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

DATE: February 2003

BUDGET ACTIVITY: 05 - System Development and Demonstration (SDD)

PE NUMBER AND TITLE: 0605011F RDT&E For Aging Aircraft

PROJECT: 4685

	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
4685	Aging Aircraft	39,245	32,894	24,063	15,806	24,990	25,439	25,806	26,153	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	0

(U) A. Mission Description

This program extends the service life, controls the rapidly rising sustainment costs, and retains the operational capability of the aging aircraft fleet. Using business case analyses, cross-cutting opportunities to reduce total ownership costs and improve productivity, reliability, availability, and maintainability are identified. The program develops tools to facilitate the sharing of aging aircraft information, knowledge, technology, and solutions among the Air Logistics Centers, Product Centers, System Program Offices, other Services and government agencies, and industry. The program provides senior Air Force decision makers with a common, comprehensive understanding of program areas such as corrosion, wiring, etc. The program also analyzes and recommends changes to existing sustainment processes such as field and depot repair processes. Note: In FY2003, Congress added $1.8M for Aging Aircraft Enterprise Knowledge Portal and $1.8M for Viable Combat Avionics Initiative.

(U) FY 2002 ($ in Thousands)

(U) $0 Accomplishments/Planned Program

(U) $5,582 Continued corrosion maintenance improvements. Developed corrosion abatement techniques, procedures, and temporary repairs. Expanded the range of available repair technologies for eliminating aircraft structural corrosion. Reduced the cost and man-hours associated with corrosion maintenance actions by providing automated corrosion detection technologies. Continued development and integration of software and analytical tools to support corrosion management workload prediction (e.g., environmental exposure models, corrosion damage analyses).

(U) $1,150 Continued work on improved non-destructive inspection (NDI) techniques. Shortened detection time for flaws and damage due to fatigue cracking, corrosion, composite material delaminations, and trapped moisture. Sponsored technology advancements to enable early damage detection, thus allowing for less costly repairs over the weapon system life cycle. Continued work on NDI techniques to detect cracks without removing fasteners to reduce inspection time and eliminate the potential for further damage by removing fasteners. Broadened the application of ultrasonic inspection techniques to detect fatigue cracks in internal wing structure from the outside of the aircraft to eliminate fuel tank entry requirements and potential damage caused by rivet removal.

(U) $4,561 Continued work on technologies to maintain the structural integrity of aging weapon systems to ensure continued flight safety. Developed viable procedures to correct the delamination of aging integral fuel tank coatings for improved corrosion protection and elimination of wing skin replacements.

(U) $1,690 Conducted analyses on aging aircraft problems to drive affordable modernization and sustainment solutions. Leveraged existing knowledge of

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(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

aging aircraft structures, avionics, and propulsion into business case analyses and related efforts to identify opportunities to reduce total ownership costs.

(U) $3,968 Developed cross-cutting aging aircraft system solutions such as a non-destructive inspection (NDI) corrosion assessment tool for accurate structural health assessments. Developed techniques to incorporate high strength, corrosion resistant alloys into legacy airframes to reduce the effects of corrosive environments. Studied aging wiring in the F-16 and C-17 fleets and developed techniques for predicting aging wiring problems. Improved repair procedures to maintain the integrity of aging integral fuel tank coating materials.

(U) $1,661 Developed an information/knowledge management tool to share aging aircraft technology and solutions across the aeronautical community. Identified existing databases which contain aging aircraft information, and connected them to a single web portal. Developed web-based data mining views that turn the raw data into information to facilitate strategic planning and trend analysis for reducing total ownership costs.

(U) $6,717 Developed and completed efforts associated with Aging Wiring and Corrosion Treatment for Aging Aircraft such as development of automated systems to assess aircraft wiring integrity.

(U) $10,076 Developed and completed engineering tasks associated with Aging Landing Gear Life Extension program such as development, prototyping, and qualification of a new F-16 nose wheel steering actuator.

(U) $1,920 Developed and completed efforts associated with Aging Propulsion Systems Life Extension such as identifying and investigating new and emerging repair technologies with the potential to improve the propulsion systems overhaul process.

(U) $1,920 Developed and completed efforts associated with Aging Aircraft Knowledge Portal such as identifying avionics high cost drivers for legacy aircraft.

(U) $39,245 Total

(U) FY 2003 ($ in Thousands)

(U) $0 Accomplishments/Planned Program

(U) $5,888 Continue corrosion maintainance improvements. Develop corrosion abatement techniques, procedures, and temporary repairs. Expand the range of available repair technologies for eliminating aircraft structural corrosion. Reduce the cost and man-hours associated with corrosion maintainance actions by providing automated corrosion detection technologies. Continue development and integration of software and analytical tools to support corrosion management workload prediction (e.g., environmental exposure models, corrosion damage analyses).

(U) $2,936 Continue work on improved non-destructive inspection techniques, deployment of corrosion and crack detection capabilities, and ongoing evaluation of new and more cost-effective techniques. Shorten detection time for flaws and damage due to fatigue cracking, corrosion, composite material delaminations, and trapped moisture. Sponsor technology advancements to enable early damage detection, thus allowing for

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(U) A. Mission Description Continued

(U) FY 2003 ($ in Thousands) Continued

		less costly repairs over the weapon system life cycle. Continue work on NDI techniques to detect cracks without removing fasteners to reduce inspection time and eliminate the potential for further damage by removing fasteners. Broaden the application of ultrasonic inspection techniques to detect fatigue cracks in internal wing structure from the outside of the aircraft to eliminate fuel tank entry requirements and potential damage caused by rivet removal.
(U)	$3,889	Continue work on technologies to maintain the structural integrity of aging weapon systems to ensure continued flight safety. Develop viable procedures to correct the delamination of aging integral fuel tank coatings for improved corrosion protection and elimination of wing skin replacements. Continue efforts to evaluate material improvement and crack detection support tools.
(U)	$964	Conduct analyses on aging aircraft problems to drive affordable modernization and sustainment solutions. Leverage existing knowledge of aging aircraft structures, avionics, and propulsion into business case analyses and related efforts to identify opportunities to reduce total ownership costs. Identify and analyze aging wiring problems in fighter, cargo, and tanker aircraft fleets. Conduct government and industry-wide forums to address cross-platform applications for aging aircraft solutions.
(U)	$3,185	Develop cross-cutting aging aircraft system solutions (e.g., universal flight data acquisition/recorder systems, aircraft life support systems, and aircraft support equipment). Develop techniques to incorporate high strength, corrosion resistant alloys into legacy airframes. Develop techniques for predicting aging wiring problems. Improve repair procedures to maintain the integrity of aging integral fuel tank coating materials. Leverage viable combat avionics work into common integrated aging avionics solutions (e.g., modular open systems architectures).
(U)	$2,889	Develop partnerships with government and commercial industry to foster shared technologies and processes and develop an information/knowledge portal tool to share aging aircraft technology and solutions across the aeronautical community. Identify existing databases which contain aging aircraft information, and connect them to a single web portal. Develop web-based data mining views that turn the raw data into information to facilitate strategic planning and trend analysis for reducing total ownership costs.
(U)	$9,665	Develop and complete engineering tasks associated with Aging Landing Gear Life Extension program such as redesigning the KC-135 main landing gear piston to preclude a recurring sudden extension problem.
(U)	$1,739	Develop and complete efforts associated with Aging Aircraft Enterprise Knowledge Portal such as automating Air Combat Command's monthly maintainance performance indicator report to reduce cycle time.
(U)	$1,739	Develop and complete efforts associated with Viable Combat Avionics Initiative such as insuring reserves computer memory and throughput, bus loading, cooling, and power support in avionics design efforts to support modular open systems architectures.
(U)	$32,894	Total

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(U) A. Mission Description Continued

(U) FY 2004 ($ in Thousands)

(U)	$0	Accomplishments/Planned Program
(U)	$7,054	Continue corrosion maintenance improvements. Continue to develop and transition corrosion abatement techniques, procedures, and temporary repairs. Expand the range of available repair technologies for eliminating aircraft structural corrosion. Continue to reduce the cost and man-hours associated with corrosion maintenance actions and minimizing aircraft downtime by providing automated corrosion detection technologies. Continue development and integration of software and analytical tools to support corrosion management workload prediction (e.g., environmental exposure models and corrosion damage analyses).
(U)	$610	Continue work on improved non-destructive inspection techniques, deployment of corrosion and crack detection capabilities, and ongoing evaluation of new and more cost-effective techniques. Continue work to shorten detection time for flaws and damage due to fatigue cracking, corrosion, composite material delaminations, and trapped moisture. Continue sponsoring technology advancements to enable early damage detection, thus allowing for less costly repairs over the weapon system life cycle. Improve aircraft availability through continued work on non-destructive inspection techniques to detect cracks without removing fasteners to reduce inspection time and eliminate the potential for further damage by removing fasteners. Broaden the application of ultrasonic inspection techniques to detect fatigue cracks in internal wing structure from the outside of the aircraft to eliminate fuel tank entry requirements and potential damage caused by rivet removal.
(U)	$2,495	Continue work on technologies to maintain the structural integrity of aging weapon systems to ensure continued flight safety. Continue techniques to incorporate bonded repairs into legacy airframes. Continue to develop viable procedures to correct the delamination of aging integral fuel tank coatings for improved corrosion protection and elimination of wing skin replacements. Continue efforts to evaluate material improvement in crack detection support tools.
(U)	$4,201	Continue to leverage knowledge of existing/legacy avionics issues (diminishing manufacturing sources, software languages, unique military interfaces, etc.). Analyze the gathered data and initiate/continue cross-cutting solutions in data acquisition/recorders, displays, expanded aircraft internal data transfer techniques, and other similar efforts. Continue expanding viable combat avionics initiatives through generation and use of: integrated change roadmaps; best value methodology; source selection actions; automated baseline analysis tools; technology solution roadmaps; etc. Advantages to the warfighter include increased mission capable rate, diminished maintenance actions, higher avionics reliability, expanded on-board information capacity and management, reduced air expeditionary forces footprint, and improved posture to incorporate future capabilities with reduced cost.
(U)	$4,328	Conduct analyses on aging aircraft problems to drive affordable modernization and sustainment solutions. Continue leveraging existing knowledge of aging aircraft structures, avionics, and propulsion into business case analyses and related efforts to identify opportunities to reduce total ownership costs. Continue work on identifying and analyzing aging wiring problems in fighter, cargo and tanker aircraft fleets to minimize diagnostic and repair time improving aircraft availability. Continue to conduct government and industry-wide forums to address cross-platform

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(U) A. Mission Description Continued

(U) FY 2004 ($ in Thousands) Continued

applications for aging aircraft solutions.

(U)	$3,437	Continue to develop cross-cutting aging aircraft system solutions (e.g., universal flight data acquisition/recorder systems, aircraft life support systems, aircraft support equipment). Continue with development of techniques to incorporate high strength, corrosion resistant alloys into legacy airframes. Continue improving repair procedures to maintain the integrity of aging integral fuel tank coating materials.
(U)	$125	Develop partnerships with government and commercial industry to foster shared technologies and processes and an information/knowledge portal tool to share aging aircraft technology and solutions across the aeronautical community. Continue identifying existing databases which contain aging aircraft information, and continue connecting them to a single web portal. Develop web-based data mining views that turn the raw data into information to facilitate strategic planning and trend analysis for reducing total ownership costs.
(U)	$560	Develop an Air Force Wire Integrity project to enable early detection and classification of failing aircraft wiring. Enhance current database system to enable capture of all maintenance actions on aircraft wiring systems. Foster the development and application of a 'tool set' which addresses the entire set of aging wiring issues, to include: circuit analyzers; fault detection and location; safety analysis; automated test generation; and trending capabilities. Provide wiring system awareness training across all maintenance disciplines.
(U)	$278	Develop a business strategy to address aging aircraft subsystem issues. Perform business case analyses to support subsystem design integrity decisions. Develop suite of analysis tools for predicting imminent failure of aircraft systems.
(U)	$365	Develop analysis tool to support diminishing manufacturing source issues and analysis, identification and management of cross-cutting issues. Develop data mining tool specifically designed to extract and analyze crosscutting issues data from existing data systems. Foster cross program sharing of information within both DoD and industry.
(U)	$610	Continue to develop and refine the Depot Technology Modernization Plan process and implement this process. This plan will identify depot technology requirements today and twenty years in the future. The Aging Aircraft Program Office will evaluate technology requirements for cross-cutting opportunities. Technology solution roadmaps from the Air Force Research Lab, industry, and program directors will be integrated with requirements. The Depot Technology Modernization Plan will be integrated into the Air Force Long-Range Depot Strategy. This integration will ensure current and future depot core capabilities will be available to support warfighter requirements at the right time. This plan will be updated on an annual basis based on updated warfighter needs, depot projected core capabilities, and new available technologies.
(U)	$24,063	Total

(U) B. Budget Activity Justification

This program is in Budget Activity 5, System Demonstration and Development, because projects/capabilities will be developed in this program, then made available for procurement by already operational systems.

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

		FY 2002	FY 2003	FY 2004	Total Cost
(U)	Previous President's Budget	41,211	19,871	24,699	
(U)	Appropriated Value	41,615	33,471		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions	-402	-354		
	b. Small Business Innovative Research	-1,270			
	c. Omnibus or Other Above Threshold Reprogram		-223		
	d. Below Threshold Reprogram	-506			
	e. Rescissions	-192			
(U)	Adjustments to Budget Years Since FY 2003 PBR			-636	
(U)	Current Budget Submit/FY 2004 PBR	39,245	32,894	24,063	TBD

(U) Significant Program Changes:
Not applicable.

(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)	AF RDT&E										
(U)	Other APPN										

(U) Related Activities:
(U) PE 0708026F, Productivity/Reliability/Availability/Maintainability.

(U) E. Acquisition Strategy

Funding may be executed internally within the Aeronautical Enterprise SPO via full and open competition or released to other organizations for projects for which they are the Office of Primary Responsibility (OPR). The OPRs will determine the most appropriate contract vehicle, Design Engineering Program (DEP) contract or full and open competition, to accomplish the project.

(U) F. Schedule Profile

FY 2002	FY 2003	FY 2004

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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)	Screening for Corrosion and Maintenance Improvement Projects			*			X				X		
(U)	Request For Proposal Release			*			X				X		
(U)	Contract Awards	*	*	*				X			X		

Note: 1Q and 2Q contract awards are from prior year funds

* = completed, X = planned

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

DATE: February 2003

BUDGET ACTIVITY: 05 - System Development and Demonstration (SDD)

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

		FY 2002	FY 2003	FY 2004
(U)	Corrosion Prevention and Control Techniques	5,582	5,888	7,054
(U)	Improved Non-Destructive Inspection Capabilities	1,150	2,936	610
(U)	Technologies to Enhance Structural Integrity	4,561	3,889	2,495
(U)	Viable Combat Avionics	0	0	4,201
(U)	Aging Aircraft Analysis	1,690	964	4,328
(U)	Cross-Cutting Aging Aircraft Technology	3,968	3,185	3,437
(U)	Aging Aircraft Knowledge Management Tools	1,661	2,889	125
(U)	Aging Wiring and Corrosion Treatment for Aging Aircraft	6,717	0	0
(U)	Aging Landing Gear Life Extension	10,076	9,665	0
(U)	Aging Propulsion Systems Life Extension	1,920	0	0
(U)	Aging Aircraft Knowledge Portal	1,920	1,739	0
(U)	Viable Combat Avionics Initiative	0	1,739	0
(U)	Improved Aging Aircraft Wiring Systems Technologies	0	0	560
(U)	Subsystems Sustainment/Enhancement Technologies	0	0	278
(U)	Diminishing Manufacturing Source Tools	0	0	365
(U)	Depot Technology Modernization Plan	0	0	610
(U)	Total	39,245	32,894	24,063

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE: February 2003
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(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										
ARINC/Boeing	T&M	Mar 01	N/A	N/A	0	0	700	0	700	1,400
Boeing	T&M	Apr 01	N/A	N/A	0	1,100	950	0	0	2,050
Southwest Research	T&M	Mar 01	N/A	N/A	0	250	350	0	0	600
SAIC/Boeing	FFP	Mar 01	N/A	N/A	0	300	400	0	0	700
SAIC	T&M	Mar 01	N/A	N/A	0	300	300	0	0	600
UDRI/S&K Tech	TBD	Mar 01	N/A	N/A	0	0	9,920	3,950	3,720	17,590
S&K Tech		Various	N/A	N/A	0	5,200	500	500	900	7,100
UDRI	T&M	Mar 01	N/A	N/A	0	0	1,000	350	250	1,600
UDRI/NASA	T&M	Mar 01	N/A	N/A	0	1,190	0	0	0	1,190
GRCI	T&M	TBD	N/A	N/A	0	0	100	0	0	100
Aging Landing Gear Life Extension	TBD	TBD	N/A	N/A	0	10,076	10,000	0	0	20,076
Aging Wiring and Corrosion Treatment for Aging Aircraft	TBD	TBD	N/A	N/A	0	6,717	0	0	0	6,717
Aging Propulsion Systems Life Extension	TBD	TBD	N/A	N/A	0	1,920	0	0	0	1,920
Aging Aircraft Knowledge Portal	TBD	TBD	N/A	N/A	0	1,920	1,800	0	0	3,720
Numerous	Various	Various	N/A	N/A	0	10,272	5,074	19,263	Continuing	TBD
Affordable Avionics	Various	Various	N/A	N/A	1,325	0	1,800			3,125
Support and Management Organizations										
In House										
Test and Evaluation Organizations										

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(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									
None									

Subtotals	Total Prior to FY 2002	Budget FY 2002	Budget FY 2003	Budget FY 2004	Budget to Complete	Total Program
Subtotal Product Development	1,325	39,245	32,894	24,063	TBD	TBD
Subtotal Support and Management						
Subtotal Test and Evaluation						
Total Project	1,325	39,245	32,894	24,063	TBD	TBD