RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 2002

BUDGET ACTIVITY: 04 - Demonstration and Validation

PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D

PROJECT: NATO

COST ($ in Thousands)		FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
NATO	Nato Coop R&D	5,217	5,560	4,355	4,684	4,713	4,788	4,818	0	0
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0

(U) A. Mission Description

These funds will be used to help implement 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)). 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 Air Force ICRD&A agreements in (1) Basic Research (2) Applied Research (3) Advanced Technology Development (4) Demonstration and Validation (5) Engineering and Manufacturing Development and (6) RDT&E Management Support.

(U) FY 2001 ($ in Thousands)

(U) $350 Air Command, Control, Communications and Intelligence (C3I) Capabilities (Electronic Systems Center (ESC)/ NATO Consultation, Command, and Control (C3) Organization) - Planned cooperative project to develop an operationally robust interface between the US Contingency Theater Automated Planning System/Theater Battle Management Core System (CTAPS/TBMCS) and NATO Initial Combined Air Operations Center (CAOC) Capability (ICC) as well as the future NATO Air Command and Control System (ACCS). This cooperative R&D effort will support air campaign planning and execution for joint and combined air operations. In FY01, the scope of work to be accomplished includes advanced R&D into shared data environment, developing a concept of operation for the transfer of control between national and NATO Command, Control, Communications, Computers and Intelligence (C4I) systems without interrupting combat operations; and the extension of a middle-ware/translator product needed for the successful prosecution of a combined/joint air operation.

(U) $279 Anthropometric Accommodations in Crew Systems (Air Force Research Lab (AFRL)/ The Netherlands) - Ongoing cooperative project to establish: (a), a collection of three-dimensional (3-D) anthropometric data which accurately and consistently describes the variability of men and women in both Europe and the US; (b), high quality methods for accommodation and interoperability assessment of crew systems; and (c), methods to assure accommodation and interoperability are achieved in the design process. In FY01, US and Dutch anthropometric data

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(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

collection was completed. Data processing is ongoing. The first phase of postural studies have been completed; further postural data collection is ongoing.

(U) $400 Advanced Transmission Language and Allocation of New Technology for International Communication and Proliferation of Allied Waveforms (ATLANTIC PAW) (AFRL/ France, Germany, UK) - Ongoing cooperative project to develop a common waveform syntax allowing for joint allied communications that will be demonstrated on programmable radio systems in each of the participating nations. In FY01, the waveform interpreter design has commenced, and initial specifications of the waveform language are being developed. Preliminary testing of portions of the system components is being performed to mitigate integration risks. Activities are beginning to address the shortfalls in tool capability.

(U) $500 Coalition Aerial Surveillance And Reconnaissance (CAESAR) (ESC/ Canada, France, Germany, Italy, Norway, UK) - Planned cooperative project to develop and evaluate technologies for the integration of diverse Ground Moving Targeting Indicator (GMTI)/Synthetic Aperture Radar (SAR) platforms to promote interoperability amongst multiple participants to support coalition warfare operations. The project will enable all participants to collaboratively develop the architecture and interoperability framework, key interfaces, and formats needed to meet coalition warfare requirements. In FY01, this project will focus on developing interoperability amongst surveillance and reconnaissance assets of participating nations.

(U) $368 Coalition Command, Control and Communications (C3) Demonstration Environment (CC3DE) (AFRL/ Australia, Canada) - Ongoing cooperative project to improve the efficiency of future coalition operations capabilities through the development of interoperable C3. This project will initially explore the effective management of information system resources in a coalition environment. It will develop a management architecture for the coalition environment, and develop the tools to implement this architecture. In particular, ATM technology will be integrated into a B-ISDN in efforts to form a common international standard for networking. In FY01, the project is continuing to finalize the testbed setup between nations to verify operational compatibility. Integration of network management technologies is being applied as development progresses.

(U) $100 Cooperative Research and Development Efforts in Imaging Spectrometer Development (Arnold Engineering and Development Center (AEDC)/ Canada) - Ongoing cooperative project to pool the spatial and spectral advances of both the US and Canada to produce a hyperspectral infrared (IR) imaging spectrometer. This high-resolution sensor system will be capable of characterizing signatures of missiles and aircraft, and for identifying trace quantities of a broad spectrum of gases in the environment. In FY01, work continued to enhance the data acquisition and viewing software. Components for the brassboard system, including a commercial IR camera and an existing spectrometer, are being assembled and integrated.

(U) $500 Distributed Mission Training (DMT) Technologies (AFRL/ Canada) - Ongoing cooperative project to develop DMT technologies that will

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(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

enhance allied simulator based training of US and Canadian fighter aircrews and demonstrate proof of concept. DMT refers to a shared training environment comprised of live, virtual, and constructive simulations allowing warfighters to train individually or collectively at all levels of war. In FY01, the project is completing software conversion and rehost efforts, developing a DMT control station, initiating modernization enhancements and aircraft hardware/emulation integration to the CF-18 Multi-Task Training (MTT), and continuing visual research and development activities.

(U) $400 Effects of Ionization on Hydrocarbon-Air Combustion (AFRL/ UK) - This ongoing cooperative project is a joint effort in the research and development of high-speed liquid hydrocarbon fueled airbreathing propulsion technology. This will be accomplished by exploiting the benefits of weak ionization in enhancing the reactivity of hydrocarbon fuels. Plasma technology will be examined for its utility in improving ignition and piloting for hydrocarbon combustors. In FY01, laboratory experiments were conducted and results are being analyzed to validate and/or improve the existing kinetic model of ion-enhanced hydrocarbon combustion. Planning is underway for experiments to be conducted in the Air Force Research Lab scramjet test facility within the next two months. These tests will explore the effectiveness of several plasma torch designs and configurations.

(U) $200 Effects of the Ionosphere on C3I Systems (AFRL/ UK) - Ongoing cooperative project to leverage complementary ionospheric sensors and data to develop capabilities for timely warning of ionospheric disturbances that disrupt C3I systems. In FY01, a new sensing technique employing High Frequency (HF) ionosounding data to provide (advanced) forecasts of ionospheric disturbance conditions that will affect C3I systems and operations is being demonstrated; and HF radio wave propagation data and ionosphere total-electron-content (tomography) data is being used to validate the Space Weather concept for real-time specification of the in-theater battlespace environment affecting C3I systems and operations.

(U) $354 Engine Component Life Extension (AFRL/ Australia) - Planned cooperative project to develop life extension techniques and strategies that can be applied to advanced military engines. The engines involved include the US Air Force F100, -220, -229 and F101 and Australia's TF30, F404 and T700. Much of the technology will be generic and flow from one engine to another. In FY01, existing life prediction models will be evaluated to determine specific avenues for improvement, and identify gaps in material databases.

(U) $100 Flight Test Demonstration of Miniature Munitions Release from Internal Weapons Bay (AFRL/ Australia) - Ongoing cooperative project to validate separation simulation codes for the release of miniature munitions from internal weapons bays at both subsonic and supersonic airspeeds. The Royal Australian Air Force (RAAF) F-111G is the only available operational fighter/bomber, with an internal bay, capable of dropping internally carried munitions at subsonic and supersonic velocities. In FY01, flight testing was conducted and completed, including release of 16 small smart bomb shapes. Data reduction and analysis in ongoing, and will be compiled for a final report.

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(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

(U) $570 High Altitude Endurance Unmanned Aerial Vehicle (HAE UAV) Cooperative Analysis, Development and Operational Demonstration (Aeronautical Systems Center (ASC)/ Australia) - Ongoing cooperative project to demonstrate the Out of Continental United States (OCONUS) deployment capability of the US Global Hawk HAE UAV, advance surveillance technology and interoperability, and enhance operational utility assessments of the US HAE UAV Advanced Concept Technology Demonstration (ACTD). In FY01, the US deployed the Global Hawk to Australia, demonstrated, and is assessing the system's operational effectiveness in a maritime and littoral environment.

(U) $532 Integrated Tactical Aircraft Control (ITAC) Program (AFRL/ France) - Ongoing cooperative project to develop, integrate and demonstrate critical flight control and flight management technologies that enable cooperative flight operations of a package comprised of UCAVs. The cooperative control architecture enables management and control of an integrated strike package by the aircrews in the combat aircraft. In FY01, agent integration and development refinement will continue culminating in a world station based on real-time and real-time simulations. The measures of merit and performance metrics will be evaluated and refined. Baseline performance for autonomous, intelligent control will be established. System mechanization for a real-time, operator in the loop simulation will be initiated.

(U) $200 Tropospheric Refraction and Propagation Modeling for Airborne Surveillance Systems (formerly Refraction and Propagation Modeling for Microwave Systems) (AFRL/ Australia, UK) - Planned cooperative project to combine a low cost aircraft measurement platform for simultaneous measurement of refraction, and Airborne Warning And Control System (AWACS) radar signal strength reduction with parabolic equation methods of microwave propagation modeling for evaluation and prediction of refraction conditions. In FY01, testing and validation will be conducted to determine the adverse performance of microwave and infra-red systems that perform surveillance, communication, signal intelligence, and directed energy functions in electronic battlespace.

(U) $300 Scintillation Impacts on Communication and Navigation Systems (AFRL/ Australia) - Ongoing cooperative project will exchange data, deploy current sensors, develop improved sensors, and tailor current decision aids, including software, which relate to ionospheric phenomena and their effect on C3I systems. This project will provide the US critical access to data in regions of strategic interest in South East Asia and the South Pacific where large ionospheric disturbances routinely occur. In FY01, data collection is continuing and additional sites are being brought on-line; characterization of ionospheric disturbances in the region and assessment of their impacts on space-based navigation, communications and surveillance systems is being conducted. An intensive multiple-diagnostic measurement campaign is being performed during active scintillation periods to enhance our understanding of the physical mechanisms leading to the development of severe equatorial disturbances.

(U) $34 Space Radiation Sensors (AFRL/ UK) - Planned cooperative project to validate the performance of a key Air Force spacecraft instrument for the measurement of space environment radiation hazards. The instrument's capability of issuing real-time space hazard warnings will be tested

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(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

under a variety of conditions encountered in space aboard a joint US/UK satellite mission. In FY01, the team will develop the preliminary space radiation data base using the US and UK instruments. Final verification of the US instrument's calibration will be performed using the preliminary database.

(U) $30 Management and administrative support and travel.

(U) $5,217 Total

(U) FY 2002 ($ in Thousands)

(U) $493 Advanced Hybrid Propulsion Technologies (AHPT) (AFRL/ Japan) - This ongoing cooperative project is researching and exploring technologies for an advanced hybrid rocket engine propulsion system to increase the performance, safety and reliability of future tactical missiles. The technologies include liquid oxidizers, gas generator fuels, and flow control systems. This activity will enable the demonstration of a forward injected gas generator hybrid rocket engine with energy management. Sub-systems of the full-scale test hardware are being manufactured and assembled. Test planning for the full-scale tests is ongoing. In FY02, activities include study of hybrid ignition, completion of test components and their integration, test firings, data collection, data analysis, and final report generation.

(U) $100 Air C3I Capabilities (ESC/ NATO C3 Organization) - Planned cooperative project to develop a fieldable interface between the US CTAPS/TBMCS and NATO Initial CAOC (ICC) and the future NATO ACCS. This cooperative R&D effort will support air campaign planning and execution for joint and combined air operations. In FY02, work will focus on: (a), productizing the C2 interface between the then fielded systems; (b), harmonization of system data base structures as part of the shared data environment; and (c), evaluating and implementing the reuse of appropriate functional module.

(U) $584 ATLANTIC PAW (AFRL/ France, Germany, UK) - Ongoing cooperative project to develop a common waveform syntax allowing for joint allied communications that will be demonstrated on programmable radio systems in each of the participating nations. In FY02, the waveform interpreter design and the initial specifications of the waveform language will be completed, and rehosted on the US development equipment. The development environment will be completed and used for an international demonstration.

(U) $1,500 Coalition Aerial Surveillance And Reconnaissance (CAESAR) (ESC/ Canada, France, Germany, Italy, Norway, UK) - Planned cooperative project to develop and evaluate technologies for the integration of diverse Ground Moving Targeting Indicator (GMTI)/Synthetic Aperture Radar (SAR) platforms to promote interoperability amongst multiple participants to support coalition warfare operations. The project will enable all participants to collaboratively develop the architecture and interoperability framework, key interfaces, and formats needed to meet coalition warfare requirements. In FY02, this project will continue to focus on developing interoperability amongst surveillance and

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(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

reconnaissance assets of participating nations, and develop architecture and interoperability framework, key interfaces, and formats needed to meet coalition warfare requirements.

(U) $182 CC3DE (AFRL/ Australia, Canada) - Ongoing cooperative project to improve the efficiency of future coalition operations capabilities through the development of interoperable C3. This project will initially explore the effective management of information system resources in a coalition environment. It will develop a management architecture for the coalition environment, and develop the tools to implement this architecture. In particular, ATM technology will be integrated into a B-ISDN in efforts to form a common international standard for networking. In FY02, the project will continue to network management integration to completion. C3I applications will be tested to demonstrate the effectiveness of the developed network management capability.

(U) $250 Cooperative Research and Development Efforts in Imaging Spectrometer Development (AEDC/ Canada) - Ongoing cooperative project to pool the spatial and spectral advances of both the US and Canada to produce a hyperspectral infrared (IR) imaging spectrometer. This high-resolution sensor system will be capable of characterizing signatures of rockets and aircraft for drug interdiction and for identifying trace quantities of a broad spectrum of gases in the environment. In FY02, work will continue to enhance the data acquisition and viewing software. The brassboard system will be assembled and integrated. Portions will be ruggedized in preparation for field testing.

(U) $250 Distributed Mission Training (DMT) and Virtual Air Environment (VAE) Technologies (AFRL/ Australia) - Planned cooperative project to develop DMT and VAE technologies that will enhance allied simulator based training of US and Australian fighter aircrews and demonstrate proof of concept. DMT refers to a shared training environment comprised of live, virtual, and constructive simulations allowing warfighters to train individually or collectively at all levels of war. The Australian VAE program will establish a training capability for the Air Defence System using networked simulated and constructive forces. The cooperative project will merge efforts being conducted under these complementary programs. In FY02 the project will initiate efforts to (1) develop Australian F-18 multi-task trainers, (2) conduct visual perception and engineering research efforts to specify design requirements for ultra-high resolution visuals for DMT flight simulators, and (3) initiate collaborative long-haul networking and constructive forces development activities.

(U) $250 DMT Technologies (AFRL/ Canada) - Ongoing cooperative project to develop DMT technologies that will enhance allied simulator based training of US and Canadian fighter aircrews and demonstrate proof of concept. DMT refers to a shared training environment comprised of live, virtual, and constructive simulations allowing warfighters to train individually or collectively at all levels of war. In FY02, the project will complete development of a DMT control station, select and integrate a visual system to the CF-18 MTT, continue modernization enhancements and aircraft hardware/emulation integration to the CF-18 MTT, finalize joint operability test procedures, and continue visual research and development activities.

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(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

(U) $400 Engine Component Life Extension (AFRL/ Australia) - Planned cooperative project to develop life extension techniques and strategies that can be applied to advanced military engines. The engines involved include the US Air Force F100, -220, -229 and F101 and Australia's TF30, F404 and T700. Much of the technology will be generic and flow from one engine to another. In FY02, full-life engine parts will be examined using nondestructive evaluation (NDE) tools and destructive analysis to identify typical populations of crack-like damage; appropriate time-temperature-stress profiles will be developed to best simulate engine operating conditions; mechanical testing will be performed for use in developing improved fatigue crack growth algorithms; development of NDE techniques for characterization of residual stress profiles will begin; activities to address the shortfalls in life prediction capabilities will begin.

(U) $568 ITAC Program (AFRL/ France) - Ongoing cooperative project to develop, integrate and demonstrate critical flight control and flight management technologies that enable cooperative flight operations of a package comprised of UCAVs. The cooperative control architecture enables management and control of an integrated strike package by the aircrews in the combat aircraft. In FY02, real-time operator in the loop simulations will be conducted. Evaluation of a flight operations package will be performed to evaluate the robustness of ITAC. Interface control documents and software will be delivered. A joint, interactive demonstration, in which an operator can select levels of autonomy, performance and coordination, will be developed for demonstration in an international forum.

(U) $50 Tropospheric Refraction and Propagation Modeling for Airborne Surveillance Systems (formerly Refraction and Propagation Modeling for Microwave Systems) (AFRL/ Australia, UK) - Planned cooperative project to combine a low cost aircraft measurement platform for simultaneous measurement of refraction, and Airborne Warning And Control System (AWACS) radar signal strength reduction with parabolic equation methods of microwave propagation modeling for evaluation and prediction of refraction conditions. In FY02, testing and validation will continue to be conducted to determine the adverse performance of microwave and infra-red systems that perform surveillance, communication, signal intelligence, and directed energy functions in electronic battlespace.

(U) $300 Scintillation Impacts on Communication and Navigation Systems (AFRL/ Australia) - Ongoing cooperative project will exchange data, deploy current sensors, develop improved sensors, and tailor current decision aids, including software, which relate to ionospheric phenomena and their effect on C3I systems. This project will provide the US critical access to data in regions of strategic interest in South East Asia and the South Pacific where large ionospheric disturbances routinely occur. In FY02, data collection will be completed, and characterization of ionospheric disturbances in the region and assessment of their impacts on space-based navigation, communications and surveillance systems will be concluded.

(U) $100 Space Radiation Sensors (AFRL/ UK) - Planned cooperative project to validate the performance of a key Air Force spacecraft instrument for the measurement of space environment radiation hazards. The instrument's capability of issuing real-time space hazard warnings will be tested

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(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

under a variety of conditions encountered in space aboard a joint US/UK satellite mission. In FY02, the project will begin the development of the final radiation database.

(U) $433 Strike Warrior (AFRL/ UK) - This planned cooperative project is to develop, demonstrate, and test interface technology and concepts for future advanced strike aircraft. It is a follow-on to the Vista Warrior project. The Strike Warrior project will increase the pilot's tactical capabilities with improvements in two related aspects of interface design. First, the interface hardware will be developed to enable better presentation of a larger variety of mission data. This will include large area cockpit displays linked with advanced interface technologies. Second, new approaches to real-time human engineering will be developed to allow the pilot to manage the new display capabilities and information. In FY02, the project will begin with an evaluation of an unmanned combat air vehicle operator's station.

(U) $100 Management and administrative support and travel.

(U) $5,560 Total

(U) FY 2003 ($ in Thousands)

(U) $358 ATLANTIC PAW (AFRL/ France, Germany, UK) - Ongoing cooperative project to develop a common waveform syntax allowing for joint allied communications that will be demonstrated on programmable radio systems in each of the participating nations. In FY03, the waveform interpreter design and the initial specifications of the waveform language will be completed, and rehosted on the US development equipment. The development environment will be completed and used for an international demonstration.

(U) $214 Cooperative Research and Development Efforts in Imaging Spectrometer Development (AEDC/ Canada) - Ongoing cooperative project to pool the spatial and spectral advances of both the US and Canada to produce a hyperspectral infrared (IR) imaging spectrometer. This high-resolution sensor system will be capable of characterizing signatures of rockets and aircraft for drug interdiction and for identifying trace quantities of a broad spectrum of gases in the environment. In FY03, work will continue to enhance the data acquisition and viewing software, instrument ruggedization will continue, and field testing will begin.

(U) $250 Distributed Mission Training (DMT) and Virtual Air Environment (VAE) Technologies (AFRL/ Australia) - Planned cooperative project to develop DMT and VAE technologies that will enhance allied simulator based training of US and Australian fighter aircrews and demonstrate proof of concept. DMT refers to a shared training environment comprised of live, virtual, and constructive simulations allowing warfighters to train individually or collectively at all levels of war. The Australian VAE program will establish a training capability for the Air Defence System using networked simulated and constructive forces. The cooperative project will merge efforts being conducted under these complementary programs. In FY03, the project will continue efforts to (1) develop Australian F-18 multi-task trainers, (2) conduct visual

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(U) A. Mission Description Continued

(U) FY 2003 ($ in Thousands) Continued

perception and engineering research efforts to specify design requirements for ultra-high resolution visuals for DMT flight simulators, and (3) initiate collaborative long-haul networking and constructive forces development activities.

(U) $500 E-3 Electronic Support Measures (ESM) Mission Data Tools Program (ESC/ NATO, France) - Planned cooperative project to develop improved mission data tools for the ESM system on the US, NATO, and French E-3 airborne warning and control system aircraft. The ESM system is a passive detection system that greatly enhances the aircraft surveillance capabilities through the detection, identification, and categorization of emitters. Cooperative development will preserve and enhance commonality, standardization, and interoperability. In FY03, alternatives will be analyzed, and development efforts will begin.

(U) $400 Engine Component Life Extension (AFRL/ Australia) - Planned cooperative project to develop life extension techniques and strategies that can be applied to advanced military engines. The engines involved include the US Air Force F100, -220, -229 and F101 and Australia's TF30, F404 and T700. Much of the technology will be generic and flow from one engine to another. In FY03, development of NDE techniques for characterization of residual stress profiles will conclude; activities to address the shortfalls in life prediction capabilities will conclude, and; the final report will be written.

(U) $400 Flight Test Demonstration of Miniature Munitions Release from Internal Weapons Bay Phase 2 (AFRL/ Australia) - Planned cooperative project to characterize the separation of asymmetric, less stable miniature munitions shapes from internal weapons bays at operational velocities. The Royal Australian Air Force (RAAF) F-111G is the only available operational fighter/bomber, with an internal bay, capable of dropping internally carried munitions at subsonic and supersonic velocities. Additionally, this project will examine emerging technologies for moderating the weapon separation aeroacoustic environment and collecting telemetry through miniature electronic systems rather than high-speed cameras. In FY03, the project team will conduct test planning and preparation, execute the testing, perform analyses, and document the results.

(U) $500 Integrated Tactical Aircraft Control (ITAC) Technology Validation (AFRL/ France) - Planned cooperative project to develop, demonstrate and validate flight control techniques and flight management concepts to enable cooperative flight operations of multiple unmanned aircraft. The project will demonstrate and validate core cooperative control technologies, developed during the ongoing ITAC Program, in realistic flight envrionments. Efforts will focus the core functions related to safety and authority. In FY03, configuration definition and development will be completed, and systems integration will begin.

(U) $500 Integrated Tactical Aircraft Control (ITAC) Autonomous Terminal-Area Operations (ATAO) Technology Development and Validation (AFRL/ France) - Planned cooperative project to develop technologies and software for autonomous launch, recovery, and taxi of multiple unmanned aerial vehicles safely and effectively within the terminal area operational infrastructure. In FY03, efforts related to system design

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(U) A. Mission Description Continued

(U) FY 2003 ($ in Thousands) Continued

and specification development will continue.

(U) $150 Materials and Technologies for Reverse Saturable Absorption (AFRL/ Australia) - Planned cooperative project to develop and characterize platinum poly-ynes materials for possible incorporation in broadband optical limiters in the visible and near infra-red spectral regions for eye and sensor protection from laswer device. In FY03, development, testing, and analyses will begin.

(U) $50 Novel G Protection for Fighter Pilots (AFRL/ Germany) - Planned cooperative project to develop improvements to the Libelle liquid-filled anti-G suit. Efforts will focus on improved relaxed G tolerance, incorporation of positive pressure breathing, improved high altitude protection, and revised anti-G training. In FY03, development work will begin on improved relaxed G tolerance, incorporation of positive pressure breathing, improved high altitude protection, and revised anti-G training.

(U) $100 Optical Sensor Protection Development and Evaluation (AFRL/ UK) - Planned cooperative project to develop and assess promising electro-optic protection materials, devices, and configurations for laser hazard and threat protection for eyes and sensors. In FY03, development, testing, and analyses will begin.

(U) $50 Spatial Disorientation Countermeasures (AFRL/ The Netherlands) - Planned cooperative project to evaluate the spatial disorientation research device and trainer, called DESDEMONA, and develop improvements. Efforts will focus on assessment of DESDEMONA relative to current simulators, development of night vision goggle and helmet mounted display interfaces, and development of revised training approaches. In FY03, the comparative assessment will be conducted; and the development of night vision goggle and helment mounted display interfaces, and the development of revised training approaches, will begin.

(U) $750 Strike Warrior (AFRL/ UK) - This planned cooperative project is to develop, demonstrate, and test interface technology and concepts for future advanced strike aircraft. It is a follow-on to the Vista Warrior project. The Strike Warrior project will increase the pilot's tactical capabilities with improvements in two related aspects of interface design. First, the interface hardware will be developed to enable better presentation of a larger variety of mission data. This will include large area cockpit displays linked with advanced interface technologies. Second, new approaches to real-time human engineering will be developed to allow the pilot to manage the new display capabilities and information. In FY03, flight testing and trials will continue.

(U) $133 Management and administrative support and travel.

(U) $4,355 Total

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(U) B. Budget Activity Justification

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) C. Program Change Summary ($ in Thousands)

		FY 2001	FY 2002	FY 2003	Total Cost
(U)	Previous President's Budget	5,509	5,616	4,355	0
(U)	Appropriated Value	5,509	5,616		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions	-51	-56		
	b. Small Business Innovative Research	-180			
	c. Omnibus or Other Above Threshold Reprogram				
	d. Below Threshold Reprogram	-61			
	e. Rescissions				
(U)	Adjustments to Budget Years Since FY 2002 PBR				
(U)	Current Budget Submit/FY 2003 PBR	5,217	5,560	4,355	TBD

(U) Significant Program Changes:
Change Summary Explanation: N/A

(U) D. Other Program Funding Summary ($ in Thousands)

	FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
(U) Program Management									

(U) E. Acquisition Strategy

A principal goal of the NATO Cooperative R&D program is to effectively utilize the aggregate resources invested by the US and our allies in conventional defense R&D. This program element provides the critical funding incentive needed to pursue 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

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(U) E. Acquisition Strategy Continued

service commitment, projects are selected from existing or new 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.

(U) F. Schedule Profile

		FY 2001				FY 2002				FY 2003			
		1	2	3	4	1	2	3	4	1	2	3	4
(U)	Effects of the Ionosphere on C3I Systems Project												
(U)	- Field demonstration of HF scintillation forecasting technique		X	X									
(U)	- Employ ionosphere sensor data to validate/expand support concept				X								
(U)	Strike Warrior Project												
(U)	- Project Agreement signed				X								
(U)	- Begin strike system simulations				X	X	X	X	X				
(U)	- Flight tests and trials					X	X	X	X	X	X	X	X
(U)	HAE UAV (Global Hawk) Coop Analysis, Dev and Op Demo Project												
(U)	- System modification	X											
(U)	- Global Hawk deployment		X										
(U)	- Operational exercise			X									
(U)	- Project report				X								
(U)	Cooperative R&D Efforts in Imaging Spectrometer Development Project												
(U)	- Brassboard development	X	X	X									
(U)	- Brassboard checkout	X	X	X	X								
(U)	- Instrument design	X	X										
(U)	- Instrument fabrication	X	X	X	X								
(U)	- Lab instrument checkout				X	X							
(U)	- Prototype checkout							X	X				
(U)	- Instrument ruggedization								X	X	X		
(U)	- Field testing											X	X

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 2002

BUDGET ACTIVITY: 04 - Demonstration and Validation

PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D

PROJECT: NATO

(U) F. Schedule Profile Continued

		FY 2001				FY 2002				FY 2003			
		1	2	3	4	1	2	3	4	1	2	3	4
(U)	Effects of Ionization on Hydrocarbon Combustion Project												
(U)	- Complete reaction rate measurements		X										
(U)	- Design plasma generator			X									
(U)	- Begin updating computational tools			X	X								
(U)	- Complete computational tools					X							
(U)	- Begin combustion experiments					X	X	X					
(U)	- Complete combustion experiments								X				
(U)	- Data analysis and model validation								X				
(U)	- Final report								X				
(U)	Integrated Tactical Aircraft Control (ITAC) Program												
(U)	- System design	X	X	X									
(U)	- System mechanization		X	X	X								
(U)	- Simulation and evaluation				X	X	X	X	X				
(U)	- Joint demonstration preparation							X	X				
(U)	- Joint demonstration									X			
(U)	Distributed Mission Training (DMT) Technologies Project												
(U)	- CF-18 software design	X	X										
(U)	- Software rehost	X	X	X	X								
(U)	- Instructor operator control station		X	X	X								
(U)	- CF-18 modernization enhancements	X	X	X	X	X	X	X	X				
(U)	- Visual display system/DMT control station					X	X	X	X				
(U)	Anthropometric Accommodation in Crew Systems Project												
(U)	- Conduct anthropometric survey	X	X	X	X								
(U)	- Augmented reality assessments	X	X	X	X	X	X						
(U)	- 3-D data reduction	X	X	X	X	X	X						
(U)	- Compare live subject, computer model, and augmented reality result		X	X	X	X	X						

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE: February 2002
BUDGET ACTIVITY: 04 - Demonstration and Validation	PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D
PROJECT: NATO	

(U) F. Schedule Profile Continued

		FY 2001				FY 2002				FY 2003			
		1	2	3	4	1	2	3	4	1	2	3	4
(U)	- Comparison of data from The Netherlands with the US	X	X	X	X	X							
(U)	- Complete final project documentation			X	X	X	X						
(U)	Space Radiation Sensors Project												
(U)	- Project Agreement signed				X								
(U)	- Calibration Review				X	X	X						
(U)	- Preliminary data base						X	X	X				
(U)	- Verification of calibration								X	X			
(U)	- Final data base										X	X	X
(U)	Air C3I Project												
(U)	- Project Agreement signed				X								
(U)	- Scope work effort to achieve shared data environment					X							
(U)	- Develop translator extensions					X							
(U)	- US/NATO battle lab verification and development test						X						
(U)	- Examine US/NATO Concept of operations in coalition environment							X					
(U)	Coalition C3 Demonstration Environment Project												
(U)	- Network management integration	X	X	X	X								
(U)	- C3I application and integration demonstrations	X				X	X						
(U)	ATLANTIC PAW Project												
(U)	- Joint compliance testing	X											
(U)	- Tool characterization	X	X	X									
(U)	- Interpreter characterization/design			X	X	X	X						
(U)	- Allied waveform coding						X						
(U)	- Interop demo							X					
(U)	Scintillation Impacts on Communication and Navigation Systems Project												
(U)	- Implement real-time data collection at existing sites	X											

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE: February 2002
BUDGET ACTIVITY: 04 - Demonstration and Validation	PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D	PROJECT: NATO

(U) F. Schedule Profile Continued

		FY 2001				FY 2002				FY 2003			
		1	2	3	4	1	2	3	4	1	2	3	4
(U)	- Deploy scintillation monitors	X	X										
(U)	- Campaign/complete data collection start		X										
(U)	- Correlate and calibrate data sets			X									
(U)	- Characterize local disturbance climatology					X							
(U)	- Develop regional forecast algorithms							X					
(U)	- Report regional scintillation & tailored products for C3I sys								X				
(U)	Tropospheric Refraction and Propagation Modeling for Airborne Surv Sys												
(U)	- Test parabolic propagation model with real refraction data				X	X	X	X					
(U)	- Aircraft measurements: validate extreme refraction cases				X	X	X	X					
(U)	- Aircraft data reduction and analyses				X	X	X	X					
(U)	- Validation propagation model for extreme cases						X	X	X				
(U)	- Demonstrate model use with AWACS operation							X	X				
(U)	- Final report								X				
(U)	Engine Component Life Extension Project												
(U)	- Project Agreement signed				X								
(U)	- Engine Rotor Life Extension (ERLE) technical/economic studies				X								
(U)	- Advanced life prediction methodologies for ERLE					X	X	X	X				
(U)	- Advanced nondestructive inspection/evaluation technology						X	X	X	X			
(U)	- Advanced manufacture concepts/ technical development for ERLE								X	X	X	X	
(U)	- Final report												X
(U)	Flight Test Demo of Mini Munitions Release from Internal Weapons Bay												
(U)	- Flight test	X											
(U)	- Final reporting		X										
(U)	Distributed Mission Training & Virtual Air Environment Technologies												

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE: February 2002
BUDGET ACTIVITY: 04 - Demonstration and Validation	PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D	PROJECT: NATO

(U) F. Schedule Profile Continued

	FY 2001				FY 2002				FY 2003			
	1	2	3	4	1	2	3	4	1	2	3	4
(U) - Project Agreement signed						X						
(U) - F-18 software conversion						X	X	X				
(U) - Software rehost						X	X	X				
(U) - Visual research and display specification								X	X	X	X	X
(U) - Long-haul networking and force construction								X	X	X	X	X
(U) CAESAR Project												
(U) - Project Agreement signed			X									
(U) - Technical and operational coordination			X	X	X	X	X	X				
(U) - Survey and assessments, Concepts of Operations			X	X	X	X	X	X				
(U) - Tactics, techniques, procedures, measures of effectiveness/ perf				X	X	X	X	X				
(U) - Identify info for CAESAR ground picture				X	X	X	X	X				
(U) - Architecture development				X	X	X	X	X				
(U) Advanced Hybrid Propulsion Technologies												
(U) - Hybrid ignition study						X						
(U) - Testing							X					
(U) - Data analysis and final report							X	X				
(U) E-3 Electronic Support Measures (ESM) Mission Data Tools Program												
(U) - Project agreement signed								X				
(U) - Alternatives analyses									X	X		
(U) - Development										X	X	X
(U) Flight Test Demo Mini Munitions Release from Internal Weaps Bay Ph 2												
(U) - Project agreement signed						X						
(U) - Test planning and preparation							X	X	X			
(U) - Test conduct and analyses										X	X	
(U) - Test report												X

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE: February 2002
BUDGET ACTIVITY: 04 - Demonstration and Validation	PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D
PROJECT: NATO	

(U) F. Schedule Profile Continued

		FY 2001				FY 2002				FY 2003			
		1	2	3	4	1	2	3	4	1	2	3	4
(U)	Integrated Tactical Aircraft Control (ITAC) Technology Validation												
(U)	- Project amendment signed					X							
(U)	- Configuration definition and development					X	X	X	X	X			
(U)	- Systems integration										X	X	X
(U)	ITAC Autonomous Terminal-Area Ops (ATAO) Technology Dev and Valid												
(U)	- Project amendment signed							X					
(U)	- System design and specification development								X	X	X	X	X
(U)	Materials and Technologies for Reverse Saturable Absorption												
(U)	- Project agreement signed								X				
(U)	- Development, testing, and analyses									X	X	X	X
(U)	Novel G Protection for Fighter Pilots												
(U)	- Project agreement signed								X				
(U)	- Improvements development									X	X	X	X
(U)	Optical Sensor Protection Development and Evaluation												
(U)	- Project agreement signed											X	
(U)	- Development, testing, and analyses												X
(U)	Spatial Disorientation Countermeasures												
(U)	- Project agreement signed								X				
(U)	- Comparative assessment									X	X	X	X
(U)	- Development of improvements										X	X	X

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 2002

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
04 - Demonstration and Validation	0603790F NATO Cooperative R&D	NATO

(U) A. Project Cost Breakdown ($ in Thousands)

		FY 2001	FY 2002	FY 2003
(U)	Advanced Hybrid Propulsion Technologies (AHPT)	0	493	0
(U)	Air Command, Control, Communications, and Intelligence (C3I) Capabilities	350	100	0
(U)	Anthropometric Accommodation in Crew Systems	279	0	0
(U)	Advanced Transmission Language and Allocation of New Technology for International Communication and Proliferation of Allied Waveforms (ATLANTIC PAW)	400	584	358
(U)	Coalition Aerial Surveillance And Reconnaissance (CAESAR)	500	1,500	0
(U)	Coalition Command, Control, and Communications (C3) Demo Environment (CC3DE)	368	182	0
(U)	Cooperative Research and Development (R&D) Efforts in Imaging Spectrometer Development	100	250	214
(U)	Distributed Mission Training (DMT) and Virtual Air Environment (VAE) Technologies	0	250	250
(U)	Distributed Mission Training (DMT) Technologies	500	250	0
(U)	E-3 Electronic Support Measures (ESM) Mission Data Tools Program	0	0	500
(U)	Effects of Ionization on Hydrocarbon-Air Combustion	400	0	0
(U)	Effects of the Ionosphere on Command, Control, Communications, and Intelligence (C3I) Systems	200	0	0
(U)	Engine Component Life Extension	354	400	400
(U)	Flight Test Demonstration of Miniature Munitions Release from Internal Weapons Bay	100	0	0
(U)	Flight Test Demonstration of Miniature Munitions Release from Internal Weapons Bay Phase 2	0	0	400
(U)	High Altitude Endurance Unmanned Aerial Vehicle (HAE UAV) (Global Hawk) Cooperative Analysis, Development, and Operational Demonstration	570	0	0
(U)	Integrated Tactical Aircraft Control (ITAC) Program	532	568	0
(U)	ITAC Technology Validation	0	0	500
(U)	ITAC Autonomous Terminal-Area Operations (ATAO) Technology Development and Validation	0	0	500
(U)	Materials and Technologies for Reverse Saturable Absorption	0	0	150
(U)	Novel G Protection for Fighter Pilots	0	0	50
(U)	Optical Sensor Protection Development and Evaluation	0	0	100
(U)	Tropospheric Refraction and Propagation Modeling for Airborne Surveillance Systems (formerly Refraction and Propagation Modeling for Microwave Systems)	200	50	0

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 2002

BUDGET ACTIVITY: 04 - Demonstration and Validation

PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D

PROJECT: NATO

(U) A. Project Cost Breakdown ($ in Thousands) Continued

		FY 2001	FY 2002	FY 2003
(U)	Scintillation Impacts on Communication and Navigation Systems	300	300	0
(U)	Space Radiation Sensors	34	100	0
(U)	Spatial Disorientation Countermeasures	0	0	50
(U)	Strike Warrior	0	433	750
(U)	Management and administrative support and travel	30	100	133
(U)	Total	5,217	5,560	4,355

Complete information regarding the use of NATO Cooperative R&D funds is not available for all proposed agreements, since some are still being negotiated or were recently signed. In addition, information on the use of future funding for continuing agreements is not available in all instances because the funds are used as needed to supplement a project office's related 6.1 through 6.5 RDT&E appropriations.

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

(U) Performing Organizations:

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 2001	Budget FY 2001	Budget FY 2002	Budget FY 2003	Budget to Complete	Total Program
Product Development Organizations										
Lockheed Martin Colorado Springs, CO	CPAF	Oct 95			0	350	0		Continuing	TBD
Sytronics Dayton, OH	CPFF	Apr 98			600	300	0	0	Continuing	TBD
Boston College Boston, MA	CFSR	Mar 97			155	0	0	0	Continuing	TBD
RADEX Bedford, MA	CPFF	Mar 97			920	50	0	0	Continuing	TBD
Pacific Sierra Research Santa Monica, CA	CPFF	Mar 97			60	0	0	0	Continuing	TBD
CPI Fairfax, VA	CPFF	Mar 97			180	0	0	0	Continuing	TBD
U of Massachusetts Lowell, MA	CR	Apr 97			170	100	0	0	Continuing	TBD

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)								DATE: February 2002	
BUDGET ACTIVITY: 04 - Demonstration and Validation			PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D						PROJECT: NATO
(U) Performing Organizations Continued:									
Product Development Organizations									
KEO Consultants Brookline, MA	CPFF	Mar 97	220	0	0	0	Continuing	TBD	
NW Research Associates Bellevue, WA	CPFF	Apr 97	110	50	0	0	Continuing	TBD	
Visdyne Inc.	CPFF	Sep 00	400	0	0	0	Continuing	TBD	
Innovative Scientific Solutions Inc.	CPFF	Sep 00	0	400	0	0	Continuing	TBD	
U of Texas Austin, TX	CPFF	May 97	25	0	0	0	Continuing	TBD	
Applied Research Lab, U of Texas Austin, TX	CPFF	May 97	105	0	0	0	Continuing	TBD	
Lockheed Martin Orlando, FL	CPFF	Sep 96	913	0	0	0	Continuing	TBD	
Raytheon TI Systems	CPFF	Dec 97	683	0	0	0	Continuing	TBD	
Boeing Seattle, WA	CPFF	Sep 98	260	300	600	0	Continuing	TBD	
UES, Inc Dayton, OH	CPFF	Oct 97	100	0	0	0	Continuing	TBD	
NOAA/ATDD Oak Ridge, TN	MIPR	Oct 97	0	0	0	0	Continuing	TBD	
Pratt & Whitney West Palm Beach, FL	CPFF	Jun 98	1,000	0	0	0	Continuing	TBD	
AFRL WPAFB, OH	TBD	TBD	0	297	816	2,252	Continuing	TBD	
Boeing Long Beach, CA	CPFF	Jul 98	265	0	0	0	Continuing	TBD	
Boeing Seattle, WA	CPFF	Mar 98	200	0	0	0	Continuing	TBD	
Lockheed Marietta, GA	CPFF	Oct 98	325	0	0	0	Continuing	TBD	
Northrop Hawthorne, CA	CPFF	Oct 98	50	0	0	0	Continuing	TBD	
Selectech Dayton, OH	CPFF	Feb 98	50	0	0	0	Continuing	TBD	
Boeing St Louis, MO	CPFF	Mar 00	0	0	0	0	Continuing	TBD	
University of South Carolina	CPFF	Apr 00	0	0	0	0	Continuing	TBD	
Boeing St Louis, MO	CPIF	Apr 99	0	0	0	0	Continuing	TBD	

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)							DATE: February 2002	
BUDGET ACTIVITY: 04 - Demonstration and Validation			PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D					PROJECT: NATO
(U) Performing Organizations Continued:								
Product Development Organizations								
Thiokol Corp Elkton, MD	CPFF	Nov 97	0	0	0	0	Continuing	TBD
Raytheon Mesa, AZ	CPFF	Jul 97	0	500	1,000	0	Continuing	TBD
CPI Annandale, VA	CPFF	TBD	0	200	0	0	Continuing	TBD
U of Colorado Boulder, CO	CPFF	TBD	0	100	0	0	Continuing	TBD
Boston College Newton, MA	CPFF	TBD	0	50	0	0	Continuing	TBD
Radex	CPFF	Feb 01	0	135	0	0	Continuing	TBD
Applied Physics Lab Laurel, MD	MIPR	May 00	0	0	0	0	Continuing	TBD
Boston College Boston, MA	CPFF	TBD	0	40	0	0	Continuing	TBD
Radex Bedford, MA	CPFF	TBD	0	0	0	0	Continuing	TBD
U of Mass Lowell, MA	CR	TBD	0	45	0	0	Continuing	TBD
Scion Associates Seattle, WA	CPFF	TBD	0	65	0	0	Continuing	TBD
SRI, Int'l Menlo Park, CA	CPFF	TBD	0	40	200	0	Continuing	TBD
AFRL Eglin AFB, FL	TBD	TBD	0	0	0	400	Continuing	TBD
AFRL Hanscom AFB, MA	TBD	TBD	0	300	100	0	Continuing	TBD
AFRL Mesa, AZ	TBD	TBD	0	0	0	250	Continuing	TBD
AFRL Rome, NY	TBD	TBD	1,250	1,070	194	300	Continuing	TBD
AFMC Hanscom AFB, MA	TBD	TBD	0	0	0	500	Continuing	TBD
AFMC WPAFB, OH	TBD	TBD	0	400	0	0	Continuing	TBD
Support and Management Organizations								
AFRL Hanscom AFB, MA			135	75	1,850	0	Continuing	TBD
AFRL WPAFB, OH			5	25	220	153	Continuing	TBD
45th Space Wing Patrick AFB, FL	AF 185	May 95	5	0	0	0	Continuing	TBD
AFRL Eglin AFB, FL			50	0	0	0	Continuing	TBD
AFMC WPAFB, OH			0	0	0	286	Continuing	TBD
Pender Technology, TN	CR	Oct 97	90	45	0	0	Continuing	TBD

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 2002

BUDGET ACTIVITY: 04 - Demonstration and Validation

PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D

PROJECT: NATO

(U) Performing Organizations Continued:

Support and Management Organizations								
Veridian Dayton, OH			145	75	75	0	Continuing	TBD
Test and Evaluation Organizations								
Air Force Development Test Center, FL	PO	Jan 98	54	0	0	0	Continuing	TBD
Sverdrup Technology, Inc TN	CPAF	Sep 95	1,443	205	205	0	Continuing	TBD
Naval Air Warfare CenterPoint Mugu, CA	MIPR	Jan 99	40	0	0	0	Continuing	TBD
Aeronautical Systems Center WPAFB			0	0	300	0	Continuing	TBD
Fora Laser System	PO	Nov 97	100	0	0	0	Continuing	TBD
Arnold Engineering Development Center, TN	TBD	TBD	0	0	0	214	Continuing	TBD

(U) Government Furnished Property:

Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 2001	Budget FY 2001	Budget FY 2002	Budget FY 2003	Budget to Complete	Total Program
Product Development Property									
None									
Support and Management Property									
None									
Test and Evaluation Property									
Fora laser system	PO	Nov 97	Jan 98	147	0			0	147

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 2002

BUDGET ACTIVITY: 04 - Demonstration and Validation

PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D

PROJECT: NATO

Subtotals	Total Prior to FY 2001	Budget FY 2001	Budget FY 2002	Budget FY 2003	Budget to Complete	Total Program
Subtotal Product Development	8,041	4,792	2,910	3,702	TBD	TBD
Subtotal Support and Management	430	220	2,145	439	TBD	TBD
Subtotal Test and Evaluation	1,784	205	505	214	TBD	TBD
Total Project	10,255	5,217	5,560	4,355	TBD	TBD