RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE FEBRUARY 2002		
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3							R-1 ITEM NOMENCLATURE Software Engineering Institute **PE 0603781D8Z**		
COST(In Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	21.876	22.983	23.020	23.088	23.831	23.901	Continuing	Continuing
Project 781/SEI	0.000	19.393	20.433	20.435	20.459	21.152	21.174	Continuing	Continuing
Project 782/ Software Intensive Systems	0.000	2.483	2.550	2.585	2.629	2.679	2.727	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) Software is key to meeting DoD's increasing demand for high quality, affordable, and timely national defense systems. There is a critical need to rapidly transition state-of-the-art technology and best practices to improve the acquisition, engineering, fielding, and evolution of software-intensive DoD systems. This project funds the technology transition activities of the Software Engineering Institute (SEI) at Carnegie Mellon University. The SEI is an R&D Laboratory Federally Funded Research and Development Center (FFRDC) sponsored by the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics. It was established in 1984 as an integral part of the DoD's software initiative to identify, evaluate, and transition high leverage software engineering technologies and practices. The SEI fosters disciplined software engineering practices for use by DoD acquisition and life cycle support programs and by the industrial base where the bulk of defense software is produced. The Institute works across government, industry, and academia to: (1) improve current software engineering activities from both management and engineering perspectives; (2) facilitate rapid, value-added transition of software engineering technology into practice; and (3) evaluate and calibrate emerging software engineering technologies to determine their potential for improving the evolution of software-intensive DoD systems.

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(U) The SEI enables the exploitation of emerging software technology by bringing engineering discipline to software acquisition, development, and evolution. The SEI focuses on software technology areas judged to be of the highest payoff in meeting defense needs. FY 2002 focus areas are: Technical Engineering Practices (including Survivable Systems practices, Architecture-centered Software Engineering, and Commercial Off-The-Shelf (COTS)-Based Software Engineering); Enhanced Software Management Capabilities (including personal and team software development processes and Capability Maturity Model Integration (CMMI)); and accelerating Adoption of High Payoff Software Technologies.

(U) This funding line also includes support of the Software Intensive Systems Office (SISO), a DoD office under the Office of the Secretary of Defense (Acquisition, Technology, and Logistics) Acquisition Resource and Analysis. This DoD function is not affiliated with the Software Engineering Institute.

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(U) Project Number and Title: Project 781/SEI

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2002 Plans

(U) Software Engineering Technical Practices. ($ 10.743 million)

- A new survivable routing emergent algorithm is being demonstrated and published.
- Specification methods for survivable systems are being developed, including the definition of a mission lifecycle process for survivable systems.
- The Product Line Technical Probe, a method for evaluating an organization's readiness to develop a software product line, is leading to a product line development effort within at least two organizations, with cost, schedule, and quality improvements typical of those experienced by commercial organizations.
- Software architecture is being documented by at least one DoD organization using SEI-recommended documentation and analysis practices.
- Tutorials on acquisition practices relating to improving the performance of DoD systems are being developed and presented to acquisition organizations, improving their insight into system performance issues.
- Two DoD organizations are routinely using a COTS risk evaluation method as part of their standard program review criteria.

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(U) Software Engineering Management Practices ($ 4.200 million)
- A CMMI lead appraiser program is being established and authorized transition partners are conducting CMMI appraisals.
- Organizations engaged in software process improvement efforts are using the software engineering-oriented version of the CMMI Product Suite.
- The transition of the Team Software Process (TSP) into practice is accelerating, with at least four DoD organizations licensed to coach TSP teams.

(U) Adoption of Software Technologies. ($ 3.700 million)
- Software engineering technology transition planning practices are in use by at least one DoD S&T organization, who is accurately estimating and measuring the speed and cost associated with introducing software engineering innovations.

(U) Acquisition Pilots (SEI). ($ .750 million)
- Provide direct technical support to prove the utility of new and improved software engineering practices and technology in strategically important acquisition programs.
- Document lessons learned from successful acquisition pilots and facilitate their rapid and broad dissemination and use.

(U) OUSD (AT&L) Software Intensive Systems Office (non-SEI). ($2.483 million)
- Support DoD implementation of the recommendations of FY01 Defense Science Board Task Force on Defense Software.
- Conduct Independent Expert Reviews of major software intensive system acquisitions.

(U) FY 2003 Plans:

(U) Software Engineering Technical Practices (SEI). ($ 10.933 million)
- Demonstrate use of emergent algorithms for intrusion-aware software design in a critical infrastructure application.
- Demonstrate architecture-centered engineering design methods for survivability and security analysis of networked systems.

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- Update and pilot use of an engineering framework to guide software reuse across families of similar systems.
- Refine and transition risk management techniques focused on survivability.
- Initiate engineering studies on use of proven survivability methods for mobile code and wireless systems
- Publish lessons learned and guidance documents for the migration and upgrade of legacy software systems.
- Update and demonstrate acquisition guidance for contracting for, documenting, and verifying software architectures.
- Provide tutorials and workshops on software architecture reconstruction, representation, and analysis practices
- Update and transition to DAU courses for executives and program managers on acquisition of COTS-based software systems.
- Develop research-enabled prototype methods to predict and verify system properties from constituent software components.
- Develop and transition acquisition guidelines for evaluating potential software performance problems in systems.

(U) Software Engineering Management Practices (SEI). ($ 3.800 million)
- Update and transition integrated engineering process (e.g., CMM Integration) framework, assessment methods, courses and case studies
- Support the DoD and the DoD industry base migration from the CMM for Software to the CMM Integration Framework.
- Extend proven software development team training methods to provide “mission rehearsal” capability for acquisition teams.
- Continually update the SEI’s on-line best practice repository with data from the DoD and the industry base (DoD and commercial).
- Update and demonstrate software risk management practices based on rapidly evolving technology and lessons learned
- Update and demonstrate measurement guidance to support the application of statistical process control in software organizations. .

(U) Accelerated Adoption of Software Technologies (SEI). ($ 3.500 million)
- Tailor and package proven software engineering technology transition planning practices for use in technology readiness planning by DoD S&T organizations.
- Create and demonstrate knowledge-based methods to accelerate the adoption of evolutionary development and acquisition practices for software intensive systems.

(U) Acquisition Pilots (SEI). ($2.200 million)

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- Provide direct technical support to prove the utility of new and improved software engineering practices and technology in strategically important acquisition programs.
- Document lessons learned from successful acquisition pilots and facilitate their rapid and broad dissemination and use.

(U) OUSD (AT&L) Software Intensive Systems Office (non-SEI). ($2.550 million)
- Support DoD implementation of the recommendations of FY01 Defense Science Board Task Force on Defense Software.
- Conduct Independent Expert Reviews of major software intensive system acquisitions.

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(U) B. Program Change Summary	**FY2001**	**FY2002**	**FY2003**	**Total Cost**
Previous President's Budget Submit	0.000	0.000	18.296	
Delta	0.000	21.091	0.000	
FY 2002 Amended President's Budget Submit	0.000	21.091	18.296	
Appropriated Value	0.000	22.091	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.215	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	0.000	0.000	0.000	
c. Other	0.000	0.000	4.687	
Current President's Budget	0.000	21.876	22.983	Continuing

Change Summary Explanation:

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(U) **Funding**: Beginning in FY 2002, SEI PE 0602301E currently funded in DARPA has been transferred to PE 0603781D8Z to align the funding authority with the management responsibility. FY 2003 increases support the Department's focus on decreasing software defects and increasing the reuse of software. Increases in FY 2003 also reflect the start of a number of additional pilot programs.

(U) **Schedule**:

(U) **Technical**:

(U) **C.** **Other Program Funding Summary Cost**:

(U) **D.** **Acquisition Strategy**:

(U) **E.** **Schedule Profile**: