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PE NUMBER: 0603791F
 PE TITLE: International Space Cooperative R&D

Exhibit R-2, RDT&E Budget Item Justification	DATE February 2005
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BUDGET ACTIVITY 04 Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE 0603791F International Space Cooperative R&D
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Cost (\$ in Millions)	FY 2004 Actual	FY 2005 Estimate	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	0.480	0.547	0.574	0.586	0.603	0.615	0.629	0.639	Continuing	TBD
5035 Intl Space Coop R&D	0.480	0.547	0.574	0.586	0.603	0.615	0.629	0.639	Continuing	TBD

In FY 2003, from PE 0603790F, 64NATO, NATO Coop R&D, space-related efforts transferred to PE 0603791F, 645035, Intl Space Coop R&D, in order to clearly identify space-related projects and funding.

(U) A. Mission Description and Budget Item Justification

These funds will be used to help implement space-related international cooperative research, development, and acquisition (ICRD&A) agreements with North Atlantic Treaty Organization (NATO) member states and major non-NATO allies (Argentina, Australia, Egypt, Israel, Japan, Jordan, and Rep. of Korea (South Korea)) and friendly foreign countries (Austria, Bulgaria, Finland, India, Singapore, South Africa, Sweden, Switzerland, and Ukraine). The program implements the provisions of Title 10 U.S. Code, Section 2350a on NATO Cooperative Research and Development (R&D). The program was established to improve cooperation among NATO nations, and later major non-NATO allies, in research, development, and acquisition. The legislation authorized funds to significantly improve United States (US) and allied conventional defense capabilities by leveraging the best defense technologies, eliminating costly duplication of R&D efforts, accelerating the availability of defense systems, and promoting US and allied interoperability or commonality. The program will be reported as required by Title 10 U.S. Code, Section 2350a(f). This program element funds the implementation of space-related Air Force ICRD&A agreements in (1) Basic Research (2) Applied Research (3) Advanced Technology Development (4) Advanced Component Development and Prototypes (5) System Development and Demonstration and (6) RDT&E Management Support. This PE is designated in Budget Activity 4 because most of the ICRD&A projects support specific systems, include all efforts necessary to evaluate integrated technologies in as realistic an operating environment as possible to assess the performance or cost reduction potential of advanced technology, and help expedite technology transition from the laboratory to operational use.

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

	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
(U) Previous President's Budget	0.480	0.547	0.574	0.575
(U) Current PBR/President's Budget	0.480	0.547	0.574	0.586
(U) Total Adjustments	0.000	0.000		
(U) Congressional Program Reductions				
Congressional Rescissions				
Congressional Increases				
Reprogrammings				
SBIR/STTR Transfer				
(U) <u>Significant Program Changes:</u>				

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Cost (\$ in Millions)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
5035 Intl Space Coop R&D	0.480	0.547	0.574	0.586	0.603	0.615	0.629	0.639	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0		

(U) A. Mission Description and Budget Item Justification

These funds will be used to help implement space-related international cooperative research, development, and acquisition (ICRD&A) agreements with North Atlantic Treaty Organization (NATO) member states and major non-NATO allies (Argentina, Australia, Egypt, Israel, Japan, Jordan, and Rep. of Korea (South Korea)) and friendly foreign countries (Austria, Bulgaria, Finland, India, Singapore, South Africa, Sweden, Switzerland, and Ukraine). The program implements the provisions of Title 10 U.S. Code, Section 2350a on NATO Cooperative Research and Development (R&D). The program was established to improve cooperation among NATO nations, and later major non-NATO allies, in research, development, and acquisition. The legislation authorized funds to significantly improve United States (US) and allied conventional defense capabilities by leveraging the best defense technologies, eliminating costly duplication of R&D efforts, accelerating the availability of defense systems, and promoting US and allied interoperability or commonality. The program will be reported as required by Title 10 U.S. Code, Section 2350a(f). This program element funds the implementation of space-related Air Force ICRD&A agreements in (1) Basic Research (2) Applied Research (3) Advanced Technology Development (4) Advanced Component Development and Prototypes (5) System Development and Demonstration and (6) RDT&E Management Support. This PE is designated in Budget Activity 4 because most of the ICRD&A projects support specific systems, include all efforts necessary to evaluate integrated technologies in as realistic an operating environment as possible to assess the performance or cost reduction potential of advanced technology, and help expedite technology transition from the laboratory to operational use.

(U) B. Accomplishments/Planned Program (\$ in Millions)

	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
(U) Hyperspectral Data Exploitation Algorithm Development and Assessment (Air Force Research Lab (AFRL)/ Australia) - Planned cooperative project to develop approaches and technologies for improved space-based hyperspectral sensors. In FY04, data collection, data analysis, and algorithm validation will begin.	0.019			
(U) Impacts of the Space Environment on Communications, Navigation, and Surveillance Systems (AFRL/ The United Kingdom (UK)) - Planned cooperative project to develop space weather specification, forecasting techniques, and data displays to provide reliable, timely warning of ionospheric disturbances that will seriously disrupt the performance of space-based communication, navigation and surveillance systems, as well as ground-based surveillance systems such as those employed for early missile warning and missile defense. In FY04, data collection will begin.	0.461	0.205		
(U) Space Vehicle Orbit Prediction (AFRL/ France) - Planned cooperative project to use data from a French accelerometer experiment currently on orbit to improve the accuracy of upper atmospheric aerodynamic drag models. This will include solving for short term geomagnetic activity variations. In FY03, modeling algorithms to use the new data will be developed.				
(U) Management and administrative support and travel.				

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BUDGET ACTIVITY 04 Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE 0603791F International Space Cooperative R&D	PROJECT NUMBER AND TITLE 5035 Intl Space Coop R&D		
(U) Measurement of High-Latitude Ionospheric Structures and System Effects from Northeast Greenland (AFRL/Denmark) - Planned cooperative project to accurately model, simulate, recognize, and forecast polar ionospheric conditions impacting DoD systems. The project will collect multi-instrument measurements of ionospheric conditions at Station Nord in Greenland for the purpose of furthering basic research into mechanisms creating ionospheric disturbances, improving high-latitude ionosphere models, simulations, and providing space weather situational awareness and forecast tools.		0.247	0.125	0.018
(U) Space Vehicle Orbit Prediction (AFRL/ France) - Ongoing cooperative project to use data from a French accelerometer experiment currently on orbit to improve the accuracy of upper atmospheric aerodynamic drag models. This will include solving for short term geomagnetic activity variations. In FY04, modeling algorithms to use the new data will be developed.				
(U) Cooperation In Navigation Warfare Technology Demonstrator and System Prototype Projects (PA) SMC/GP (GPS Joint Program Office) and ASD/NII/UK - Cooperative project to conduct collaborative studies and cooperatively develop advance counterSATNAV capabilities that can be employed from current and projected EA platforms. Developed technologies will be jointly tested to assure desired effects are achieved and that there is minimal fratricide impact on friendly forces. Additionally, an initial concept of employment or operations will be collectively developed and tested by the participants in order to assess optimal capabilities in varying threat situations.		0.095	0.143	0.357
(U) Forecasting Communication and Navigation Disruptions due to Inospheric Disturbance During Solar Mininum (AFRL/VSBX) and Australia - Planned cooperative project to collaborate with Australia to study ionospheric phenomena which impact communication, navigation and radio frequency (RF) surveillance systems. The key research focus will be on forecasting ionospheric disturbances and their impact on systems such as Ultra High Frequency (UHF) Satellite Communication (SATCOM) and GLOBAL Positioning System (GPS) navigation. Ionospheric phenomena had an adverse impact on DoD satellite communication and navigation systems in recent operations in Afghanistan and during Operation Iraqi Freedom (OIF); future military operations will almost certainly be conducted in regions where ionospheric disturbances occur and C31 systems may be vulnerable. The Communication/Navigation Outage Forecast System System (C/NOFS) Advance Concept Technical Demonstration (ACTD) is dedicated to providing space-based forecasts of the disturbances that cause impacts on radio frequency (RF) systems.	0.000		0.306	0.211
(U) Total Cost	0.480	0.547	0.574	0.586

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

<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>Cost to</u>	<u>Total Cost</u>
<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	<u></u>

(U) N/A

(U) **D. Acquisition Strategy**

A principal goal of the International Space Cooperative R&D program is to effectively utilize the aggregate resources invested by the US and our allies in space-related R&D. This program element provides the critical funding incentive needed to pursue space-related ICRD&A agreements and helps to (a) leverage USAF and allied resources through cost sharing and economies of scale; (b) exploit the best US and allied technologies for equipping coalition forces; (c) demonstrate areas of commonality or interoperability with our allies; and (d) accelerate the availability of defense technology and systems. Candidate projects are reviewed and approved by the USD(AT&L). An international agreement defining project objectives, responsibilities and costs is required prior to release of funds. To obtain these funds and ensure service commitment, projects are selected from existing or new space-related RDT&E programs funded in the Future Years Defense Plan (FYDP). Project offices must show matching funds and contributions from associated program elements and equitable allied funding. As appropriate, funding responsibility for out-year requirements and follow-on efforts are transferred to the project office and associated program elements. Most contracts are awarded after full and open competition.

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Exhibit R-3, RDT&E Project Cost Analysis

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(U) <u>Cost Categories</u> (Tailor to WBS, or System/Item Requirements) (\$ in Millions)	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior to FY 2004 Cost</u>	<u>FY 2004 Cost</u>	<u>FY 2004 Award Date</u>	<u>FY 2005 Cost</u>	<u>FY 2005 Award Date</u>	<u>FY 2006 Cost</u>	<u>FY 2006 Award Date</u>	<u>FY 2007 Cost</u>	<u>FY 2007 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
(U) <u>Product Development</u>														
AFRL Hanscom AFB, MA	TBD											Continuing	TBD	TBD
AFRL, WPAFB				0.499		0.355		0.428		0.218			1.500	TBD
AEDC/DO						0.097							0.097	TBD
SMC, LAAFB, CA						0.100		0.143		0.357			0.600	TBD
Subtotal Product Development			0.000	0.499		0.552		0.571		0.575		Continuing	TBD	TBD
Remarks:														
(U) <u>Support</u>														
AFRL, WPAFB	TBD											Continuing	TBD	TBD
None													0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000		Continuing	TBD	TBD
Remarks:														
(U) <u>Test & Evaluation</u>														
TBD	TBD											Continuing	TBD	TBD
None													0.000	
Subtotal Test & Evaluation			0.000	0.000		0.000		0.000		0.000		Continuing	TBD	TBD
Remarks:														
(U) <u>Management</u>														
Subtotal Management			0.000	0.000		0.000		0.000		0.000			0.000	0.000
Remarks:														
(U) Total Cost			0.000	0.499		0.552		0.571		0.575		Continuing	TBD	TBD

Exhibit R-4, RDT&E Schedule Profile

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Name of ICR&D Project & In't Agreement Schedule	Start Date	END IA	PE
Hyperspectral Data Exploitation	FY 03	FY 05	63791
Impacts of the Space Environment	FY 03	FY 05	63791
Space Vehicle Orbit Prediction	FY 03	FY 05	63791
Hypersonic Airbreathing Propulsion Test	FY 04	FY 07	63791
Measurement of High-Latitude	FY 04	FY 07	63791
Cooperation in Navigation Warfare Technology	FY 05	FY 07	63791
Forecasting Communication and Navigation Disruptions due to Ionospheric Disturbance During Solar Minimum	FY06	FY08	63791

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PE NUMBER AND TITLE

0603791F International Space
Cooperative R&D

PROJECT NUMBER AND TITLE

5035 Intl Space Coop R&D

Name of ICR&D Project & In't Agreement Schedule	Start Date	END IA	PE
Hyperspectral Data Exploitation	FY 03	FY 05	63791
Impacts of the Space Environment	FY 03	FY 05	63791
Space Vehicle Orbit Prediction	FY 03	FY 05	63791
Hypersonic Airbreathing Propulsion Test	FY 04	FY 07	63791
Measurement of High-Latitude	FY 04	FY 07	63791
Cooperation in Navigation Warfare Technology	FY 05	FY 07	63791
Forecasting Communication and Navigation Disruptions due to Ionospheric Disturbance During Solar Minimum	FY06	FY08	63791

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Exhibit R-4a, RDT&E Schedule Detail		DATE February 2005		
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NUMBER AND TITLE		
04 Advanced Component Development and Prototypes (ACD&P)	0603791F International Space Cooperative R&D	5035 Intl Space Coop R&D		
(U) <u>Schedule Profile</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
(U) Hyperspectral Data Exploitation Algorithm Development and Assessment	1Q			
(U) - Project Agreement signed	1Q			
(U) - Data collection	2Q			
(U) - Data analysis and algorithm validation	3Q			
(U) - Interim report	4Q			
(U) Impacts of the Space Environment on Comm, Nav, and Surv Sys	3Q			
(U) - Project Agreement signed	3Q			
(U) - Data collection		2Q		
(U) Forecasting Comm. and Navigation Disruption due to Ionospheric Disturbances During Solar Minimum			1Q	
(U) - Project Agreement signed			1Q	
(U) Cooperation in Navigation Warfare Technology		1Q		
(U) - Data collection begins			3Q	
(U) Measurement of High-Latitude Ionospheric Structures and System Effects			4Q	
(U) - Project agreement signed			1Q	
(U) - Data collection begins				1Q