

MBSE Working Group Overview

INCOSE San Diego Chapter

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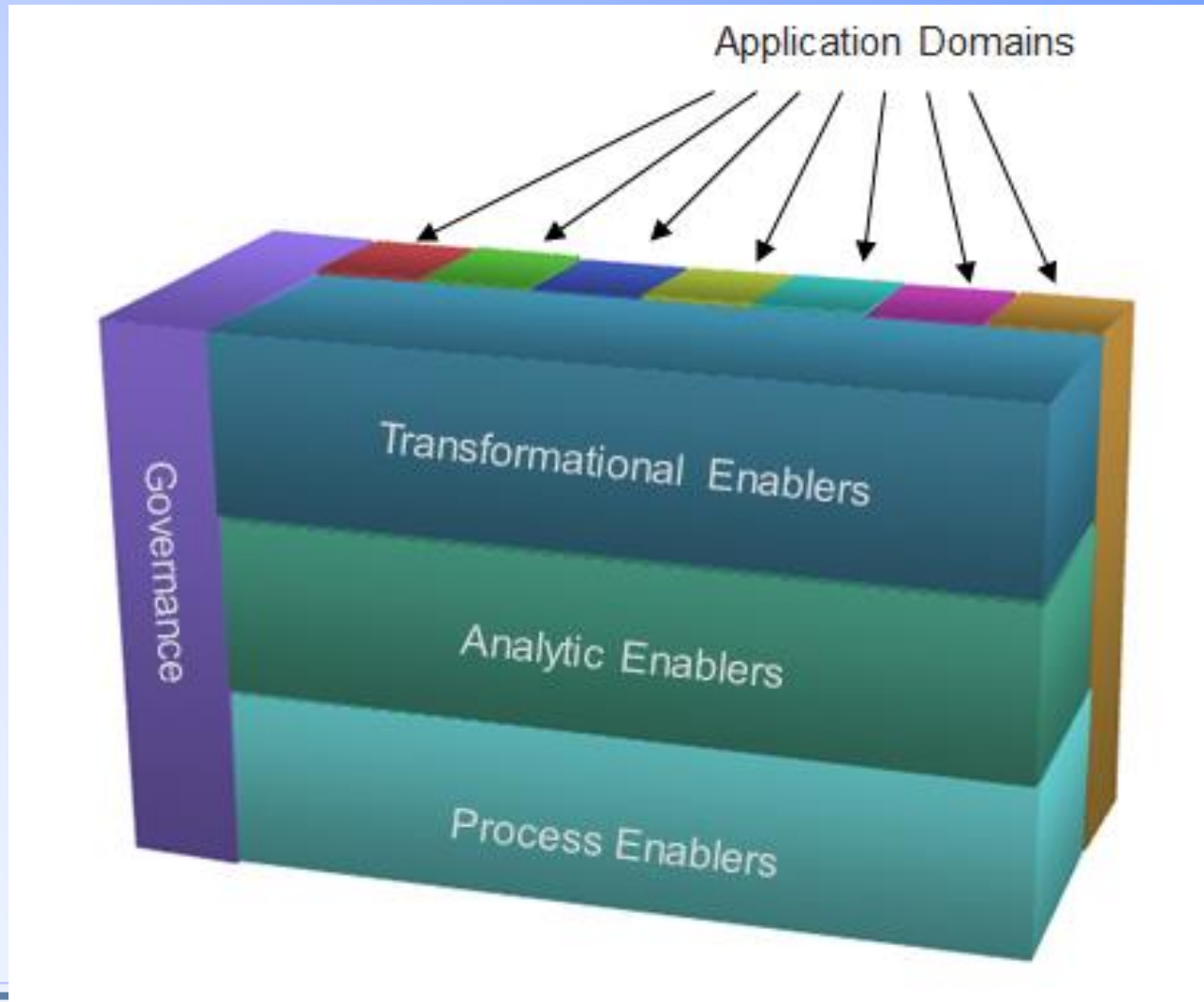
Outline

- **Introduction**
- **INCOSE's Technical Operation - Functional Structure**
- **Model Based Systems Engineering (MBSE) Working Group (WG)**
- **MBSE Leadership**
- **SysML Overview and History**
- **Q/A**

Introduction

- There are more than 45 WGs with a wide diversity of interest.
 - <https://www.incose.org/incose-member-resources/working-groups>
- INCOSE WGs create products, present panels, develop and review standards.
- WGs support INCOSE's objectives, their functions and execution.
- MBSE is a **transformational enabler** working group.

INCOSE's Technical Operations Functional Structure



MBSE Initiative Charter

- Supports MBSE Component of the SE Vision 2020
- Promote, advance, and institutionalize the practice of MBSE through broad industry/academic involvement.
 - Research
 - Standards
 - Processes, Practices, & Methods
 - Tools & Technology
 - Outreach, Training & Education
- MBSE Wiki
 - <http://www.omgwiki.org/MBSE/doku.php>

MBSE WG Leadership

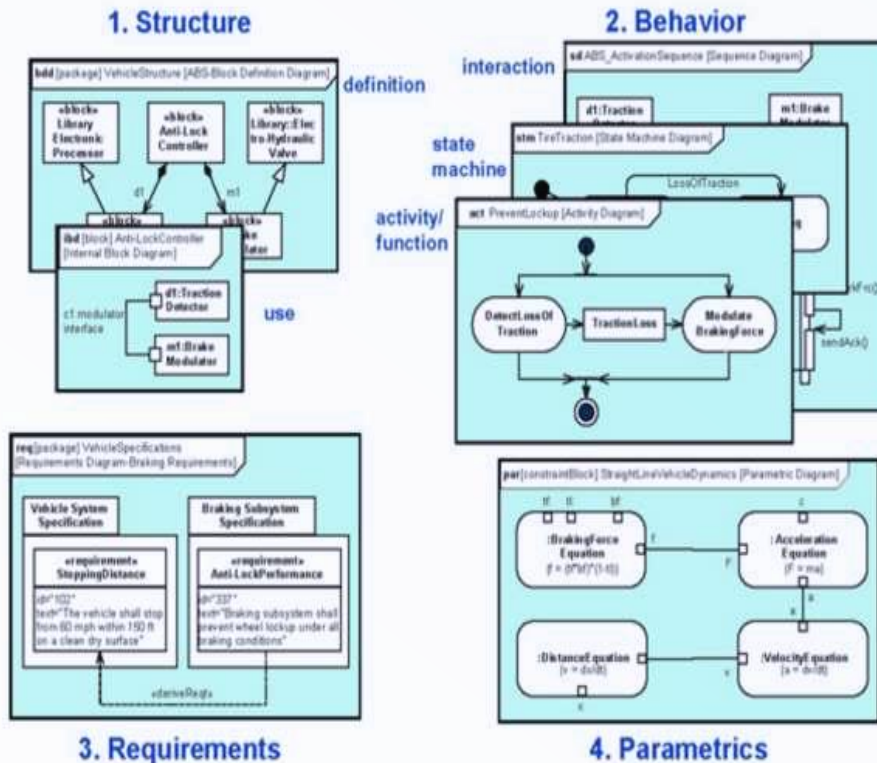
MBSE WG leaders and members meet regularly at the INCOSE workshops, symposiums, and OMG technical meetings few times a year.

Chair	Mark Sampson
Co-Chair	Troy Peterson (previously Sandy Friedenthal)
MBSE Wiki Support	Roger Burkhart

What is SysML

- The OMG Systems Modeling Language (SysML) is a general-purpose graphical modeling language for **specifying, analyzing, designing, and verifying complex systems that may include hardware, software, information, personnel, procedures, and facilities.**

Four Pillars of SysML



Note that the Package and Use Case diagrams are not shown in this example, but are respectively part of the structure and behavior pillars

Figure 3. The Four Pillars of SysML

- **Structure:** Specification of hierarchies, interconnection, model organization
- **Behavior:** Specification of sequences of actions, life cycle of a block, message based behavior
- **Requirements:** Specification of requirements and relationships among model elements
- **Parametrics:** Expresses constraints, enables integration of engineering analysis and design models

SysML Usage and History

- SysML Specification is a product of the Object Management Group (OMG) and **provides graphical representations for modeling a system.**
- SysML has facilitated awareness and adaption of MBSE
- Much has been learned from using SysML for MBSE
- Initial version was developed based on a profile of UML
 - First version (1.0) released September 2007
 - Current Version (1.5) released September 2015
 - Version (2.0) Final release planned for Nov 2020

Key Elements of SysML V 2.0

- New Metamodel that is not constrained by UML including formal semantics
- Robust visualizations based on flexible view & viewpoint specification and execution
- Standardized API to access the model
 - Provides a mechanism for tool interoperability
 - Ample API binding including; JAVA, .NET, REST/HTTP, OSLC, and others

Backup Slides

MBSE Objectives

Accelerate transformation of systems engineering to a model-based discipline:

- Advance and mature the MBSE Practice
- Promote and advance the role of MBSE in global Model Based Engineering (MBE)
- Get authoritative information on MBSE out to practitioners and the broader community
- Infuse MBSE throughout INCOSE products, activities
- Engage stakeholders to assess the **current state** of practice
- Determine **needs and value of model based methods**
- Advance stakeholder community and advance model-based methods

Questions?

