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

DATE: February 2002

BUDGET ACTIVITY: 03 - Advanced Technology Development

PE NUMBER AND TITLE: 0603601F Conventional Weapons Technology

	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
	Total Program Element (PE) Cost	21,398	39,729	38,001	25,017	22,859	23,312	23,765	Continuing	TBD
670A	Ordnance Technology	21,398	12,399	18,158	15,967	14,111	14,380	14,650	Continuing	TBD
670B	Guidance Technology	0	27,330	19,843	9,050	8,748	8,932	9,115	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0

Note: In FY 2001, Project 670A and Project 670B were combined into a single project. In FY 2002, Project 670B was separated from Project 670A for clarity in describing the different technology development and demonstration programs.

(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 2002, Congress added $3.8 million to the Low-Cost Autonomous Attack System (LOCAAS) program.

(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 2001	FY 2002	FY 2003	Total Cost
(U)	Previous President's Budget	22,523	37,617	23,827	
(U)	Appropriated Value	22,731	40,117		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions		-388		

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE: February 2002
BUDGET ACTIVITY: 03 - Advanced Technology Development	PE NUMBER AND TITLE: 0603601F Conventional Weapons Technology

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

		FY 2001	FY 2002	FY 2003	Total Cost
	b. Small Business Innovative Research	-534			
	c. Omnibus or Other Above Threshold Reprogram				
	d. Below Threshold Reprogram	-591			
	e. Rescissions	-208			
(U)	Adjustments to Budget Years Since FY 2002 PBR			14,174	
(U)	Current Budget Submit/FY 2003 PBR	21,398	39,729	38,001	TBD

(U) Significant Program Changes:

FY 2003 increases are due to increased emphasis of Project 670A for Advanced Energetics and Payload Delivery Capability and Tunnel Defeat Weapons Concept, plus increased emphasis for Project 670B to further enhance the Low-Cost Autonomous Attack System Advanced Technology Demonstration flight test program.

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

DATE: February 2002

BUDGET ACTIVITY: 03 - Advanced Technology Development

PE NUMBER AND TITLE: 0603601F Conventional Weapons Technology

PROJECT: 670A

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
670A Ordnance Technology	21,398	12,399	18,158	15,967	14,111	14,380	14,650	Continuing	0

Note: In FY 2001, Project 670A and Project 670B were combined into a single project. In FY 2002, Project 670B was separated from Project 670A for clarity in describing the different technology development and demonstration programs.

(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 capability for conventional ordnance supporting an Air Expeditionary Force.

(U) FY 2001 ($ in Thousands)

(U) $4,040 Developed and demonstrated advanced conventional armament warhead technologies, including heavy metal liners, dense metal cases, and less sensitive explosives. These warhead technologies improved target penetration capabilities, enhanced kill probability against fragmentation sensitive targets, reduced sorties to improve pilot survivability, and increased aircraft longevity. Ground tested a chemical and biological defeat warhead to characterize effectiveness against production and storage capabilities. Continued developing and evaluating concepts for neutralizing a broad spectrum of chemical and biological agents. Fabricated the tri-mode warhead and associated weapon electronics, designed in FY 2000, for lethal suppression of enemy air defenses and weapons interdiction missions.

(U) $4,980 Developed and demonstrated advanced air-delivered munition fuze technologies. These fuze technologies improved munitions effectiveness, and allowed smaller warheads and munition airframes, thereby increasing strike aircraft load-outs and improving sortie effectiveness. Conducted initial field test of multiple-event, hard-target fuze component design. Developed component design of an integrated fuze, improved target detection device, and directional warhead package.

(U) $2,489 Developed innovative air-delivered munition carriage and release equipment, miniature weapon release concepts, and airframe size reduction concepts. The innovative concepts provided the capability to safely carry, launch, and provide communication between the aerospace vehicle and the multiple miniature weapons, thereby increasing weapon load-outs and improving sortie effectiveness for current and future strike aircraft while reducing munition airlift requirements. Continued Unmanned Combat Air Vehicle miniature munition integration and planning support for the flight test demonstration. Completed ground and flight test of a small munition dispenser.

(U) $2,495 Developed and demonstrated advanced conventional armament seeker technologies. These advanced seeker technologies were applied to the development of miniature munitions. The advanced seeker had the capability to autonomously detect, acquire, and guide to targets of interest

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 2002
BUDGET ACTIVITY: 03 - Advanced Technology Development	PE NUMBER AND TITLE: 0603601F Conventional Weapons Technology / PROJECT: 670A

(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

in adverse weather and battlefield conditions, thus increasing the probability of kill and minimizing collateral damage while providing increased weapons load-out and improving sortie effectiveness. Developed preliminary design of a terminal, laser radar seeker for a miniature munition that will be effective against high value fixed targets. Fabricated and captive flight tested a low-cost, tactical sized laser radar terminal seeker for miniature munitions compatible with Unmanned Combat Air Vehicle.

(U) $2,410 Developed and demonstrated advanced conventional armament navigation and control technologies that provided increased armament navigation accuracy, improved standoff range, enhanced weapon control and operation in electronic jamming environments. Initiated 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) $4,984 Integrated advanced conventional guidance technologies that provided improved adverse weather performance, faster processing of target information, higher probability of target detection, and an operationally acceptable target false alarm rate. These advanced technologies enhanced the effectiveness of miniature munitions against both mobile and hardened fixed ground targets to reduce sortie rates, improved mission effectiveness, and reduced collateral damage. 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 integrated laser radar seeker and GPS/INS guidance to validate design and determine target false alarm rate.

(U) $21,398 Total

(U) FY 2002 ($ in Thousands)

(U) $4,296 Develop and demonstrate 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 enhance kill mechanisms against softer surface targets. Fabricate and test an innovative warhead capable of defeating a broad range of soft targets associated with development, production, and storage of chemical and biological weapons. Design a weapon capable of high-speed penetration of extremely hard targets by combining new warhead case technology, insensitive explosive, and multiple-event fuze.

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE: February 2002
BUDGET ACTIVITY: 03 - Advanced Technology Development	PE NUMBER AND TITLE: 0603601F Conventional Weapons Technology	PROJECT: 670A

(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

(U) $3,123 Develop and demonstrate 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 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. Integrate subsystems by combining ordnance and guidance subsystem technology into an effective payload size. Design a low-cost, precision-guided weapon with a Circular Error Probable of 1.4 meter.

(U) $12,399 Total

(U) FY 2003 ($ in Thousands)

(U) $6,812 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 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 explosive, and 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 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 burst accuracy of 0.5 meter for weapons that have closure rates up to 2,500 meters per second. Begin design trades for a precision-guided munitions 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) $4,631 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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE: February 2002

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
03 - Advanced Technology Development	0603601F Conventional Weapons Technology	670A

(U) A. Mission Description Continued

(U) FY 2003 ($ in Thousands) Continued

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) $18,158 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.

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

DATE: February 2002

BUDGET ACTIVITY: 03 - Advanced Technology Development

PE NUMBER AND TITLE: 0603601F Conventional Weapons Technology

PROJECT: 670B

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
670B Guidance Technology	0	27,330	19,843	9,050	8,748	8,932	9,115	Continuing	0

Note: In FY 2001, Project 670A and Project 670B were combined into a single project. In FY 2002, Project 670B was separated from Project 670A for clarity in describing the different technology development and demonstration programs.

(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 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 2001 ($ in Thousands)

(U) $0 This work was performed in Project 670A.

(U) $0 Total

(U) FY 2002 ($ in Thousands)

(U) $2,251 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. Demonstrate laser radar terminal seeker for a miniature munition that will be effective against high-value fixed and mobile targets.

(U) $2,133 Develop and demonstrate advanced conventional armament navigation and control technologies to provide increased armament navigation accuracy, improved standoff range, enhanced weapon control, and operation in electronic jamming environments. Develop interface design between target detection device, fuze, directional warhead, and weapon terminal guidance seeker. Complete design and fabrication of an integrated laser radar terminal seeker and Global Positioning System/Inertial Navigation System (GPS/INS) navigation and control system.

(U) $3,146 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. Complete flight

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 2002
BUDGET ACTIVITY: 03 - Advanced Technology Development	PE NUMBER AND TITLE: 0603601F Conventional Weapons Technology / PROJECT: 670B

(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

readiness review and final subsystem integration of an autonomous guidance seeker against ground fixed and mobile targets. Conduct free flight tests and analyze flight test data of a powered miniature munition with integrated laser radar seeker and GPS/INS guidance to demonstrate design and determine target false alarm rate.

(U) $19,800 Enhance the current Low Cost Autonomous Attack System (LOCAAS) Advanced Technology Demonstration (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 and preparing the LOCAAS flight test vehicle for carriage and release from a tactical fighter aircraft. Other ATD tasks will include continuing automatic target recognition algorithm development; designing the Low Cost Autonomous Attack System datalink to improve cooperative attack and communicate bomb damage assessment to the command and control network; and evaluating electronic safe and arm fuzing.

(U) $27,330 Total

(U) FY 2003 ($ in Thousands)

(U) $2,784 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 using DARPA-developed fixed, detector array technology.

(U) $1,932 Develop and demonstrate advanced conventional armament navigation and control technologies to increase armament navigation accuracy, improve stand off range, 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) $4,127 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) $11,000 Enhance the current LOCAAS ATD program by adding more flight and ground testing. Additional LOCAAS ATD tasks include flight testing

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE: February 2002

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
03 - Advanced Technology Development	0603601F Conventional Weapons Technology	670B

(U) A. Mission Description Continued

(U) FY 2003 ($ in Thousands) Continued

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) $19,843 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.