) |

Appropriation/Budget Activity
3600 / 4

R-1 Program Element (Number/Name)
PE 0603742F / *Combat Identification Technology*

Project (Number/Name)
642599 / *Cooperative Identification Techniques*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total

and certification responsibilities for the present Mark XII system, development and integration of Mark XIIA (Mode 5) and transition to Mark XIIA Mode S systems.

FY 2014 Accomplishments:
- Continued to fund AIMS for interoperability testing, FAA liason, and support of Mode 4 / Mode 5 equipment.

FY 2015 Plans:
- Continue to fund AIMS for interoperability testing, FAA liason, and support of Mode 4 / Mode 5 equipment.

FY 2016 Base Plans:
- Will continue to fund AIMS for interoperability testing, FAA liason, and support of Mode 4 / Mode 5 equipment.

FY 2016 OCO Plans:
N/A

| Accomplishments/Planned Programs Subtotals | 1.945 | 1.876 | 1.897 | - | 1.897 |

C. Other Program Funding Summary ($ in Millions)
N/A

Remarks

D. Acquisition Strategy
Award multiple, competitive contract vehicles emphasizing off-the-shelf technology and maximizing the use of non-developmental items (NDIs).

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force													Date: February 2015		

Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603742F / Combat Identification Technology	Project (Number/Name) 642599 / Cooperative Identification Techniques

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Systems Engineering / Program Management (AIMSPO)	C/Various	WRALC/ENT : Robins AFB, GA	-	1.880	Mar 2014	1.756	May 2015	1.777	Apr 2016	-		1.777	Continuing	Continuing	-
Subtotal			-	1.880		1.756		1.777		-		1.777	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Office Support	Various	Not specified. : ,	-	0.065	Sep 2014	0.120	Sep 2015	0.120	Sep 2016	-		0.120	Continuing	Continuing	-
Subtotal			-	0.065		0.120		0.120		-		0.120	-	-	-

	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1.945		1.876		1.897		-		1.897	-	-	-

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2016 Air Force | **Date:** February 2015

Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603742F / *Combat Identification Technology*	Project (Number/Name) 642599 / *Cooperative Identification Techniques*

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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
ADS-B / M5L2 TIP																												
ADS-B / M5L2 TIP - AIMS Certification																												
Digital IFF Control Panel																												
Digital IFF Control Panel - AIMS Certification																												
AIMS Program Office Support																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2016 Air Force		**Date:** February 2015
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642599 / *Cooperative Identification Techniques*

Schedule Details

Events	Start		End	
	Quarter	**Year**	**Quarter**	**Year**
ADS-B / M5L2 TIP	1	2014	3	2014
ADS-B / M5L2 TIP - AIMS Certification	3	2014	3	2014
Digital IFF Control Panel	1	2014	4	2014
Digital IFF Control Panel - AIMS Certification	4	2014	4	2014
AIMS Program Office Support	1	2014	4	2020