PE NUMBER: 0603742F
PE TITLE: Combat Identification Technology

Exhibit R-2, RDT&E Budget Item Justification	DATE February 2006
BUDGET ACTIVITY 04 Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE 0603742F Combat Identification Technology

	Cost ($ in Millions)	FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
	Total Program Element (PE) Cost	23.634	51.146	26.517	20.643	20.882	21.242	21.482	Continuing	TBD
2597	Noncooperative Identification Subsystems	23.634	28.226	20.327	20.643	20.882	21.242	21.482	Continuing	TBD
2599	Cooperative Identification Techniques	0.000	22.920	6.190	0.000	0.000	0.000	0.000	0.000	38.121

(U) A. Mission Description and Budget Item Justification

U.S. Combat Air Forces have a critical requirement to positively identify enemy, friendly, and neutral aircraft, battlefield equipment and personnel in order to increase combat effectiveness and prevent fratricide. Numerous Joint needs statements, operational documents, lessons learned, and NATO requirements documents also state the need for positive combat identification (ID). High confidence combat ID in all weather and day/night enables combatant commanders to effectively command and control their forces. This program will participate in the development, testing, and implementation of international standards (to include NATO standardization agreements) to ensure joint, Allied, and coalition interoperability.
The Combat Identification (CID) Technology program analyzes, develops, and demonstrates promising target identification technologies in order to transition them into Systems Development/Demonstration (SD/D) programs. These technologies include both cooperative and non-cooperative techniques that will improve our ability to positively identify ground and air targets in both Air-to-Surface and Air-to-Air engagements.

Non-cooperative CID employs a number of sensing and signal processing techniques and compares the results against a database of known objects to determine identity. The non-cooperative CID techniques can be used for identifying surface or air threats from air platforms. These technologies include 1) Laser Vision, an electro-optical imaging system that significantly increases ID ranges and includes the Laser Target Imaging Program (LTIP), as well as other Advanced Laser System (ALS) imaging technologies, 2) Radar Vision, an air-to-ground radar imaging technique to identify objects using their radar signatures; and 3) the High Range Resolution (HRR) program that uses radar signals processing to increase ID range and confidence. Within these programs the goal is to bring algorithm maturation to the point to allow for data fusion sufficient to support Automatic Target Cueing (ATC) and Automatic Target Recognition (ATR). A robust database program underwrites all these techniques.

Cooperative CID techniques require a system that allows rapid identification of a friendly system. In an air-to-ground setting, this can be in the form of unique markings on a vehicle or a radio-based reply that is activated by a directed signal. In both an air-to-air and surface-to-air setting, this program element funds the growth to Mark XIIA, the Next Generation Identification Friend or Foe (IFF) standard for NATO and Joint Services, through the development of Mode 5 capability within Mark XII equipment. IFF performance was highlighted as a significant deficiency in Operation Iraqi Freedom. Mode 5 implementation within the Air Force began with the fielding of new digital Mark XII hardware capable of Mode S for Air Traffic Control (ATC), and upgradeable to Mode 5 with new cryptologic gear, processor cards, and software. The development funded by this program element ensures availability of an upgrade path for implementing platforms across the Air Force fleet.

Current and future space-based systems can facilitate these processes leading ultimately to Automatic Target Recognition (ATR) fusion and net-centric warfare. ATR focuses on development, demonstration, and integration of technologies drawing upon all available information data elements or platforms e.g. (national, tactical,

Exhibit R-2, RDT&E Budget Item Justification	DATE February 2006
BUDGET ACTIVITY 04 Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE 0603742F Combat Identification Technology

fighter, bomber, ISR). The desired outcome would provide the operational-level decision maker a single, fused display of all threats or assets. These technologies must provide near-real time information, to include Special Compartmented Information (SCI) and classified data information, to the operational and tactical level decision makers for both ground and airborne systems. Efforts, such as Blue Force Tracking (BFT) and Joint Blue Force Situational Awareness (JBFSA), focus on development and approval of new technologies so all this information can be shared across security levels, services and with foreign participants.

This program is in Budget Activity 4 - Advanced Component Development and Prototypes (ACD&P). The PE includes advanced technology demonstrations that help transition technologies from laboratory to operational use.

(U) B. Program Change Summary ($ in Millions)

		FY 2005	FY 2006	FY 2007
(U)	Previous President's Budget	19.582	51.893	20.160
(U)	Current PBR/President's Budget	23.634	51.146	26.517
(U)	Total Adjustments	4.052	-0.747	
(U)	Congressional Program Reductions		-0.008	
	Congressional Rescissions	-0.178	-0.739	
	Congressional Increases			
	Reprogrammings	4.230		
	SBIR/STTR Transfer			

(U) Significant Program Changes:

The Air Force reprogrammed nearly $5.0M in FY05 to accelerate the development of Mode 5 because this capability is needed to prevent fratricide. An additional $32.0M was provided in the FY06 President's Budget, the year when the bulk of the development work is being done. The work then tapers off in FY07 as the development concludes and the capability is integrated on various weapons platforms beginning in FY08, which is being programmed for by the receiving platforms.

Exhibit R-2a, RDT&E Project Justification			DATE: February 2006
BUDGET ACTIVITY: 04 Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE: 0603742F Combat Identification Technology	PROJECT NUMBER AND TITLE: 2597 Noncooperative Identification Subsystems	

Cost ($ in Millions)		FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
2597	Noncooperative Identification Subsystems	23.634	28.226	20.327	20.643	20.882	21.242	21.482	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0		

(U) A. Mission Description and Budget Item Justification

Non-cooperative CID employs a number of sensing and signal processing techniques and compares the results against a database of known objects to determine identity. The non-cooperative CID techniques can be used for identifying surface or air threats from air platforms. These technologies include 1) Laser Vision, an electro-optical imaging system that significantly increases ID ranges and includes the Laser Target Imaging Program (LTIP), as well as other Advanced Laser System (ALS) imaging technologies, 2) Radar Vision, an air-to-ground radar imaging technique to identify objects using their radar signatures; and 3) the High Range Resolution (HRR) program that uses radar signals processing to increase ID range and confidence. Within these programs the goal is to bring algorithm maturation to the point to allow for data fusion sufficient to support Automatic Target Cueing (ATC) and Automatic Target Recognition (ATR). A robust database program underwrites all these techniques. The non-cooperative CID programs will participate in the development, testing, and implementation of international standards (to include NATO standardization agreements) to ensure joint, Allied, and coalition interoperability.

This program is in Budget Activity 4 - Advanced Component Development and Prototypes (ACD&P)., because it includes advanced technology demonstrations that help transition technologies from laboratory to operational use.

(U) B. Accomplishments/Planned Program ($ in Millions)	FY 2005	FY 2006	FY 2007
(U) Continue the High Range Resolution (HRR) synthetic target database development in conjunction with National Air and Space Intelligence Center (NASIC). Implement enhancement techniques to improve the HRR algorithm and increase the fidelity of the HRR database. Prepare for the transition of database management and maintenance from the lab environment to a SPO.	7.389	5.536	5.776
(U) Transition verified air-to-ground and air-to-air identification capabilities for reduced battle space fratricide and enhanced mission performance and develop/demonstrate promising future capabilities. Program candidates include the integration of Laser Vision/LTIP into designated platforms, to include Advanced LTIP projects, development of 1st generation Electro Optical/Automatic Target Cueing/Automatic Target Recognition (EO/ATC/ATR) Laser Vision capability, development/demonstration of laser vibrometry, and insertion of mature/hardened camera technologies into alternate platforms. Radar Vision's air-to-ground radar imaging technology is in its second phase and will release its third spiral development during FY06 which will integrate selected algorithms, data sets, and enhanced technologies into designated platforms.	8.663	19.838	11.779
(U) Fund Air Traffic Control Radar Beacon Systems Identification Friend or Foe Mark XIIA System (AIMS) Program Office support of the Mark XIIA system to include current and next generation IFF equipment integration, including Mode 5 documentation and individual IFF system/box certification.	0.824	0.863	1.063

Exhibit R-2a, RDT&E Project Justification		DATE February 2006
BUDGET ACTIVITY 04 Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE 0603742F Combat Identification Technology	PROJECT NUMBER AND TITLE 2597 Noncooperative Identification Subsystems

	B. Accomplishments/Planned Program ($ in Millions)	FY 2005	FY 2006	FY 2007
(U)	Continue funding the CID Integrated Management Team and other engineering support necessary for management of CID efforts.	1.055	1.566	1.681
(U)	Conduct CID-related studies/demos and conferences. Execute Mode 5 IFF flight test preparations and demonstration to assess system operational capacity, interoperability, and equipment integration. Studies and demonstrations will include those directed by Joint Staff and OSD to research and evaluate a family of CID systems, linkage between airborne and ground-based non-cooperative CID technologies/systems, and quantify the relationship between CID and improved combat effectiveness.	0.367	0.423	0.028
(U)	Continued the Mode 5 upgrade to the APX-119 transponder, the APX-114 interrogator, and the APX-113 Combined Interrogator/Transponder (CIT). Funded the Mode 5 upgrade to the UPX-40 interrogator on the AWACS. Provided systems engineering and program management for other planned platform integrations, including test planning. Funding for these efforts in FY05 was through funds reprogrammed into Project number 2597; in FY06 and beyond through the FY06 POM under Project number 2599, Cooperative Identification Techniques	5.336		
(U)	Total Cost	23.634	28.226	20.327

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

	FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total Cost
(U) Not Applicable									

(U) D. Acquisition Strategy

The acquisition strategy for CID programs is and will continue to be to investigate, develop, and transition CID capabilities via contract vehicles that provide the greatest benefit to the end-user in the areas of performance, value, and transition timeline.

Exhibit R-3, RDT&E Project Cost Analysis

DATE: **February 2006**

BUDGET ACTIVITY: **04 Advanced Component Development and Prototypes (ACD&P)**

PE NUMBER AND TITLE: **0603742F Combat Identification Technology**

PROJECT NUMBER AND TITLE: **2597 Noncooperative Identification Subsystems**

(U) Cost Categories (Tailor to WBS, or System/Item Requirements) ($ in Millions)	Contract Method & Type	Performing Activity & Location	Total Prior to FY 2005 Cost	FY 2005 Cost	FY 2005 Award Date	FY 2006 Cost	FY 2006 Award Date	FY 2007 Cost	FY 2007 Award Date	Cost to Complete	Total Cost	Target Value of Contract
(U) Product Development												
Raytheon Co	C/CPFF	El Segundo CA		4.278	Nov-04	4.098	Feb-06	4.118	Dec-06	Continuing	TBD	TBD
Northrop Grumman Corp	C/CPFF	Baltimore MD		2.500	Apr-05	7.029	Feb-06	8.215	Dec-06	Continuing	TBD	TBD
Lockheed Martin	OTA	Orlando FL				0.146	Dec-05			0.000	0.146	TBD
Northrop Grumman	CPFF	Linthicum Heights, MD		2.999	Apr-05	4.519	Mar-06	0.851	Mar-07	Continuing	TBD	TBD
Science Applications Internation Corp	SS/CPFF	Dayton OH		3.691	Dec-04	2.502	Feb-06	2.400	Feb-07	Continuing	TBD	TBD
AIMS Program Office	MIPR/PO	Warner Robins, GA		1.060	Oct-04	0.863	Oct-05	0.906	Oct-06	Continuing	TBD	TBD
Raytheon	CPFF	Baltimore, MD		4.700	Jul-05						4.700	TBD
Veridian Engineering	C	Buffalo, NY		0.655	Apr-05						0.655	TBD
Sverdrup Technology	C	Ft Walton Beach, FL		0.590	Apr-05	1.030	Feb-06	0.600	Jan-07	Continuing	TBD	TBD
DOE - Sandia National Labs	MIPR	Albuquerque, NM				1.140	Feb-06				1.140	TBD
JSTARS Platform	AF616	Hanscom AFB, MA				1.600	Mar-06				1.600	
AFRL -ERIM DCS	AF616	WPAFB, OH				0.770	Mar-06				0.770	
AFIT	MIPR/PO	WPAFB, OH		0.027	Jan-05	0.023	Jan-06				0.050	
Subtotal Product Development			0.000	20.500		23.720		17.090		Continuing	TBD	TBD
Remarks:												
(U) Support												
SPO support	Various	Hanscom AFB, MA		1.327	Oct-04	1.560	Oct-05	1.600	Oct-06	Continuing	TBD	
Air Force Research Laboratory	MIPR	Dayton OH		0.260	Oct-04	0.370	Oct-05	0.381	Oct-06	Continuing	TBD	
MITRE	Various	Hanscom AFB, MA		0.115	Nov-05	0.270	Nov-05	0.278	Nov-06	Continuing	TBD	
Subtotal Support			0.000	1.702		2.200		2.259		Continuing	TBD	0.000
Remarks:												
(U) Test & Evaluation												
46th Test Wing	MIPR/PO	Eglin AFB, FL		0.635	Mar-05	0.250	Jan-06	0.300	Jan-07	Continuing	TBD	
412th Test Wing	MIPR/PO	Edwards AFB, CA		0.360	Dec-04	0.926	Dec-05	0.400	Dec-06	Continuing	TBD	
AFRL/DE Maui Test	MIPR	Kirtland AFB, NM				0.040	Feb-06				0.040	
Navy Systems Mgmt Activity	MIPR	Arlington, VA		0.080	May-05						0.080	
NASIC	AF616	WPAFB, OH		0.095	Jan-05						0.095	
Aberdeen Proving Ground	MIPR	MD				0.020	Feb-06				0.020	

Exhibit R-3, RDT&E Project Cost Analysis

DATE: **February 2006**

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NUMBER AND TITLE
04 Advanced Component Development and Prototypes (ACD&P)	**0603742F Combat Identification Technology**	**2597 Noncooperative Identification Subsystems**

	Western Test Range	MIPR/PO	CA			0.750	Feb-06			0.750	
	ROC-V Fielding	MIPR	Ft. Belvoir, VA			0.050	Apr-06			0.050	
	Subtotal Test & Evaluation			0.000	1.170	2.036		0.700	Continuing	TBD	0.000
	Remarks:										
(U)	Management										
	SAF/AQ Support				0.262	0.270		0.278		0.810	
	Subtotal Management			0.000	0.262	0.270		0.278	0.000	0.810	0.000
	Remarks:										
(U)	Total Cost			0.000	23.634	28.226		20.327	Continuing	TBD	TBD

Exhibit R-4, RDT&E Schedule Profile		DATE February 2006
BUDGET ACTIVITY **04 Advanced Component Development and Prototypes (ACD&P)**	PE NUMBER AND TITLE **0603742F Combat Identification Technology**	PROJECT NUMBER AND TITLE **2597 Noncooperative Identification Subsystems**

Non-cooperative Identification Subsystems Schedule Profile

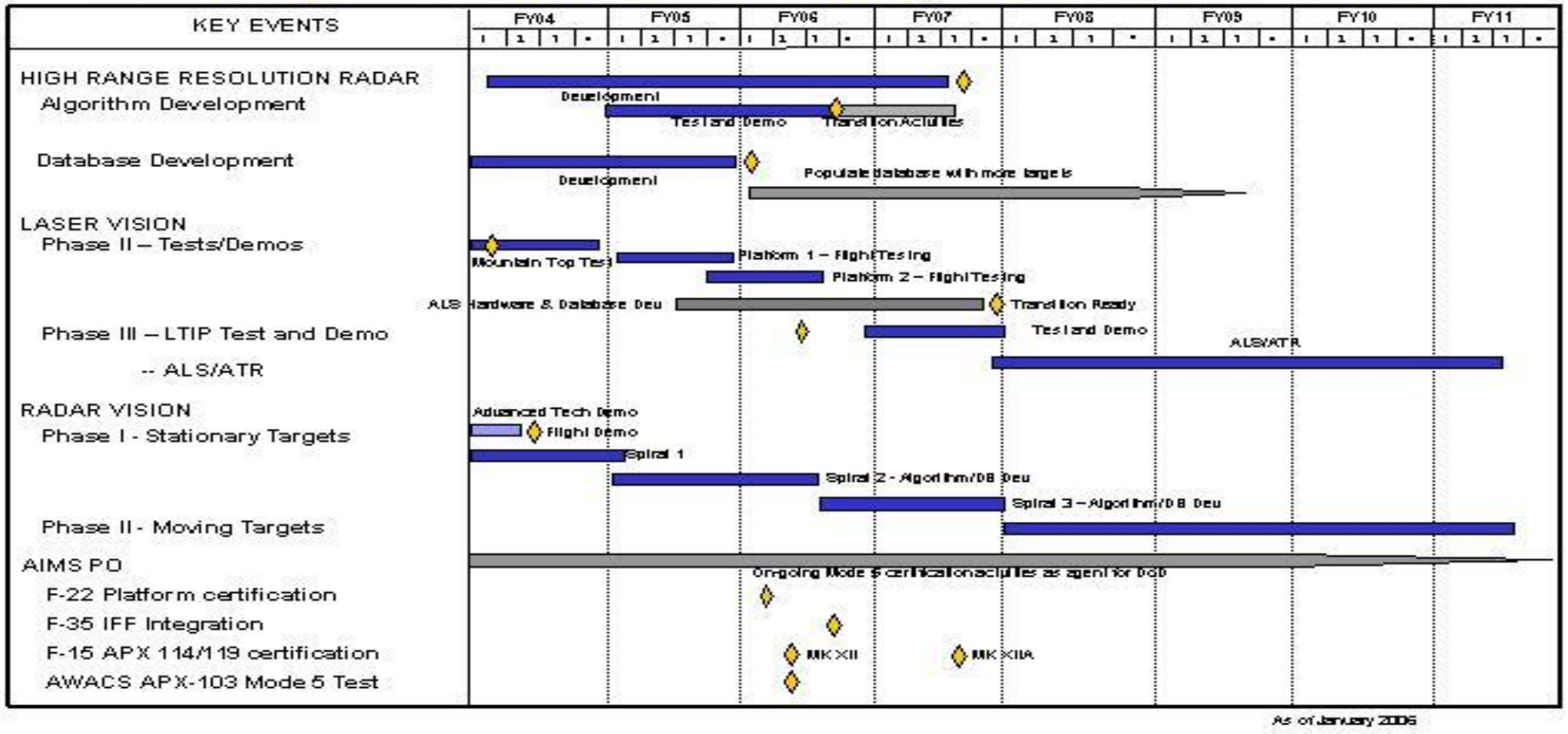

Exhibit R-4a, RDT&E Schedule Detail		DATE February 2006
BUDGET ACTIVITY **04 Advanced Component Development and Prototypes (ACD&P)**	PE NUMBER AND TITLE **0603742F Combat Identification Technology**	PROJECT NUMBER AND TITLE **2597 Noncooperative Identification Subsystems**

(U)	**Schedule Profile**	FY 2005	FY 2006	FY 2007
(U)	1. HRR Classifier Dev/Qual		1-4Q	1-4Q
(U)	Algorithm Development	3Q	1-4Q	
(U)	Algorithm Test and Demo	1-4Q	3Q	
(U)	Database Development	1-4Q	1Q	
(U)	Database Population		1-3Q	1-4Q
(U)	2. LASER VISION / ADVANCED LASER SENSING (ALS)	4Q	1Q	
(U)	LV Flight Testing	1-4Q	1Q	
(U)	Completion of Phase II		2Q	
(U)	LTIP Fligt Testing		3-4Q	1-4Q
(U)	LTIP/Advanced LTIP	3Q	1-4Q	1-4Q
(U)	ALS Development			1-4Q
(U)	3. RADAR VISION (Development and transition of air-to-ground radar imaging automatic target recognition)	4Q		
(U)	Phase 1 - Stationary Target Recognition	1-4Q	1-4Q	1-4Q
(U)	Radar Vision Spiral 1	1Q		
(U)	Radar Vision Spiral 2	1-4Q	1-4Q	
(U)	Radar Vision Spiral 3		4Q	1-4Q
(U)	Phase 2 - Moving Target Recognition			4Q
(U)	4. AIMSPO Integration and Certification Support	1-4Q	1-4Q	1-4Q
(U)	F-22 IFF Platform certification		1Q	
(U)	F-35 IFF Integration		3Q	
(U)	F-15 APX-114/119 certification (MK XII/MK XIIA)		2Q	3Q
(U)	AWACS APX-103 Mode 5 test		2Q	
(U)	5. INTEGRATED MANAGEMENT TEAM	1-4Q	1-4Q	1-4Q
(U)	Air-to-Air CID Tech Roadmap Update	3Q	3Q	3Q
(U)	Air-to-Ground CID Tech Roadmap Update	4Q	3Q	3Q
(U)	6. CID Studies and Demos	4Q	1-4Q	1-4Q
(U)	AFSAA AoA Completion	1Q		

Exhibit R-2a, RDT&E Project Justification		DATE: February 2006
BUDGET ACTIVITY: 04 Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE: 0603742F Combat Identification Technology	PROJECT NUMBER AND TITLE: 2599 Cooperative Identification Techniques

Cost ($ in Millions)		FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
2599	Cooperative Identification Techniques	0.000	22.920	6.190	0.000	0.000	0.000	0.000	0.000	38.121
	Quantity of RDT&E Articles	0	0	0	0	0	0	0		

(U) A. Mission Description and Budget Item Justification

Cooperative CID techniques require a system that allows rapid identification of a friendly system. In an air-to-ground setting, this can be in the form of unique markings on a vehicle or a radio-based reply that is activated by a directed signal. In both an air-to-air and surface-to-air setting, this program element funds the growth to Mark XIIA, the next Generation Identification Friend or Foe (IFF) standard for NATO and Joint Services, through the development of Mode 5 capabiliy within Mark XII equipment. IFF performance was highlighted as a significant deficiency in Operation Iraqi Freedom. Mode 5 implementation within the Air Force began with the fielding of new digital Mark XII hardware capable of Mode S for Air Trafffic Control (ATC) and upgradeable to Mode 5 with new cryptologic gear, processor cards, and software. The development funded by this program element ensures availability of an upgrade path for implementing platforms across the Air Force fleet.

This project is in Budget Activity 4 - Advanced Component Development and Prototypes (ACD&P). The PE includes advanced technology demonstrations that help transition technologies from laboratory to operational use. Also, the project will participate in the development, testing, and implementation of international standards (to include NATO standardization agreements) to ensure joint, Allied, and coalition interoperability.

	B. Accomplishments/Planned Program ($ in Millions)	FY 2005	FY 2006	FY 2007
(U)	Continue the Mode 5 upgrade to the APX-119 transponder, the APX-114 interrogator, and the APX-113 Combined Interrogator/Transponder (CIT). Fund the Mode 5 upgrade to the UPX-40 interrogator on the AWACS. Provide systems engineering and program management for other planned platform integrations, including test planning. Funding in this project is a continuation of funds originally listed in FY04 and FY05 under Project number 2597. Funding in FY06 and beyond is broken out separately in this project number to provide greater insight into the "cooperative" combat ID portion of the PE.		22.920	6.190
(U)				
(U)				
(U)	Total Cost	0.000	22.920	6.190

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

	FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total Cost
(U) Not applicable									

(U) D. Acquisition Strategy

To develop the Mode 5 capability in the digital Mark XII IFF equipment in or planned for use on AF platforms, and provide systems engineering and program management in order to facilitate the integrate into all AF mission design series (MDS), or platforms, and transition the AF cooperative ID capability to Mark XIIA.

Exhibit R-3, RDT&E Project Cost Analysis

DATE: **February 2006**

BUDGET ACTIVITY: **04 Advanced Component Development and Prototypes (ACD&P)**

PE NUMBER AND TITLE: **0603742F Combat Identification Technology**

PROJECT NUMBER AND TITLE: **2599 Cooperative Identification Techniques**

(U) Cost Categories (Tailor to WBS, or System/Item Requirements) ($ in Millions)	Contract Method & Type	Performing Activity & Location	Total Prior to FY 2005 Cost	FY 2005 Cost	FY 2005 Award Date	FY 2006 Cost	FY 2006 Award Date	FY 2007 Cost	FY 2007 Award Date	Cost to Complete	Total Cost	Target Value of Contract
(U) Product Development												
BAE	C	Greenlawn, NY				6.350	Feb-06	2.480	Nov-07		8.830	TBD
Boeing/Telephonics	C	Farmingdale, NY				7.200	Mar-06				7.200	TBD
Raytheon	C	Townson, MD				6.220	Feb-06	3.710	Nov-07		9.930	
Subtotal Product Development			0.000	0.000		19.770		6.190		0.000	25.960	TBD
Remarks:												
(U) Support											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	0.000
Remarks:												
(U) Test & Evaluation											0.000	
Subtotal Test & Evaluation			0.000	0.000		0.000		0.000		0.000	0.000	0.000
Remarks:												
(U) Management												
Systems Engineering/Program Management	Various	Various				3.150	Nov-05	0.000		Continuing	TBD	
Subtotal Management			0.000	0.000		3.150		0.000		Continuing	TBD	0.000
Remarks:												
(U) Total Cost			0.000	0.000		22.920		6.190		Continuing	TBD	TBD

Exhibit R-4, RDT&E Schedule Profile		DATE February 2006
BUDGET ACTIVITY 04 Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE 0603742F Combat Identification Technology	PROJECT NUMBER AND TITLE 2599 Cooperative Identification Techniques

Cooperative Identification Techniques Schedule Profile

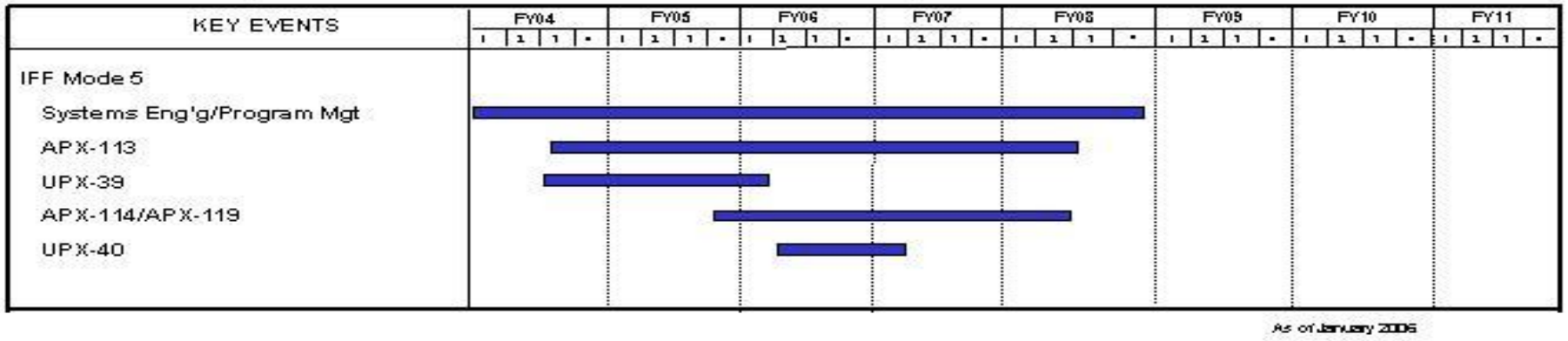

Exhibit R-4a, RDT&E Schedule Detail		DATE: February 2006
BUDGET ACTIVITY: 04 Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE: 0603742F Combat Identification Technology	PROJECT NUMBER AND TITLE: 2599 Cooperative Identification Techniques

(U) Schedule Profile	FY 2005	FY 2006	FY 2007
(U) IFF MODE 5 RDT&E	1-4Q	1-4Q	1-4Q
(U) Systems Eng'g/Program Mgt	1-4Q	1-4Q	1-4Q
(U) APX-113	1-4Q	1-4Q	1-4Q
(U) UPX-39	1-4Q	1Q	
(U) APX-114/APX-119	4Q	1-4Q	1-4Q
(U) UPX-40		2-4Q	1Q