Safety and Mission Critical System Challenge
The traditional development lifecycle using existing methods of system engineering are not working for the latest generation of systems being developed. Requirements and architecture design introduce 70% of system issues, while 80% are discovered post unit test, when they are exponentially more expensive to fix.

Virtual System Integration with SAE AADL
The SAE International AS-5506 Architecture Analysis & Design Language (AADL) standard suite has been developed to address this challenge through virtual system integration and analysis to discover system-level issues earlier in the life cycle.

The Open Source AADL Tool Environment (OSATE)
The Open Source AADL Tool Environment (OSATE) provides a reference implementation of the SAE AADL standard suite notation and a prototyping platform for advancing research in architecture-centric system analysis and verification.

Towards an Architecture-centric Virtual Integration Practice (ACVIP)
A Key Technology in the System Architecture Virtual Integration (SAVI) Initiative by an international Aerospace Industry consortium. Proof of concept demonstrations, return on investment, technology maturation, pilot applications, and process adaptation in a multi-year self-funded effort.

International investment and engagement

Support of SAE ARP4761 System Safety Assessment Practice

Rate Monotonic with Memory Partitioning

DoD Capabilities through Software

Virtual System Integration with SAE AADL

43% of legacy system cost

80% of faults discovered post unit test

9%

10% 80% of faults discovered post unit test

50.5%

4.3%

3.5%

Requirements and System Challenge

DoD Capabilities through Software

2004

2020

International investment and engagement

The Boeing Company

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Research to Operations: Virtual System Integration

Research Review 2016

Much of the growth in total system cost is interaction complexity and mismatched assumptions in embedded software, making systems increasingly unaffordable.

An Analyzable Architecture Modeling Notation. Well-defined timing semantics of a task and communication architecture deployed on distributed platforms, modeling of virtual channels, partitions, operational modes, end-to-end flows, fault behavior, and security characteristics lead to multi-dimensional analysis of virtually integrated systems and discovery of system level issues early in the lifecycle.

Software as % of total system cost

1997: 45% → 2010: 66% → 2024: 88%