



OOSEM v2 Development Objectives and Roadmap

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INCOSE OOSEM WG Goal

Advance the state of the practice of MBSE by accelerating convergence toward best practices, improving MBSE adoption and implementation outcomes, and elevating the discipline of MBSE practitioners

- Accelerate convergence of the community toward a consistent use of SysML v2
 - To improve model interoperability and understanding
- Aid the adoption of MBSE by organizations
 - By establishing a solid foundation of MBSE methods that can be readily tailored
- Improve organizations' ability to quickly extract value from MBSE
- Advance the state of the practice of MBSE
 - By improving modeling discipline both individually and collectively

OOSEM Background

- OOSEM is a top-down, scenario-driven process
 - Uses descriptive models to support analysis, specification, design, and verification of systems
 - Leverages OO concepts and other modeling techniques to improve SE execution
- OOSEM was originally developed in 1998
 - Further evolved in a joint effort between Lockheed Martin Corporation and the Systems and Software Consortium (SSCI), previously known as the Software Productivity Consortium
 - Initial implementation used the newly published Unified Modeling Language (UML)
- OOSEM was further refined by the INCOSE OOSEM WG beginning in 2002
 - Led to the development of the Systems Modeling Language (SysML), which was published in 2007

OOSEM Emerging Context

- Since the original development of OOSEM, several key developments in the state of the art and practice of MBSE have occurred
 - 20+ years of learning with SysML v1
 - Emergence of SysML v2 as a paradigm-shifting successor to SysML v1
 - Recognition of criticality of disciplined MBSE implementation & transition planning
 - To improve the odds of achieving the intended outcomes of adopting MBSE
 - Integration of MBSE within a broader Digital Engineering (DE) paradigm
 - Digitally connects information and work across a wide range of disciplines and organizations
 - INCOSE's 2035 Vision and Future of Systems Engineering initiative
 - Which seek to push the state of the art and practice of SE to the next level
 - The recent explosion of growth of deep learning
 - Game-changing technology that can revolutionize the practice of SE

OOSEM v2 Objectives

- Broad applicability to a wide range of system development use cases
 - Different system scales and domains
 - Different development life cycles, e.g., sequential, incremental, and evolutionary
 - Span range from standalone MBSE to full-spectrum integrated digital engineering
- Harmonize with other INCOSE guidance
 - Collaborate with INCOSE WGs to integrate SE practices
 - Collaborate with OMG SMC to converge on interoperable SysML v2 modeling approaches
 - Ensure compatibility with SysML v2 implementation
 - Provide flexibility to support other modeling notations and tools
- Provide reference methodology documentation
 - Tailorable process model with tailoring guidance
 - Tailored processes and illustrative example models to accelerate adoption

OOSEM v2 Roadmap Lines of Effort

- Task 1: Baseline reference methodology
- Task 2: Tailoring and exploration
- Task 3: Integration with domain practices
- Task 4: Methodology survey
- Task 5: Demonstrate continuous integration

OOSEM v2 Task 1: Baseline reference methodology

Lead: Sandy Friedenthal

- Goal:
 - Develop the baseline OOSEM v2 reference methodology to serve as a starting point for tailoring
- Intended Outcomes:
 - A definitive OOSEM v2 Core Process Model
 - An example SysML v2 model illustrating OOSEM v2 implementation
 - Top-level tailoring guidance for OOSEM v2
 - Continue to evolve core SysML v2 modeling patterns
 - Web-based documentation and tooling extracted from the model to improve accessibility

OOSEM v2 Task 2: Tailoring and exploration

All OOSEM WG members

- Goal:
 - Accelerate adaptation, evolution, and adoption of OOSEM v2

- Intended Outcomes:
 - Discovery and capture of lessons learned from adapting the OOSEM reference methodology
 - Feedback to drive evolution of the OOSEM v2 core process model
 - Updated tailoring guidance for various domains and contexts
 - Tailored OOSEM adaptations to various domains and contexts
 - Example models to illustrate varied application of OOSEM

OOSEM v2 Task 3: Integration with domain practices

Lead: Ryan Noguchi, POCs for each collaboration TBD

- Goal:
 - Harmonize OOSEM with INCOSE SE practices and OMG Systems Modeling Community modeling practices to ensure consistency and alignment
- Intended Outcomes:
 - Alignment with INCOSE Requirements WG on modeling of needs, requirements, etc.
 - Alignment with INCOSE Product Line Engineering WG on modeling of variants and variations, PLE, etc.
 - Alignment with INCOSE Integration, Verification & Validation WG on modeling of requirement verification
 - Alignment with Reliability and Safety domains and OMG RAAML on reliability and safety modeling

OOSEM v2 Task 4: Methodology survey

Lead: TBD

- Goal:
 - Accelerate evolution of MBSE methodologies
- Intended Outcomes:
 - Bidirectional gap analysis between emerging MBSE methodologies
 - Update MBSE Methodology survey paper
 - Engage with other MBSE methodologists to harmonize efforts and advance relevant standards

OOSEM v2 Task 5: Demonstrate continuous system integration

Lead: TBD

- Goal: Demonstrate continuous system integration (CSI)
 - Continuous integration (CI) of the system via CI of the model(s)
- Intended Outcomes:
 - Identify automation support needed in tools to support OOSEM CSI implementation
 - Develop exemplar OOSEM execution workflow for CSI implementation
 - Develop exemplar OOSEM model for use in CSI demonstration
 - Develop exemplar automated tests to populate CSI pipeline
 - Demonstrate end-to-end execution of CSI in one or more suites of tools