Carnegie Mellon University
Software Engineering Institute

Software Solutions Division

Providing Trusted Solutions for the Nation's Critical Software Engineering Challenges

THE SOFTWARE SOLUTIONS DIVISION (SSD) develops and provides proven solutions and innovations throughout the entire life cycle of software-reliant systems, from acquisition through sustainment, to assure that software functions predictably as intended and that capability is delivered quickly with a minimum of uncertainty and risk. SSD focuses on the most complex of today's systems—business IT, C4ISR, and complex cyber-physical systems such as weapon and control systems—applying a wide range of software analyses and data analytics.

SSD advances software engineering and its practice through research, prototyping, technical solutions, and transition of technology.

Key Capabilities

Strategies for predictable acquisition

Innovative methods for assuring cyber-physical systems such as unmanned vehicles (UAVs)

New techniques for big-data and analytics systems

Novel approaches to cost estimation and project management

Advanced applications for analysis of mobile-computing systems

Get Connected to SSD

SSD works with government, industry, and academia as a trusted, independent third party to conduct research, develop advanced technologies, and provide objective solutions that inform customer decisions and solve both short- and long-term challenges.

Working with SSD

Partner with us in key research areas including empirical analysis of software development practices, assurance of autonomous system behavior, and design and analysis of tactical systems.

Collaborate with us on cutting-edge innovations and prototyping of new techniques, design strategies, and technologies that impact your work.

Let us help you improve acquisition, development, and sustainment through expert analysis and assessment.

Leverage and apply the latest methods, tools, and results by taking a course, attending a symposium, or downloading our reports or open-source tools that can help you achieve the software capabilities you need.

Customer Impact

SEI has been a partner in an important Navy program, DDG-1000, for more than 14 years, beginning with its two predecessor programs, DD(X) and DD-21. SEI independent software analysis identified and helped to resolve significant problems for a critical software subsystem of the DDG-1000 Zumwalt avoiding additional schedule slips and achieving multi-million dollar cost savings.

SEI analyzed repetitively failing satellite software for the Operationally Responsive Space (ORS) Program and identified and corrected satellite software bugs to save the launch window, thereby avoiding a delay of up to two years.

As part of the Tactical Assault Light Operator Suit (TALOS) computing team, the SEI is responsible for the software libraries and computing environment that is used by all developers. TALOS is a prototype for risk reduction under development by the US Special Operations Command (SOCOM).

Through use of the Architecture Analysis and Design Language (AADL) and the SEI Open Source AADL Tool Environment (OSATE), the Army Joint Multi-role Rotorcraft (JMR) is using virtual integration to improve affordability and reduce certification time for the upcoming Future Vertical Lift (FVL) program. The program detected more than 85 potential integration issues early in JMR development that traditional approaches missed.

SEI use of virtual integration for the CH-47F Program Office (Army Aviation and Missile Command) has provided the ability to identify incompatibilities and defects prior to development and integration testing. It revealed defects a year earlier than otherwise possible, allowing time for contractors to remove the defects before coding the software.

The General Accounting Office (GAO) asked the SEI to provide expert review and comment on the software-related information in its Technology Readiness Assessment Guide, currently in a one-year comment period prior to its final release.

Should-cost analysis of the software used in the F-22 Modernization Program achieved a 15% savings ($32M) to a $225M software development contract. A 9% savings was also achieved for the follow-on testing contract.

Risk identification on the AF Space Fence program yielded a watch-list that is currently being used by the program's chief engineer and project team leads.

About the SEI

The Software Engineering Institute is a research and development center that works with defense and government organizations, industry, and academia to advance the state-of-the art in software engineering and cybersecurity to benefit public interest. Part of Carnegie Mellon University, the SEI is a national resource in pioneering emerging technologies, cybersecurity, software acquisition, and software lifecycle assurance.

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