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

DATE: February 2003

BUDGET ACTIVITY: 03 - Advanced Technology Development (ATD)

PE NUMBER AND TITLE: 0603601F Conventional Weapons Technology

	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
	Total Program Element (PE) Cost	37,190	43,605	30,516	22,456	22,656	23,071	23,420	23,748	Continuing	TBD
670A	Ordnance Technology	13,077	20,731	21,647	13,862	13,975	14,222	14,437	14,640	Continuing	TBD
670B	Guidance Technology	24,113	22,874	8,869	8,594	8,681	8,849	8,983	9,108	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	0

Note: In FY 2004, the Low-Cost Autonomous Attack System (LOCAAS) Advanced Technology Demonstration (ATD) is transitioning from the initial powered flight test phase of the ATD to a second phase of the ATD that requires less investment and will incorporate other technologies, potentially a datalink, enhancing LOCAAS mission effectiveness; therefore, the level of investment in 670B is being reduced.

(U) A. Mission Description

This program develops, demonstrates, and integrates ordnance and advanced guidance technologies for air-launched conventional weapons. The program includes two projects: (1) development of conventional ordnance technologies including warheads, fuzes, and explosives; and (2) development of advanced guidance technologies including seekers, navigation and control, and guidance. Note: In FY 2003, Congress added $3.5 million for the LOCAAS and $3.0M for the BLU-109 Heavy Warhead.

(U) B. Budget Activity Justification

This program is in the Budget Activity 3, Advanced Technology Development, since it develops and demonstrates technologies for existing system upgrades and/or new system developments that have military utility and address warfighter needs.

(U) C. Program Change Summary ($ in Thousands)

		FY 2002	FY 2003	FY 2004	Total Cost
(U)	Previous President's Budget	39,729	38,001	25,017	
(U)	Appropriated Value	40,117	44,501		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions	-388	-471		
	b. Small Business Innovative Research	-1,000			

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE: February 2003
BUDGET ACTIVITY: 03 - Advanced Technology Development (ATD)	PE NUMBER AND TITLE: 0603601F Conventional Weapons Technology

(U) C. Program Change Summary ($ in Thousands) Continued

		FY 2002	FY 2003	FY 2004	Total Cost
	c. Omnibus or Other Above Threshold Reprogram		-425		
	d. Below Threshold Reprogram	-1,358			
	e. Rescissions	-181			
(U)	Adjustments to Budget Years Since FY 2003 PBR			5,499	
(U)	Current Budget Submit/FY 2004 PBR	37,190	43,605	30,516	TBD

(U) Significant Program Changes:
Not Applicable.

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

DATE: February 2003

BUDGET ACTIVITY: 03 - Advanced Technology Development (ATD)

PE NUMBER AND TITLE: 0603601F Conventional Weapons Technology

PROJECT: 670A

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
670A	Ordnance Technology	13,077	20,731	21,647	13,862	13,975	14,222	14,437	14,640	Continuing	0

(U) A. Mission Description

This project develops, demonstrates, and integrates ordnance technologies for enhancing the effectiveness of air-launched conventional weapons. The project develops conventional ordnance including warheads, fuzes, explosives, carriage and release, and munition integration technologies. This project improves the capability for conventional ordnance supporting an Air Expeditionary Force.

(U) FY 2002 ($ in Thousands)

(U) $0 Accomplishments/Planned Program

(U) $4,574 Developed and demonstrated advanced conventional armament warhead technologies, including heavy metal liners, dense metal cases, and less sensitive explosives. The goals of these efforts are to destroy hardened targets by more effectively penetrating protective surfaces and to enhance kill mechanisms against softer surface targets. Fabricated and tested an innovative warhead capable of defeating a broad range of soft targets associated with development, production, and storage of chemical and biological weapons. Designed a weapon capable of high-speed penetration of extremely hard targets by combining a new warhead case technology, insensitive explosives, and a multiple-event fuze.

(U) $4,980 Developed and demonstrated advanced air-delivered munition fuze technologies and mass focusing warhead technologies to improve munition effectiveness, allowing for smaller warheads and munition airframes, thereby improving sortie effectiveness by increasing strike aircraft load-outs. Sled tested the multiple-event, hard target fuze in an ordnance package. Continued cooperative program with the United Kingdom to design an integrated fuze, an improved target detection device, and a directional warhead package. Designed a fuze using Microwave Monolithic Integrated Circuit technologies that will give a burst accuracy of 0.5 meters for weapons that have closure rates up to 2,500 meters/sec.

(U) $3,523 Developed and demonstrated conventional munition subsystem and platform integration technologies. These technologies include innovative air-delivered munition carriage and release equipment, miniature weapon release concepts, and reduced airframe size to provide the capability to safely carry, launch, and communicate among the aerospace vehicle and multiple miniature weapons. These integration technologies will increase weapon load-outs and improve sortie effectiveness for current and future strike aircraft while reducing munition airlift requirements. Integrated subsystems by combining ordnance and guidance subsystem technologies into an effective payload size. Designed a low-cost, precision-guided weapon with a Circular Error Probable of 1.4 meters.

(U) $13,077 Total

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 2003
BUDGET ACTIVITY 03 - Advanced Technology Development (ATD)	PE NUMBER AND TITLE 0603601F Conventional Weapons Technology	PROJECT 670A

(U) A. Mission Description Continued

(U) FY 2003 ($ in Thousands)

(U)	$0	Accomplishments/Planned Program
(U)	$9,075	Develop and demonstrate advanced conventional armament warhead technologies, including heavy metal liners, dense metal cases, and insensitive explosives. The goals of these efforts are to destroy hardened targets by more effectively penetrating protective surfaces and to enhance kill mechanisms against softer surface targets. Begin designing a unitary warhead penetrator capable of damaging weapons of mass destruction production and storage facilities with minimum collateral damage. Continue design and begin fabrication of a weapon capable of high-speed penetration of extremely hard targets by integrating a new warhead case technology, insensitive explosives, and a multiple-event fuze. Begin a program to mature design of advanced reactive materials such as nano-scale aluminum.
(U)	$6,715	Develop and demonstrate advanced air-delivered munitions fuze and mass focusing warhead technologies to improve munition effectiveness, allowing for smaller warheads and munition airframes, thereby improving sortie effectiveness and increasing strike aircraft load-outs. Develop a fuzing capability that will transmit function data from penetrating weapons through various hard target mediums. Continue cooperative program with the United Kingdom to design an integrated fuze, an improved target detection device, and a directional warhead package. Continue design of a fuze using Microwave Monolithic Integrated Circuit technologies that will give a burst accuracy of 0.5 meters for weapons that have closure rates up to 2,500 meters per second. Begin design trades for a precision-guided munition with precise, time-of-arrival attributes that can be used to defeat hard and deeply buried targets. Simultaneous delivery of multiple, precise, time-of-arrival munitions will be used to overpower protective tunnel doors, destroying tunnel contents with intruding blast pressures.
(U)	$4,941	Develop and demonstrate conventional munition subsystem and platform integration technologies. These integration technologies include innovative air-delivered munition carriage and release equipment, miniature weapon release concepts, and reduced airframe size providing the capability to safely carry, launch, and communicate among the aerospace vehicle and multiple miniature weapons. These integration technologies will increase weapon load-outs and improve sortie effectiveness for current and future strike aircraft while reducing munition airlift requirements. Initiate design of a low-cost, precision-guided weapon with a Circular Error Probable of 1.4 meters and lethal effectiveness against 85% of the MK-83 and BLU-109 targets.
(U)	$20,731	Total

(U) FY 2004 ($ in Thousands)

(U)	$0	Accomplishments/Planned Program
(U)	$11,309	Develop and demonstrate advanced conventional armament warhead technologies, including heavy metal liners, dense metal cases, and insensitive explosives with increased energy release performance attributes. The goal of these efforts is to destroy hardened targets by more effectively penetrating protective surfaces and by enhancing kill mechanisms against softer surface targets. Demonstrate a Tantalum warhead to

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE February 2003
BUDGET ACTIVITY 03 - Advanced Technology Development (ATD)	PE NUMBER AND TITLE 0603601F Conventional Weapons Technology	PROJECT 670A

(U) A. Mission Description Continued

(U) FY 2004 ($ in Thousands) Continued

provide attack capability against armored targets employing 'Active Protection Systems.' Continue design and begin fabrication of a warhead capable of surviving high-speed penetration of extremely deep targets by integrating a new warhead case technology, insensitive explosives, and a multiple-event fuze.

(U) $7,317 Develop and demonstrate advanced air-delivered munitions fuze and mass-focusing warhead technologies to improve munition effectiveness, allowing for smaller warheads and munition airframes, thereby improving sortie effectiveness and increasing strike aircraft load-outs. Develop a fuzing capability that will transmit function data from penetrating weapons through various hard target mediums. In collaboration with the United Kingdom's Ministry of Defense, ground test an integrated fuze, an improved target detection device, and a directional warhead package that selects a vulnerable aim-point to center a focused warhead fragment pattern. Continue design of a fuze using Microwave Monolithic Integrated Circuit technologies that will give a burst accuracy of 0.5 meters for weapons that have closure rates up to 2,500 meters per second. Begin design of a hard target influence fuze capable of denying access to and from hard and deeply buried facilities.

(U) $3,021 Develop and demonstrate conventional munition subsystem and platform integration technologies. These integration technologies include innovative air-delivered munition carriage and release equipment, miniature weapon release concepts, and reduced airframe size providing the capability to safely carry, launch, and communicate with the aerospace vehicle and other multiple miniature weapons. These integration technologies will increase weapon load-outs and improve sortie effectiveness for current and future strike aircraft while reducing munition airlift requirements. Begin an effort to develop a weapon that can neutralize chemical and biological warfare facilities. Begin an effort to mass-focus an ordnance package for minimally hardened surface targets. Demonstrate large blast munitions.

(U) $21,647 Total

(U) B. Project Change Summary

Not Applicable

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

(U) Related Activities:

(U) PE 0602602F, Conventional Munitions.

(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

(U) D. Acquisition Strategy

Not Applicable.

(U) E. Schedule Profile

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE: February 2003
BUDGET ACTIVITY: 03 - Advanced Technology Development (ATD)	PE NUMBER AND TITLE: 0603601F Conventional Weapons Technology — PROJECT: 670A

(U) E. Schedule Profile Continued

(U) Not Applicable.

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

DATE: February 2003

BUDGET ACTIVITY: 03 - Advanced Technology Development (ATD)

PE NUMBER AND TITLE: 0603601F Conventional Weapons Technology

PROJECT: 670B

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
670B Guidance Technology	24,113	22,874	8,869	8,594	8,681	8,849	8,983	9,108	Continuing	0

(U) A. Mission Description

This project develops, demonstrates, and integrates affordable, autonomous, and adverse weather advanced guidance technologies for conventional armament delivered from manned and unmanned aerospace vehicles. This project includes development of conventional weapon guidance systems including terminal seekers, midcourse navigation sensors for standoff delivery weapons, and target detection and identification processing algorithms for reducing target location error to improve target kill probability.

(U) FY 2002 ($ in Thousands)

(U) $0 Accomplishments/Planned Program

(U) $1,152 Developed and demonstrated advanced conventional armament seeker technologies for miniature munitions' applications. These seeker technologies will autonomously detect, acquire, and guide to targets of interest in adverse weather and battlefield conditions. Also, the seeker technologies will increase the probability of kill and minimize collateral damage while providing increased weapons load-out and improved sortie effectiveness. Demonstrated laser radar terminal seeker for a miniature munition that will be effective against high-value fixed and mobile targets.

(U) $1,133 Developed and demonstrated advanced conventional armament navigation and control technologies to provide increased armament navigation accuracy, improved stand off range, enhanced weapon control, and operation in electronic jamming environments. Developed interface design between target detection device, fuze, directional warhead, and weapon terminal guidance seeker. Completed design and fabrication of an integrated laser radar terminal seeker and Global Positioning System/Inertial Navigation System (GPS/INS) navigation and control system.

(U) $2,028 Integrated advanced conventional guidance technologies including seekers, processors, controls, and algorithms. Provided improved adverse weather performance, faster processing of target information, higher probability of target detection, an operationally acceptable target false alarm rate, and enhanced the effectiveness of miniature munitions against both mobile and hardened fixed ground targets. Completed flight readiness review and final subsystem integration of an autonomous guidance seeker against ground fixed and mobile targets. Conducted free flight tests and analyzed flight test data of a powered miniature munition with an integrated laser radar seeker and GPS/INS guidance to demonstrate design and determine target false alarm rate.

(U) $19,800 Enhanced the current Low-Cost Autonomous Attack System (LOCAAS) Advanced Technology Demonstration (ATD) program by adding more flight and ground testing. Additional LOCAAS ATD tasks included flight testing of a LOCAAS with a live warhead to demonstrate that the integrated technologies perform as expected and preparing the LOCAAS flight test vehicle for carriage and release from a tactical fighter aircraft.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE: February 2003
BUDGET ACTIVITY: 03 - Advanced Technology Development (ATD)	PE NUMBER AND TITLE: 0603601F Conventional Weapons Technology / PROJECT: 670B

(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

Other Advanced Technology Demonstration (ATD) tasks included continuing automatic target recognition algorithm development; designing the Low-Cost Autonomous Attack System (LOCAAS) datalink to improve cooperative attack and communicate bomb damage assessment to the command and control network; and evaluating electronic safe and arm fuzing.

(U) $24,113 Total

(U) FY 2003 ($ in Thousands)

(U) $0 Accomplishments/Planned Program

(U) $2,782 Develop and demonstrate advanced conventional armament seeker technologies for miniature munitions applications. These seeker technologies will autonomously detect, acquire, and guide to targets of interest in adverse weather and battlefield conditions. Also, the seeker technologies will increase the probability of kill and minimize collateral damage while providing increased weapons load-out and improved sortie effectiveness. Begin developing a low-cost, laser radar seeker to be used to search and identify fixed, re-locatable, and moving targets that will increase data rate and reduce moving parts of earlier generation laser seeker technologies.

(U) $1,932 Develop and demonstrate advanced conventional armament navigation and control technologies to increase armament navigation accuracy, improve stand off range, and enhance weapons control and operation in electronic jamming environments. Develop interface between a target detection device, fuze, directional warhead, and weapon terminal guidance seeker. Develop a munition navigation system using micro-electromechanical system technology to provide an accurate (less than one meter), miniature (less than 25 cubic inches), and affordable (less than $6,000 per unit) Global Positioning System/Inertial Measurement Unit navigation system.

(U) $3,781 Integrate advanced conventional guidance technologies including seekers, processors, controls, and algorithms. Provide improved adverse weather performance, faster processing of target information, higher probability of target detection, an operationally acceptable target false alarm rate, and enhance the effectiveness of miniature munitions against both mobile and hardened fixed ground targets. Begin development and fabrication of a low-cost seeker, guidance hardware, and autonomous target recognition software for a small bomb to attack mobile and re-locatable targets.

(U) $14,379 Enhance the current LOCAAS ATD program by adding more flight and ground testing. Additional LOCAAS ATD tasks include flight testing of a LOCAAS with a live warhead to demonstrate that the integrated technologies perform as expected. Also, the ATD will include separating the LOCAAS flight test vehicle from a tactical fighter aircraft. Other ATD tasks will include continuing automatic target recognition algorithm development, designing the LOCAAS datalink to improve cooperative attack and communicate bomb damage assessment to the command and control network, and evaluating electronic safe and arm fuzing.

(U) $22,874 Total

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE: February 2003
BUDGET ACTIVITY: 03 - Advanced Technology Development (ATD)	PE NUMBER AND TITLE: 0603601F Conventional Weapons Technology	PROJECT: 670B

(U) A. Mission Description Continued

(U) FY 2004 ($ in Thousands)

(U)	$0	Accomplishments/Planned Program
(U)	$2,417	Develop and demonstrate advanced conventional armament seeker technologies for miniature munitions applications. These seeker technologies will autonomously detect, acquire, and guide to targets of interest in adverse weather and battlefield conditions. Also, the seeker technologies will increase the probability of kill and minimize collateral damage while providing increased weapons load-out and improved sortie effectiveness. Develop a low-cost, laser detection and ranging seeker that will increase data rate and reduce moving parts of earlier generation laser seeker technologies.
(U)	$2,175	Develop and demonstrate advanced conventional armament navigation and control technologies to increase armament navigation accuracy, improve stand off range, and enhance weapons control and operation in electronic jamming environments. Develop a munition navigation system using micro-electromechanical system technology to provide an accurate (less than one meter), miniature (less than 25 cubic inches), and affordable (less than $6,000 per unit) Global Positioning System/Inertial Measurement Unit navigation system.
(U)	$4,277	Integrate advanced conventional guidance technologies including seekers, processors, controls, datalinks, and algorithms. Provide improved adverse weather performance, faster processing of target information, higher probability of target detection, an operationally acceptable target false alarm rate, and enhance the effectiveness of miniature munitions against both mobile and fixed ground targets. Continue technology development tasks to further reduce risk of integrating the Low-Cost Autonomous Attack System onto manned and unmanned aircraft.
(U)	$8,869	Total

(U) B. Project Change Summary

Not Applicable.

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

(U) Related Activities:

(U) PE 0602602F, Conventional Munitions

(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

(U) D. Acquisition Strategy

Not Applicable.

(U) E. Schedule Profile

(U) Not Applicable.