

# Improving Software-Intensive Systems for Our Warfighters

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**T**wo organizations recognized as leaders in software engineering for DOD have formed a unique association. The U.S. Army Research, Development and Engineering Command's (RDECOM's) Aviation and Missile Research, Development and Engineering Center (AMRDEC) Software Engineering Directorate (SED) and the Software Engineering Institute (SEI), the preeminent software engineering research and development (R&D) technology center, have entered into a strategic partnership that will accelerate SEI technology transition for enhancing weapon systems that support our warfighters.



In 1984, SEI was established as a federally funded R&D center sponsored by DOD. Since that time, SEI has provided the technical leadership for DOD's advancement of software engineering. Likewise, other federal agencies and non-DOD associated companies have benefited from the technologies developed and promulgated by SEI. SEI's practices and technologies — such as Capability Maturity Models — help organizations make measured improvements in their software engineering capabilities.



As an Army Life Cycle Software Engineering Center, SED, located at Redstone Arsenal, AL, supports the acquisition, research, development and sustainment for the Nation's most sophisticated weapon systems. Recognized as an early adopter of SEI's technologies, SED has distinguished itself as one of DOD's high-maturity software organizations.

### Partnering for Greater Impact

The partnership — established in 2002 between SED and SEI — exploits the unique credentials of each organization to accelerate the transition and adoption of software engineering technologies to larger communities. Three specific communities — government organizations, academia and industry — are targeted to benefit from the partnership.

Accordingly, SED's well-established relationship with the Army program executive offices/program management offices (PEOs/PMOs) and federal agencies in the Huntsville, AL, area make the partnership's benefit to those organizations particularly powerful. The partnership provides accessibility to software system

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acquisition expertise as well as best practices in software engineering for these government entities.

The partnership's effort to engage the academic community in advancing the transition of software engineering technology seeks to provide better trained engineers and scientists for the future workforce. SED's relationship with the University of Alabama in Huntsville for training SED's software engineering interns has provided these new government employees with a solid foundation in the engineering principles that have been articulated by the SEI staff throughout the last 20 years.

Lastly, the partnership benefits industry by facilitating the implementation of engineering technologies by a larger portion of the companies. Numerous reports and publications have delineated the return on investment received by organizations and companies who adopt SEI's technologies. The partnership seeks to broaden and expand the base of

organizations and companies who adopt these software engineering and acquisition technologies by:

- Improving engineering practices for the system life cycle.
- Improving engineering practices for the R&D cycle.
- Improving systems acquisition practices for Army PEOs/PMOs.
- Creating a transition bridge between R&D organizations and users.
- Improving success rates for technology insertion in Army programs.
- Creating curricula in academia that support Army engineering needs.
- Strengthening defense contractors' abilities to produce better quality products faster and more economically.

### Experiencing Initial Successes

An early SED-SEI partnership accomplishment was a program designed to identify the technical enablers and barriers to Capability Maturity Model Integration (CMMI) adoption within small companies or organizations. Since small companies or organizations are increasingly involved in the development of significant components for software-intensive systems,



SED has distinguished itself as one of DOD's high-maturity software organizations and prides itself on its abilities to accelerate and transition the adoption of software engineering technologies to other government organizations, academia and industry.

their usage of reliable engineering practices has become increasingly critical.

Conversely, the resource commitment perceived for CMMI adoption provides a major barrier to many small companies. Two small companies from Huntsville participated in the pilot program, which provided noteworthy insight into the feasible approaches and techniques to use in scaling the CMMI for use by small organizations. All industry will benefit from the pilot's work products, tools and studies, which will be released through SEI by the end of 2004.

In an effort to continue its internal process improvements, SED has invested in the training and certification of two staff members in SEI's Personal Software Process/Team Software Process (PSP/TSP). These staff members now serve as the trainers and launch coaches for SED projects to best use the SEI technology that has demonstrated the most significant quality and cost savings for software development. Through the selective adoption of PSP/TSP, SED will complement its organizational process capability with the discipline, skill and performance data that developmental teams need to perform successfully.

The partnership has enabled SED — along with major customer PEO Aviation — to embark on the Army's pilot program for SEI's Integrated Software Acquisition Measurement technology. Through SED's implementation of SEI's Team Software Process technology, the associated PMO can have greater access and insight into the development metrics. This pilot's results have the potential to change the approaches used for larger Army developments and procurements in the future. This coincides clearly with the Army Acquisition Executive's (AAE's) initiative to improve the acquisition of software-intensive systems.

By establishing the SEI Huntsville Field Office, SED can now provide products and services to a greater audience. SEI sponsors and participates in the Southeastern Software Engineering Conference held in Huntsville each spring. SEI training, which typically is only offered in Pittsburgh, PA, or Washington, DC, is now available in the Huntsville area. SEI's software architecture courses — based on its widely acclaimed practitioner books — are being offered at the SED facility through a program sponsored by the AAE.

PEO/PMO employees — including key personnel from Future Combat Systems — have received training on improving their acquisition practices through the SED-SEI partnership. An acquisition process improvement workshop developed specifically for program management office personnel was also offered through the SED-SEI partnership. Likewise, PEOs/PMOs have found SEI's resources and

expertise in acquisition improvement extremely useful in responding to or complying with recent legislation and Army directives. These directives seek to improve the acquisition community's technical and management practices, thus reaping the full rewards of software system developers' maturing capabilities.

## Positioning for the Future

While benefits from the SED-SEI partnership have already been seen, many more opportunities are ahead. The problems and trials of today's Army are much different from those faced only a decade ago. Arguably, most future challenges cannot be foreseen today. The strategic partnership with SEI provides SED with a unique mechanism to quickly adapt to the ever-changing world of software system engineering. As SEI maintains a responsive and progressive approach to providing solutions for future challenges, SED continues to serve as a champion for the practical adoption of capable technologies. Together, these two leaders in software engineering will continue to embark on initiatives that will culminate in improved software-intensive systems for our warfighters.

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