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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE February 2000			
BUDGET ACTIVITY 07 - Operational System Development				PE NUMBER AND TITLE 0708612F Computer Resources Support Improvement Program				PROJECT 674851		
COST (\$ in Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
674851	Embedded Comp Res Spt Prog Impr	0	0	2,356	3,363	3,416	3,485	3,553	Continuing	TBD
Quantity of RDT&E Articles		0	0	0	0	0	0	0	0	0

Note: In FY 2001, funding was moved to this PE from PE 0708611F, Project 673090.

(U) **A. Mission Description**
 This program conducts research and development to improve the support of mission-critical software intensive systems. It encompasses automation and standardization of support processes, advanced support methodologies, tools and environments, and readiness support to facilitate rapid turnaround of software in response to changing mission and/or changing threat requirements.

(U) **FY 1999 (\$ in Thousands)**
 (U) \$0 Previously accomplished in PE 0708611F.
 (U) \$0 Total

(U) **FY 2000 (\$ in Thousands)**
 (U) \$0 Previously accomplished in PE 0708611F.
 (U) \$0 Total

(U) **FY 2001 (\$ in Thousands)**
 (U) \$350 Continue Adaptive Software Technology Development (ASTD). The objective of ASTD is to develop, demonstrate, and transfer adaptive software techniques for embedded weapon system software. The ASTD effort provides the defense software development community with an application design methodology allowing the use of commercial and emerging technologies to construct robust, platform-independent, resource adaptive applications. Such applications can respond to both mission profile changes (e.g., change from Air-to-Air to Air-to-Ground combat) and dynamic mission events that drive changing computational resource requirements, such as increased numbers of targets or hardware failures.

(U) \$125 Continue Incremental Upgrade of Legacy Systems Tech Demo (IULS TD). The object of IULS TD is to develop, demonstrate, and transition technology that will enable cost-effective, incremental improvements to fielded embedded information systems, affordably allowing systems to operate in a 'System of Systems'.

(U) \$300 Continue Reconfigurable Aerospace Computer Emulator (RACE). The object of RACE is to improve the reliability and maintainability of

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<p>(U) <u>A. Mission Description Continued</u></p> <p>(U) <u>FY 2001 (\$ in Thousands) Continued</u></p> <p>aging/obsolete on-board aerospace computers by replacing them with commercial microprocessor-based computer emulation technology; providing for backward compatibility with existing mission critical software and allowing for incremental software upgrades on new Commercial-Off-The-Shelf (COTS) processors.</p> <p>(U) \$75 Continue Real-Time Defense Information Infrastructure Common Operating Environment (RT DII COE). The objective of RT DII COE is to extend the ideas for reuse and commonality to improve the effectiveness of systems performing real-time Command and Control (C2) missions. Our participation provides the RT DII COE effort with needed real-time embedded system experience, adds to the effectiveness of the Computer Resource Support Improvement Program's (CRSIP's) Weapon System Open Architecture (WSOA) project, and provides the Air Force Research Lab (AFRL) with on going technical information that will eventually apply to real-time aspects of all C2 programs.</p> <p>(U) \$636 Continue Virtual Engineering Environment (VEE). The objective of VEE is to provide the DoD user with a low-cost, reconfigurable and scaleable engineering environment; develops concepts and technologies, and employs common components aimed at significantly improving embedded software development and test, while at the same time, reducing facility acquisition and maintenance costs. VEE technologies and components will be applied to both current and next-generation weapon system software development and test environments. VEE will leverage off commercial hardware and software as well as build upon existing technologies previously developed and demonstrated under the Embedded Computer Resource (ECR) Support Improvement Program (ESIP) and CRSIP.</p> <p>(U) \$870 Continue Weapon System Open Architecture (WSOA). Application of Open System Architecture (OSA) to embedded avionics applications is a key element of AFRL's strategy for future weapon systems development. Previous demonstrations supported by the DoD have shown the application of Ada 95, Object-Oriented methodology, and real-time distributed processing with open systems infrastructure to embedded avionics systems. WSOA represents the next logical extension by providing a bridge between embedded avionics and command and control computer and intelligence (C3I) systems with an open systems 'virtual backplane'.</p> <p>(U) \$2,356 Total</p> <p>(U) <u>B. Budget Activity Justification</u> This program is in Budget Activity 7, Operational System Development, because it provides support to operational systems.</p>		
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BUDGET ACTIVITY				PE NUMBER AND TITLE			PROJECT			
07 - Operational System Development				0708612F Computer Resources Support Improvement Program			674851			
(U) C. Program Change Summary (\$ in Thousands)										
		<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>Total Cost</u>					
(U)	Previous President's Budget (FY 2000 PBR)	0	0	0	TBD					
(U)	Appropriated Value	0	0							
(U)	Adjustments to Appropriated Value									
	a. Congressional/General Reductions									
	b. Small Business Innovative Research									
	c. Omnibus or Other Above Threshold Reprogram									
	d. Below Threshold Reprogram									
	e. Rescissions									
	f. Other									
(U)	Adjustments to Budget Years Since FY 2000 PBR			2,356						
(U)	Current Budget Submit/FY 2001 PBR	0	0	2,356	TBD					
(U)	<u>Significant Program Changes:</u>									
	In FY 2001, funding was moved to this PE from PE 0708611F, Project 673090.									
(U) D. Other Program Funding Summary (\$ in Thousands)										
		<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>Cost to</u>	<u>Total Cost</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	
(U)	AF RDT&E									
(U)	Other APPN									
(U)	PE 0708611F/3080	2,356	2,237							4,593
(U)	PE 0708611F/3400	9,377	19,417							28,794
(U)	PE 0708612F/3080			2,288	2,341	2,394	2,445	2,500	Continuing	Continuing
(U)	PE 0708612F/3400			13,877	14,099	14,386	14,667	14,957	Continuing	Continuing
(U)	<u>E. Acquisition Strategy</u>									
	All major contracts within this Program Element were awarded after full and open competition.									
(U)	<u>F. Schedule Profile</u>									
		<u>FY 1999</u>		<u>FY 2000</u>		<u>FY 2001</u>				
	Project 674851									

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BUDGET ACTIVITY 07 - Operational System Development	PE NUMBER AND TITLE 0708612F Computer Resources Support Improvement Program
PROJECT 674851	

(U) F. Schedule Profile Continued

	<u>FY 1999</u>				<u>FY 2000</u>				<u>FY 2001</u>			
	1	2	3	4	1	2	3	4	1	2	3	4
(U) Start Adaptive Software Flight Demonstration (ASFD)		*										
(U) ASFD Demo					*							
(U) Adaptive Software Technology Demos (ASTD)				*							X	
(U) Automated Operational Flight Program (OFP) Validation Demo		*		*								
(U) Start Embedded Information Systems Re-engineering (EISR)												
(U) EISR Demos				*		X						
(U) Incremental Software Evolution for Real-Time (INSERT) Demos				*			X					
(U) Incremental Upgrade of Legacy Systems (IULS) Tech Demos				*		X		X				X
(U) Reconfigurable Aerospace Computer Emulator (RACE) Demos					*			X				X
(U) Virtual Test Station (VTS) Demo				*		X						
(U) Start Virtual Engineering Environment (VEE)				*								
(U) VEE Demos								X				X
(U) Start Weapon System Open Architecture (WSOA)				*								
(U) WSOA Demo												X
(U) Real-Time DII COE IPT Support			*	*	*	X	X	X	X	X	X	X

DII COE IPT: Defense Information Infrastructure (DII) Common Operating Environment (COE) Integrated Product Team (IPT)

* denotes completed event
X denotes planned event

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)							DATE February 2000			
BUDGET ACTIVITY					PE NUMBER AND TITLE			PROJECT		
07 - Operational System Development					0708612F Computer Resources Support Improvement Program			674851		
(U) A. Project Cost Breakdown (\$ in Thousands)										
					<u>FY 1999</u>			<u>FY 2000</u>		<u>FY 2001</u>
(U)	Adaptive Software Technology Development									350
(U)	Incremental Upgrade of Legacy Systems Tech Demo									125
(U)	Reconfigurable Aerospace Computer Emulator									300
(U)	Real-Time Defense Information Infrastructure Common Operating Environment Integrated Process Team Support									75
(U)	Virtual Engineering Environment									636
(U)	Weapon System Open Architecture									870
(U)	Total									2,356
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)										
(U) Performing Organizations:										
<u>Contractor or Government</u>	<u>Contract Method/Type</u>	<u>Award or Obligation</u>	<u>Performing Activity</u>	<u>Project Office</u>	<u>Total Prior to FY 1999</u>	<u>Budget FY 1999</u>	<u>Budget FY 2000</u>	<u>Budget FY 2001</u>	<u>Budget to Complete</u>	<u>Total Program</u>
	<u>Vehicle</u>	<u>Date</u>	<u>EAC</u>	<u>EAC</u>						
<u>Product Development Organizations</u>										
SAIC	DO	Various	N/A	N/A				436	Continuing	TBD
TRW	DO	Various	N/A	N/A				200	Continuing	TBD
Boeing	DO	Various	N/A	N/A				1,270	Continuing	TBD
Lockheed-Martin	DO	Various	N/A	N/A				375	Continuing	TBD
Other (RT DII COE)			N/A	N/A				75	Continuing	TBD
<u>Support and Management Organizations</u>										
<u>Test and Evaluation Organizations</u>										
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BUDGET ACTIVITY				PE NUMBER AND TITLE			PROJECT		
07 - Operational System Development				0708612F Computer Resources Support Improvement Program			674851		
(U) <u>Government Furnished Property:</u>									
	<u>Contract</u>	<u>Award or</u>							
<u>Item</u>	<u>Method/Type</u>	<u>or Funding</u>	<u>Obligation</u>	<u>Delivery</u>	<u>Total Prior</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget to</u>
<u>Description</u>	<u>Vehicle</u>	<u>Date</u>	<u>Date</u>		<u>to FY 1999</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>Complete</u>
<u>Product Development Property</u>									
<u>Support and Management Property</u>									
<u>Test and Evaluation Property</u>									
					<u>Total Prior</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget to</u>
<u>Subtotals</u>					<u>to FY 1999</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>Complete</u>
Subtotal Product Development								2,356	TBD
Subtotal Support and Management									
Subtotal Test and Evaluation									
Total Project								2,356	TBD