

# Systems Modeling & Simulation WG Standards for Systems Design & Analysis



**2018**  
Annual **INCOSE**  
international workshop  
Jacksonville, FL, USA  
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Don Tolle

Email: [d.tolle@cimdata.com](mailto:d.tolle@cimdata.com)

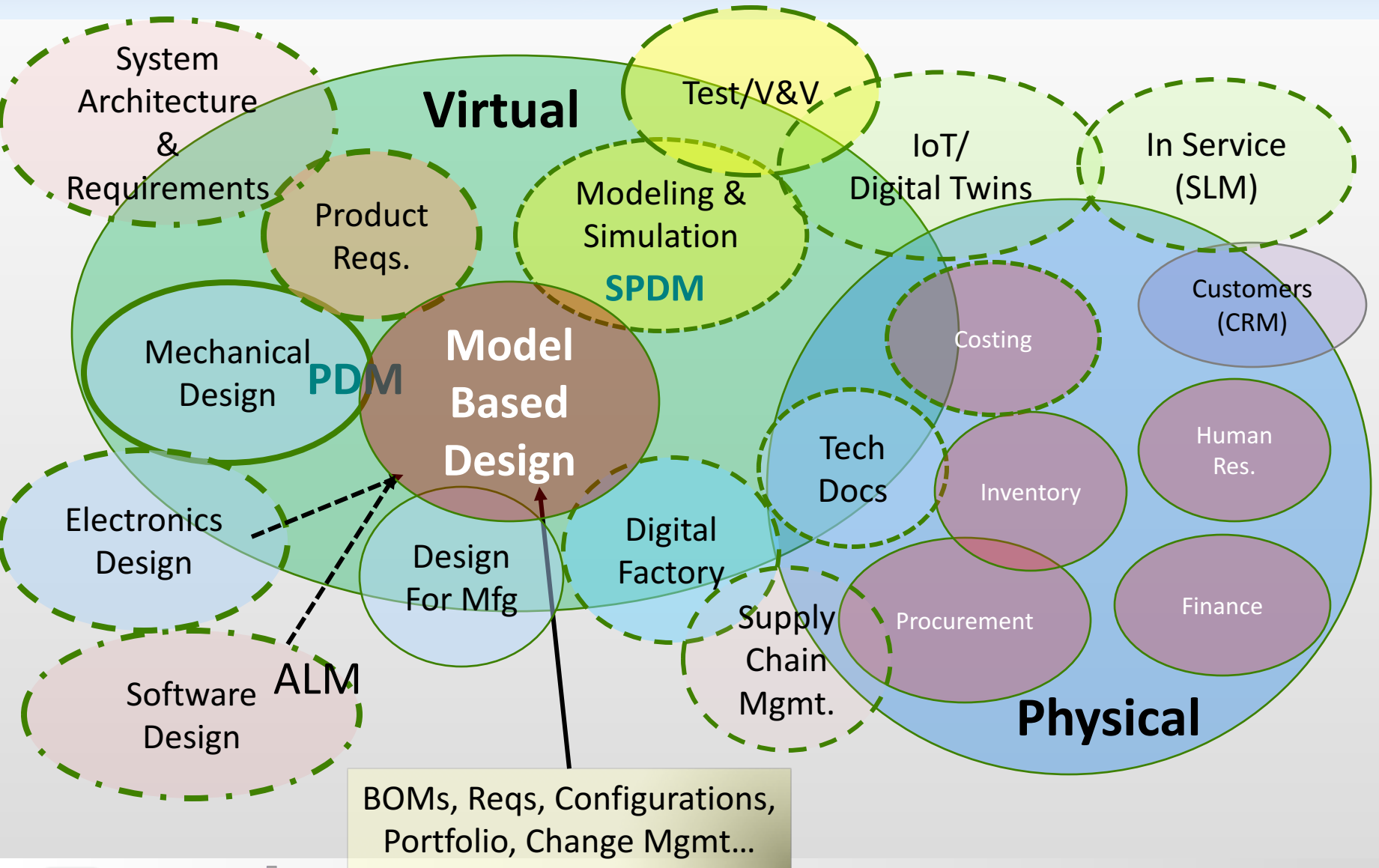
Tel: +1.513.295.3641

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# Status of Digitalization Initiatives (“As Is”)

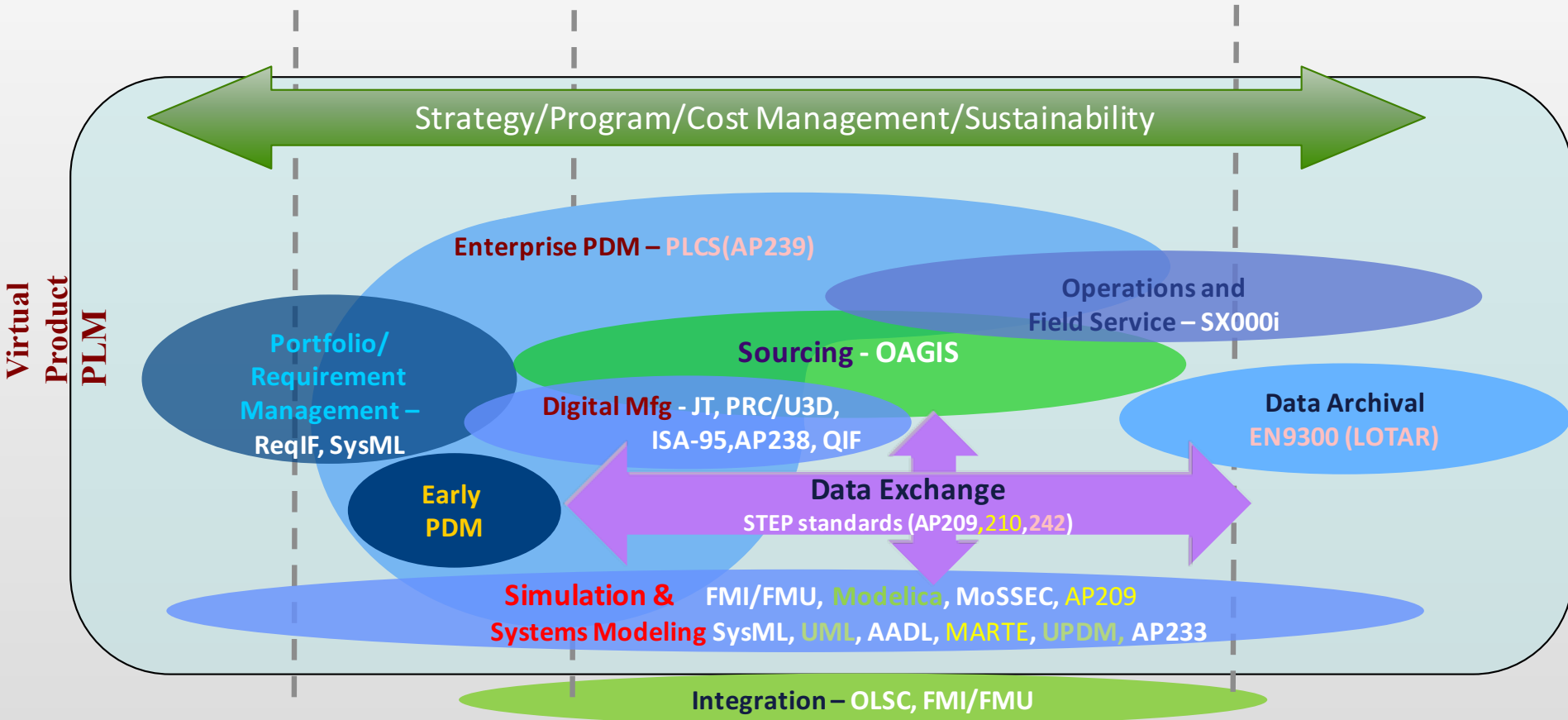
*Key domains in model-based are typically managed partially or totally in silos today*



# High Impact Standards Landscape Analysis

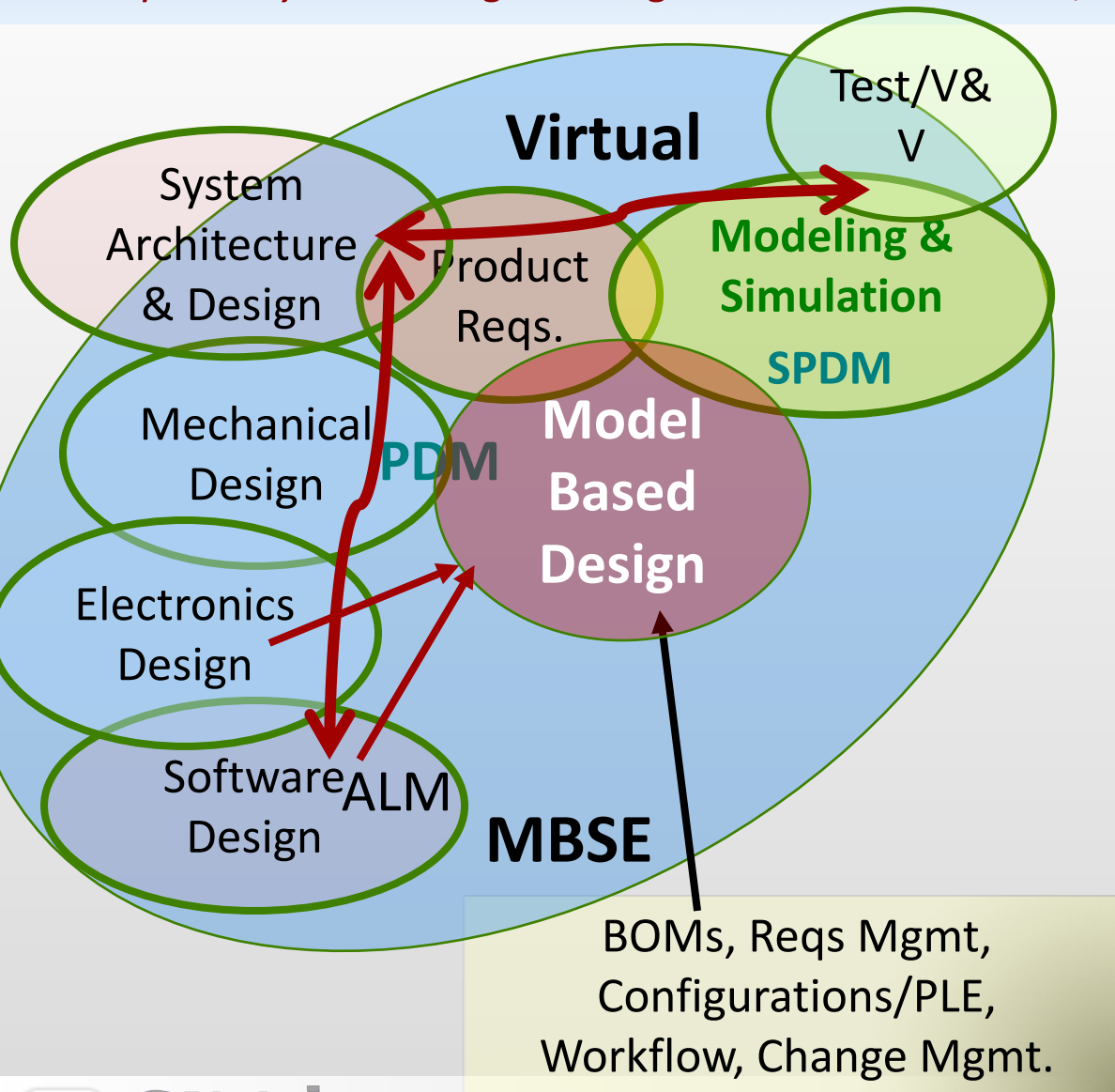
*High impact standards mapped into the product lifecycle*

- Contractually Enforce High Impact Standard**
- Recommended High Impact Standard**
- De-emphasized High Impact Standard**
- Related standard**



# Sewing the MBSE Digital Thread ("To Be")

*Conceptual Systems Engineering across domain silos; Iterative & agile processes*



## MBSE Use Case:

*Conceptual Design,  
Optimization and Validation  
Of Cyber-Physical Systems*

The MBSE thread needs to connect information across:

- \* Systems Architecture & Requirements
- \* Software/ALM
- \* EDA/ECAD/EBOM
- \* MDA/MCAD/PDM
- \* M&S/CAE/SPDM
- \* Test/V&V/TDM

# Enabling the Digital Thread Vision for MBSE

*What is needed to address the industry's business needs?*

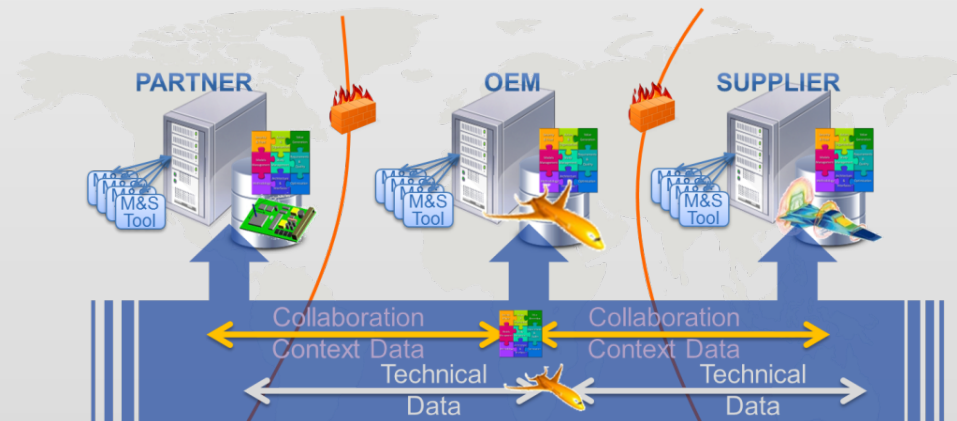
## **MBSE solutions will ultimately require a blend of:**

- 1) *Process change*** leveraging MBSE best practices across industry
- 2) *Common ontology, semantics & language***
- 3) *Innovation platforms & tools*** for PLM/MBSE integration
- 4) *Model management*** across the engineering domain data silos
- 5) *Robust standards*** to enable systems modeling, simulation and PLM/MBSE data interoperability
  - System Architecture- SysML, AADL, others?
  - Data Interoperability- XML/XMI, OSLC(RDF), ReqIF, OWL
  - Behavior Simulation- Modelica, FMI/FMU/SSP, MoSSEC (AP 243\*)

# MoSSEC: A work-in-progress ISO Standard

## PDT Europe 2017

- ISO “Approved new Work Item” - Dec 2016 ([ISO/AWI 22071](#), AP243)
  - Committee Draft planned Q1 2018
- Shares systems engineering context of modelling and simulation data between internal teams/domains and Extended Enterprise
  - Who, What ,Where, When, How, Why
- Supported by industrial partners (e.g. Airbus, Rockwell Collins, Boeing, BAE Systems)
- Supported by vendors (e.g. Eurostep, Dassault Systèmes, MSC Software, Siemens)



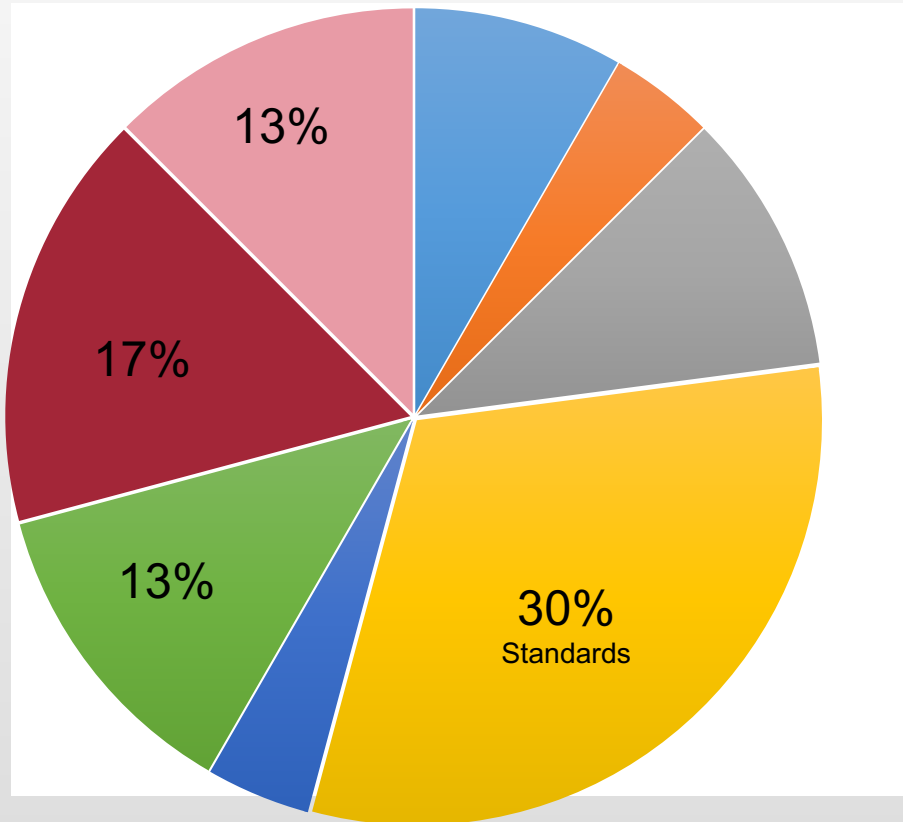
October 19, 2017

# Industry Input- End User Survey

## Data from the 2016 GPDIS Workshop

Global Product Data Interoperability Summit | 2017

### The MBSE GAPS



- Define/Justify MBSE
- Training-Implementation
- Integrate with PLM
- Standards - Interoperability
- Vocabulary
- Tool Integration (Vendors)
- Roadmap
- Modeling

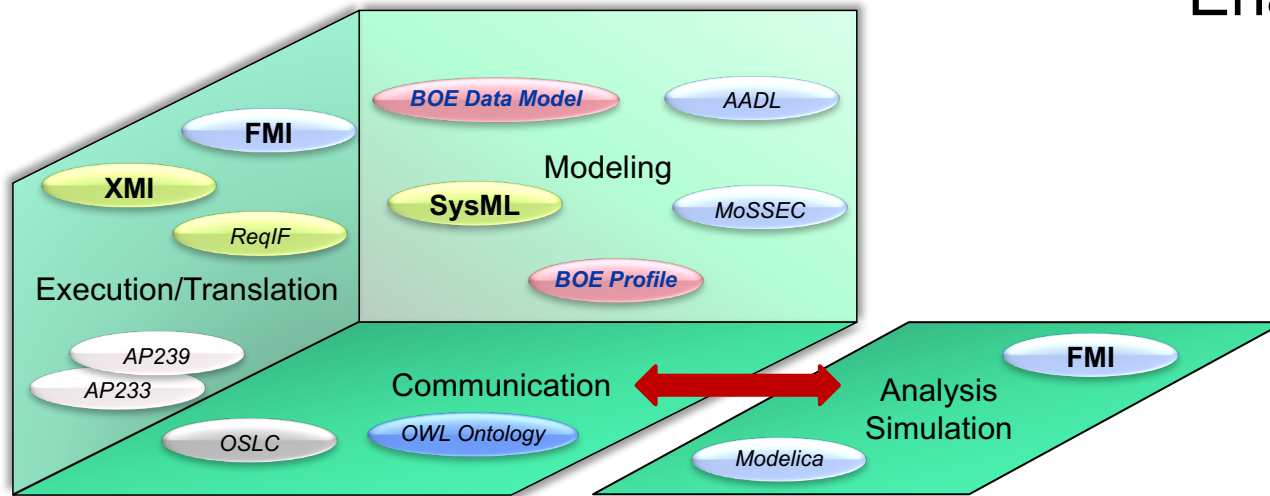
“...just because you have a model doesn't mean you are model based...”

98 participants, 12 teams, 33 written submissions and 104 comments





## MBSE Standards



## Critical Enablers !

Info Data Model

Modeling Architecture

Process

### Standard Body Legend



CREDIT: Bill Chown, Mentor Graphics; MBSE Roundtable, 2015 GPDIS

January 21, 2018

[www.incose.org/IW2018](http://www.incose.org/IW2018)

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# Standards for Systems Design & Analysis

*Open Discussion- What role should the SMS WG provide?*



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## **World Headquarters**

3909 Research Park Drive  
Ann Arbor, MI 48108 USA  
Tel: +1.734.668.9922  
Fax: +1.734.668.1957

## **Main Office - Europe**

Oogststraat 20  
6004 CV Weert, NL  
Tel: +31 (0) 495.533.666

## **Main Office - Asia-Pacific**

Takegahana-Nishimachi 310-31  
Matsudo, Chiba 271-0071 JAPAN  
Tel: +81.47.361.5850  
Fax: +81.47.362.0472

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