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

DATE: February 2003

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

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

PROJECT: NATO

COST ($ in Thousands)		FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	Cost to Complete	Total Cost
NATO	Nato Coop R&D	5,230	4,237	3,888	3,940	3,963	3,980	4,098	4,152	0	0
	Quantity of RDT&E Articles	0	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, major non-NATO allies (Argentina, Australia, Egypt, Israel, Japan, Jordan, and Rep. of Korea (South Korea), and friendly foreign countries (Austria, Brazil, 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 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.

(U) FY 2002 ($ in Thousands)

(U) $493 Advanced Hybrid Propulsion Technologies (AHPT) (AFRL/ Japan) - Cooperative project to researched and explore 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) - 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.

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(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

(U) $450 ATLANTIC PAW (AFRL/ France, Germany, UK) - 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) - 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, the project will continue to focus on developing interoperability amongst surveillance and 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) - 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) - 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) - Cooperative project to develop DMT and VAE technologies to 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

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(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

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) $460 DMT Technologies (AFRL/ Canada) - Cooperative project to develop DMT technologies to 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.

(U) $400 Engine Component Life Extension (AFRL/ Australia) - 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) $398 ITAC Program (AFRL/ France) - 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. Evaluation of a flight operations package will be performed to evaluate the robustness of ITAC. Interface control documents and software will be delivered.

(U) $300 Scintillation Impacts on Communication and Navigation Systems (AFRL/ Australia) - Cooperative project to 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) $433 Strike Warrior (AFRL/ UK) - Cooperative project to develop, demonstrate, and test interface technology and concepts for future advanced strike

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(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

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) $14 Management and administrative support and travel.

(U) $5,230 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) $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 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) - Ongoing 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 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) $400 Engine Component Life Extension (AFRL/ Australia) - Ongoing cooperative project to develop life extension techniques and strategies that can

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(U) A. Mission Description Continued

(U) FY 2003 ($ in Thousands) Continued

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) $799 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) 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 FY03, real-time operator in the loop simulations will be conducted.

(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 laser 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

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(U) A. Mission Description Continued

(U) FY 2003 ($ in Thousands) Continued

FY03, the comparative assessment will be conducted; and the development of night vision goggle and helmet mounted display interfaces, and the development of revised training approaches, will begin.

(U) $1,148 Strike Warrior (AFRL/ UK) - Ongoing cooperative project 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) $182 Management and administrative support and travel.

(U) $4,237 Total

(U) FY 2004 ($ in Thousands)

(U) $100 Assessment of C3 Team Performance in Sustained Operations (AFRL/ Sweden) - Planned cooperative project studying the effects of acute and chronic fatigue in complex decision-making and team performance. This project will use a platform called C3FIRE to assess the effects of fatigue on adaptive team response, agility, and versatility to unpredictable, time-critical and long-duration high-ops tempo events.

(U) $261 C-2 Warrior (AFRL/ Australia) - Planned cooperative project will develop advanced work-centered interface technologies to enhance ISR Collection Management and Air Space Control operations within an Air Operations Center (AOC). The work-centered interface systems will integrate stereoscopic visualization, speech control, head-eye based control, gesture recognition, intelligent interface agents, and face recognition. By combining technical components within a work-centered organizing framework, an interface client system can be developed that will improve information integration, decision making, and operational execution.

(U) $100 Coalition Mission Training (AFRL/ Canada/ UK) - Planned cooperative project is being conducted to enable warfighters to train for coalition air operations while remaining at their home stations. Partner nations will develop distributed simulation technologies, implement a multi-national distributed training network, and conduct a series of coalition force training exercises. Warfighters will use real-time virtual simulators to conduct readiness training for combined air operations within a common synthetic environment. The program sill support incorporation of USAF simulators located outside the Continental US into Distributed Mission Training exercises and will provide the foundation for integrating coalition partners' simulation assets into future multi-national training readiness exercises.

(U) $400 Distributed Mission Training (DMT) Technologies (AFRL/ Canada) - Planned cooperative project to develop DMT technologies that will

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(U) A. Mission Description Continued

(U) FY 2004 ($ in Thousands) Continued

enhance allied simulator based training of fighter aircrews and demonstrate proof of concept. Project will complete research and development of next generation visual systems for DMT to include ultra-high resolution laser projector, image generator, and collimating display screen materials.

(U) $50 Enhanced C3 Team Training in Sustained Operations (AFRL / The Netherlands) - Planned cooperative project to evaluate team performance in advanced capabilities. This effort will evaluate the effects of fatigue on adaptive team performance in unpredictable, time-critical and long-duration high-ops tempo events. The primary goal will be to enhance a simulated environment for developing operational teamwork under wartime conditions characterized by mental fatigue, uncertainty, unexpected events, high-ops tempo, and/or sustained operations.

(U) $140 Fit and Accommodation Consulting Tools (AFRL / Canada, The Netherlands) - Planned cooperative project to develop web based, comprehensive, international data system on 3-D body size, shape, fit, and performance. The new data visualization tools will be used to make information more usable, and additional data on pilot performance will be more dynamic.

(U) $75 High-Power Microwave Narrowband Effects Investigations (AFRL / UK) - Planned cooperative project will conduct High-Power Microwave (HPM) electronics effects experiments in the UK. There is a need for HPM effects information on electronic systems in a statistically significant format with high confidence values in order to investigate the impact of future HPM systems on the battlefield. There is a need to perform test series in order to build up a library of electronic asset response distributions. This cooperative project will perform these needed experiments and tests.

(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 laser device. In FY04, analysis and review on the testing and development previously performed 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. In FY04, efforts will begin to develop and adapt the Libelle technology for insertion into USAF and NATO aircraft.

(U) $777 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 FY04, development, testing, and analyses will continue on promising electro optic protection measures (EOPM) materials, devices, and configurations for laser hazard and threat protection for eyes and sensors.

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(U) A. Mission Description Continued

(U) FY 2004 ($ in Thousands) Continued

(U) $400 Programmable Integrated Ordnance Suite (PIOS) Phase II (AFRL/ UK) - Planned cooperative project to develop and demonstrate advanced missile ordnance technology. New ordnance suite capability will be achieved by coupling an ability to 'see' the target and select the best aimpoint with the ability to direct the warhead fragments to intercept the target at that specific aimpoint. This will be a continuation of Phase I PIOS.

(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 FY04, the comparative assessment will continue. The development of night vision goggle and helmet mounted display interfaces, and the development of revised training approaches, will also continue.

(U) $750 Strike Warrior (AFRL/ UK) - Ongoing 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 FY04, flight testing and trials will continue.

(U) $250 Targets Under Trees (AFRL/ Sweden) - Planned cooperative project is to develop new capabilities to detect, locate and prosecute mobile or fixed Time Critical Targets (TCTs) in Camouflage, Concealment, and Deception (CC&D) conditions. The Target Under Trees (TUT) program is developing wide area surveillance (WAS) sensor which will provide an operationally significant probability of detecting targets in CC&D conditions with low false-alarm rates. The TUT sensor is being developed to be form, fit and function compatible with the Global Hawk UAV. In FY04, the TUT program will demonstrate this capability during the JEFX 04 exercise using a TUT-like sensor called CARABAS II. The funds will be used to test the CARABAS II system prior to the actual JEFX 04 exercise and insure the operation and compatibility of the CARABAS II within JEFX 04 environment and the TUT exploitation system.

(U) $135 Turbine Engine Particulate Matter Emissions (AEDC / UK) - Planned cooperative project to jointly evaluate state-of-the-art particualte measurement instrumentation, modify the instrumentation for robust operation in turbine test cells, develop particulate characterization test procedures, and validate the performance during gas turbine engine (GTE) testing. The project will produce test protocol, instrumentation and procedures, adequate to assess regulatory agency requirements for GTE particulate matter emissions.

(U) $200 Management and administrative support and travel

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(U) A. Mission Description Continued

(U) FY 2004 ($ in Thousands) Continued
(U) $3,888 Total

(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 2002	FY 2003	FY 2004	Total Cost
(U)	Previous President's Budget	5,256	4,355	3,977	0
(U)	Appropriated Value	5,256	4,355		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions	-15			
	b. Small Business Innovative Research				
	c. Omnibus or Other Above Threshold Reprogram		-118		
	d. Below Threshold Reprogram				
	e. Rescissions				
(U)	Adjustments to Budget Years Since FY 2003 PBR	-11		-89	
(U)	Current Budget Submit/FY 2004 PBR	5,230	4,237	3,888	TBD

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

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

		FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	Cost to Complete	Total Cost
(U)	Program Management										

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(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 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 2002				FY 2003				FY 2004			
		1	2	3	4	1	2	3	4	1	2	3	4
(U)	Strike Warrior Project												
(U)	- Begin strike system simulations	*	*	*	*								
(U)	- Flight tests and trials	*	*	*	*	*	X	X	X				
(U)	Cooperative R&D Efforts in Imaging Spectrometer Development Project												
(U)	- Lab instrument checkout	*											
(U)	- Prototype checkout			*	*								
(U)	- Instrument ruggedization				*	*	X						
(U)	- Field testing							X	X				
(U)	Effects of Ionization on Hydrocarbon Combustion Project												
(U)	- Complete computational tools	*											
(U)	- Begin combustion experiments	*	*	*									
(U)	- Complete combustion experiments				*								
(U)	- Data analysis and model validation				*								
(U)	- Final report				*								
(U)	Integrated Tactical Aircraft Control (ITAC) Program												
(U)	- Simulation and evaluation	*	*	*	*								

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(U) F. Schedule Profile Continued

		FY 2002				FY 2003				FY 2004			
		1	2	3	4	1	2	3	4	1	2	3	4
(U)	- Schedule and technology sharing development meetings	*	*	*	*								
(U)	- Agent maturation requirements and develop of delivery schedule			*	*	*	X						
(U)	- Joint demonstration preparation					*	X	X					
(U)	- Joint demonstration							X	X	X			
(U)	Distributed Mission Training (DMT) Technologies Project												
(U)	- CF-18 modernization enhancements	*	*	*	*								
(U)	- Visual display system/DMT control station	*	*	*	*								
(U)	Anthropometric Accommodation in Crew Systems Project												
(U)	- Augmented reality assessments	*	*										
(U)	- 3-D data reduction	*	*										
(U)	- Compare live subject, computer model, and augmented reality result	*	*										
(U)	- Comparison of data from The Netherlands with the US	*											
(U)	- Complete final project documentation	*	*										
(U)	Air C3I Project												
(U)	- Scope work effort to achieve shared data environment	*											
(U)	- Develop translator extensions	*											
(U)	- US/NATO battle lab verification and development test		*										
(U)	- Examine US/NATO Concept of operations in coalition environment			*									
(U)	Coalition C3 Demonstration Environment Project												
(U)	- Network management integration	*	*	*	*								
(U)	- C3I application and integration demonstrations	*	*	*									
(U)	ATLANTIC PAW Project												
(U)	- Interpreter characterization/design	*	*										
(U)	- Allied waveform coding		*	*									
(U)	- Interop demo			*									

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(U) F. Schedule Profile Continued

		FY 2002				FY 2003				FY 2004			
		1	2	3	4	1	2	3	4	1	2	3	4
(U)	- Creation of WDE prototype	*	*										
(U)	- Testing of WDE with WDL proposal		*	*	*								
(U)	- SoRDS testbed					*	X	X					
(U)	- FM3TR waveform implementation and analysis of SATURN requirements			*	*	*							
(U)	- Interoperability testing of WDL waveforms							X	X				
(U)	Scintillation Impacts on Communication and Navigation Systems Project												
(U)	- Characterize local disturbance climatology	*											
(U)	- Develop regional forecast algorithms			*									
(U)	- Report regional scintillation & tailored products for C3I sys				*								
(U)	Engine Component Life Extension Project												
(U)	- Advanced life prediction methodologies for ERLE	*	*	*	*								
(U)	- Advanced nondestructive inspection/evaluation technology		*	*	*	*							
(U)	- Advanced manufacture concepts/ technical development for ERLE				*	*	X	X					
(U)	- Final report								X				
(U)	Flight Test Demo of Mini Munitions Release from Internal Weapons Bay												
(U)	- Amending PA and SSOI to include Phase II program			*	*	*							
(U)	Distributed Mission Training & Virtual Air Environment Technologies												
(U)	- Project Agreement signed		*										
(U)	- F-18 software conversion		*	*	*	*							
(U)	- Software rehost		*	*	*	*							
(U)	- Visual research and display specification					*	X	X	X	X	X		
(U)	- Long-haul networking and force construction						X	X	X	X	X	X	

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BUDGET ACTIVITY: 04 - Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D — PROJECT: NATO

(U) F. Schedule Profile Continued

		FY 2002				FY 2003				FY 2004			
		1	2	3	4	1	2	3	4	1	2	3	4
(U)	CAESAR Project												
(U)	- Technical and operational coordination	*	*	*	*								
(U)	- Survey and assessments, Concepts of Operations	*	*	*	*								
(U)	- Tactics, techniques, procedures, measures of effectiveness/ perf	*	*	*	*								
(U)	- Identify info for CAESAR ground picture	*	*	*	*								
(U)	- Architecture development	*	*	*	*								
(U)	Advanced Hybrid Propulsion Technologies												
(U)	- Hybrid ignition study		*										
(U)	- Testing			*									
(U)	- Data analysis and final report			*	*								
(U)	Flight Test Demo Mini Munitions Release from Internal Weaps Bay Ph 2												
(U)	- Project agreement signed						X						
(U)	- Test planning and preparation				*	*	X						
(U)	- Test conduct and analyses						X	X	X				
(U)	- Test report								X				
(U)	Materials and Technologies for Reverse Saturable Absorption												
(U)	- Project agreement signed						X						
(U)	- Development, testing, and analyses						X	X	X				
(U)	Novel G Protection for Fighter Pilots												
(U)	- Project agreement signed				*								
(U)	- Improvements development						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												

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BUDGET ACTIVITY: 04 - Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D
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(U) F. Schedule Profile Continued

	FY 2002				FY 2003				FY 2004			
	1	2	3	4	1	2	3	4	1	2	3	4
(U) - Project agreement signed						*						
(U) - Comparative assessment						X	X	X				
(U) - Development of improvements						X	X	X				
(U) Assessment of C3 Team Performance in Sustained Operations												
(U) - Project agreement signed						X						
(U) - Technology development						X	X	X	X			
(U) - Experimental studies and data analysis									X	X	X	X
(U) C-2 Warrior												
(U) - Project agreement signed							X					
(U) - Development work-centered interface technologies							X	X	X	X	X	X
(U) - Test ISR Collection Manager against new requirements and situation											X	X
(U) Coalition Mission Training Using Distributed Mission Simulation												
(U) - Project agreement signed						X						
(U) - Develop and test basic systems for coalition operations						X	X	X				
(U) - Conduct and document coalition exercises in real-time simulators									X	X	X	X
(U) Distributed Mission Training (DMT) Technologies												
(U) - Signed international agreement						X	X					
(U) - Technology development								X	X	X	X	X
(U) Fit and Accommodation Consulting Tools												
(U) - Dynamic and performance data gathering									X	X	X	X
(U) - Digital pilot profiles and injury potential									X	X	X	X
(U) - Initial data collation and website prototype									X	X	X	X
(U) Enhanced C3 Team Training in Sustained Operations												
(U) - Project agreement signed						X						
(U) - Technology development						X	X	X	X	X		

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(U) F. Schedule Profile Continued

		FY 2002				FY 2003				FY 2004			
		1	2	3	4	1	2	3	4	1	2	3	4
(U)	- Experimental studies and data analysis								X	X	X	X	X
(U)	High-Power Microwave Narrowband Effects Investigations												
(U)	- Test targets to build up electronic library									X	X	X	X
(U)	Programmable Integrated Ordnance Suite Phase II												
(U)	- Develop detailed design baseline							X	X	X	X		
(U)	- Test high fidelity model and performance analysis								X	X	X	X	X
(U)	- Report system performance results												X
(U)	Targets Under Trees												
(U)	- Project agreement signed						X						
(U)	- Test CARABAS II sensor for operation and compatibility						X	X	X	X			
(U)	- Test CARABAS II sensor in JEFX exercise										X		
(U)	Turbine Engine Particulate Matter Emissions												
(U)	- Project agreement signed						X						
(U)	- Technology development						X	X	X	X	X	X	X
(U)	- Test and analysis										X	X	X

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE: February 2003
BUDGET ACTIVITY: 04 - Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D — PROJECT: NATO

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

		FY 2002	FY 2003	FY 2004
(U)	Advanced Hybrid Propulsion Technologies (AHPT)	493	0	0
(U)	Air Command, Control, Communications, and Intelligence (C3I) Capabilities	100	0	0
(U)	Advanced Transmission Language and Allocation of New Technology for International Communication and Proliferation of Allied Waveforms (ATLANTIC PAW)	450	358	0
(U)	Assent of C3 Team Performance in Sustained Operations	0	0	100
(U)	C-2 Warrior	0	0	261
(U)	Coalition Aerial Surveillance And Reconnaissance (CAESAR)	1,500	0	0
(U)	Coalition Command, Control, and Communications (C3) Demo Environment (CC3DE)	182	0	0
(U)	Coalition Mission Training (CMT)	0	0	100
(U)	Cooperative Research and Development (R&D) Efforts in Imaging Spectrometer Development	250	250	0
(U)	Distributed Mission Training (DMT) and Virtual Air Environment (VAE) Technologies	250	250	0
(U)	Distributed Mission Training (DMT) Technologies	460	0	0
(U)	Distributed Mission Training (DMT) Technologies FY04 New Start	0	0	400
(U)				
(U)	Engine Component Life Extension	400	400	0
(U)	Enhanced C3 Team Training in Sustained Operations	0	0	50
(U)	Fit and Accommodation Consulting Tools	0	0	140
(U)	Flight Test Demonstration of Miniature Munitions Release from Internal Weapons Bay Phase 2	0	799	0
(U)	High-Power Microwave Narrowband Effects Investigations	0	0	75
(U)	Integrated Tactical Aircraft Control (ITAC) Program	398	500	0
(U)	Materials and Technologies for Reverse Saturable Absorption	0	150	150
(U)	Novel G Protection for Fighter Pilots	0	50	50
(U)	Optical Sensor Protection Development and Evaluation	0	100	777
(U)	Programmable Integrated Ordnance Suite (PIOS) Phase II	0	0	400
(U)	Targets Under Trees (TUT)	0	0	250
(U)	Turbine Engine Particulate Matter Emissions	0	0	135
(U)	Scintillation Impacts on Communication and Navigation Systems	300	0	0

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE: February 2003
BUDGET ACTIVITY: 04 - Advanced Component Development and Prototypes (ACD&P)	PE NUMBER AND TITLE: 0603790F NATO Cooperative R&D — PROJECT: NATO

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

		FY 2002	FY 2003	FY 2004
(U)	Spatial Disorientation Countermeasures	0	50	50
(U)	Strike Warrior	433	1,148	750
(U)	Management and administrative support and travel	14	182	200
(U)	Total	5,230	4,237	3,888

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 2002	Budget FY 2002	Budget FY 2003	Budget FY 2004	Budget to Complete	Total Program
Product Development Organizations										
Sytronics Dayton, OH	CPFF	Apr 98			600	0	0	0	Continuing	TBD
Boston College Boston, MA	CFSR	Mar 97			155	0	0	0	Continuing	TBD
RADEX Bedford, MA	CPFF	Mar 97			920	0	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	0	0	0	Continuing	TBD
KEO Consultants Brookline, MA	CPFF	Mar 97			220	0	0	0	Continuing	TBD
NW Research Associates Bellevue, WA	CPFF	Apr 97			110	0	0	0	Continuing	TBD

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

DATE: February 2003

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

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

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(U) **Performing Organizations Continued:**

Product Development Organizations								
Visdyne Inc.	CPFF	Sep 00	400	0	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	0	0	0	Continuing	TBD
UES, Inc Dayton, OH	CPFF	Oct 97	100	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	1,231	2,398	2,088	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
AFRL Eglin AFB, FL	TBD	TBD	0	0	799	0	Continuing	TBD
AFRL Hanscom AFB, MA	TBD	TBD	0	1,900	0	550	Continuing	TBD
AFRL Mesa, AZ	TBD	TBD	0	710	250	300	Continuing	TBD
AFRL Rome, NY	TBD	TBD	1,250	632	358	250	Continuing	TBD
Support and Management Organizations								
AFRL Hanscom AFB, MA			135	0	0	0	Continuing	TBD
AFRL WPAFB, OH			5	14	182	200	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
Pender Technology, TN	CR	Oct 97	90	0	0	0	Continuing	TBD

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

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

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

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(U) Performing Organizations Continued:

Support and Management Organizations								
Veridian Dayton, OH			145	0	0	0	Continuing	TBD
Test and Evaluation Organizations								
Air Force Development Test Center, FL	PO	Jan 98	54	493	0	0	Continuing	TBD
Sverdrup Technology, Inc TN	CPAF	Sep 95	1,443	0	0	0	Continuing	TBD
Naval Air Warfare CenterPoint Mugu, CA	MIPR	Jan 99	40	0	0	0	Continuing	TBD
Fora Laser System	PO	Nov 97	100	0	0	0	Continuing	TBD
Arnold Engineering Development Center, TN	TBD	TBD	0	250	250	500	Continuing	TBD

(U) Government Furnished Property:

Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 2002	Budget FY 2002	Budget FY 2003	Budget FY 2004	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	147

Subtotals	Total Prior to FY 2002	Budget FY 2002	Budget FY 2003	Budget FY 2004	Budget to Complete	Total Program
Subtotal Product Development	8,041	4,473	3,805	3,188	TBD	TBD
Subtotal Support and Management	430	14	182	200	TBD	TBD
Subtotal Test and Evaluation	1,784	743	250	500	TBD	TBD
Total Project	10,255	5,230	4,237	3,888	TBD	TBD