

“With analysis and integration tools, AADL will provide a strong foundation for rapid, predictable, computer-based system design, development, and evolution. It will be used to reduce program risk, rework, and integration costs and add a powerful mechanism for lifecycle system modernization.”

— Bruce Lewis, chairman of the SAE AS-2C AADL Subcommittee, experimental developer, U.S. Army RD&E Command

>> Using AADL to Engineer Reliable Systems

For embedded software systems—such as the ATM on the corner or the guidance system in a fighter plane—reliability, safety, and performance are critical. Yet, software architects have been largely unable to assess early in the design process the impact of decisions about those properties, if at all.

Developed under the auspices of the Society of Automotive Engineers (SAE) and published in November 2004, the Architecture Analysis and Design Language (AADL) standard provides architects with a common language precise enough to specify and analyze embedded real-time systems long before integration time. Peter Feiler, senior member of the technical staff at the SEI, was technical lead, author, and co-editor of the AADL standard.

The AADL standard gives users the ability to model architectures textually and graphically and to exchange models via the industry-standard XML format with other analysis tools. The standard already has widespread application in fields that use real-time engineering practices, including avionics, robotics, and the aerospace and automotive industries. Organizations such as the U.S. Army, Honeywell, Rockwell-Collins, Lockheed Martin, General Dynamics, Airbus, the European Space Agency, Axlog, Dassault, EADS, Ford, and Toyota are voting members of the standard subcommittee and are actively investigating incorporating or extending it.

To encourage its adoption, the AADL standard supports open-source tool development and integration with commercial modeling tools, including UML-based tools through its XML interchange format. The SEI and Airbus have developed open-source tools, and commercial tools are emerging.

The SEI currently is helping organizations understand how to apply the standard in their development processes by holding workshops and developing training materials and a public course, Model-Based Engineering with SAE AADL.

Peter Feiler

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Peter Feiler is the technical lead and author of the SAE AS-2C Architecture Analysis & Design Language (AADL) standard. His research interests include dependable real-time systems, architecture languages for embedded systems, and predictable system analysis and engineering.

