2019
Annual INCOSE
international workshop
Torrance, CA, USA
January 26 - 29, 2019

MBSE Collaborations, MB Activities

Model Communities Outreach

www.incose.org/IW2019

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V1.2.1

INCOSE External Model-Based Collaborations

- Concept: INCOSE collaborations with diverse *model-related* communities
- INCOSE has some history of effective collaboration with model-related communities, but . . .
- The number and diversity of these communities is growing rapidly.
- Difficult to be aware of each other and effectively leverage each other's efforts.
- INCOSE's systems engineering focus means it has a special interest in being aware and in touch with these modeling communities.

Formal vs. Informal Start-Up Relationships

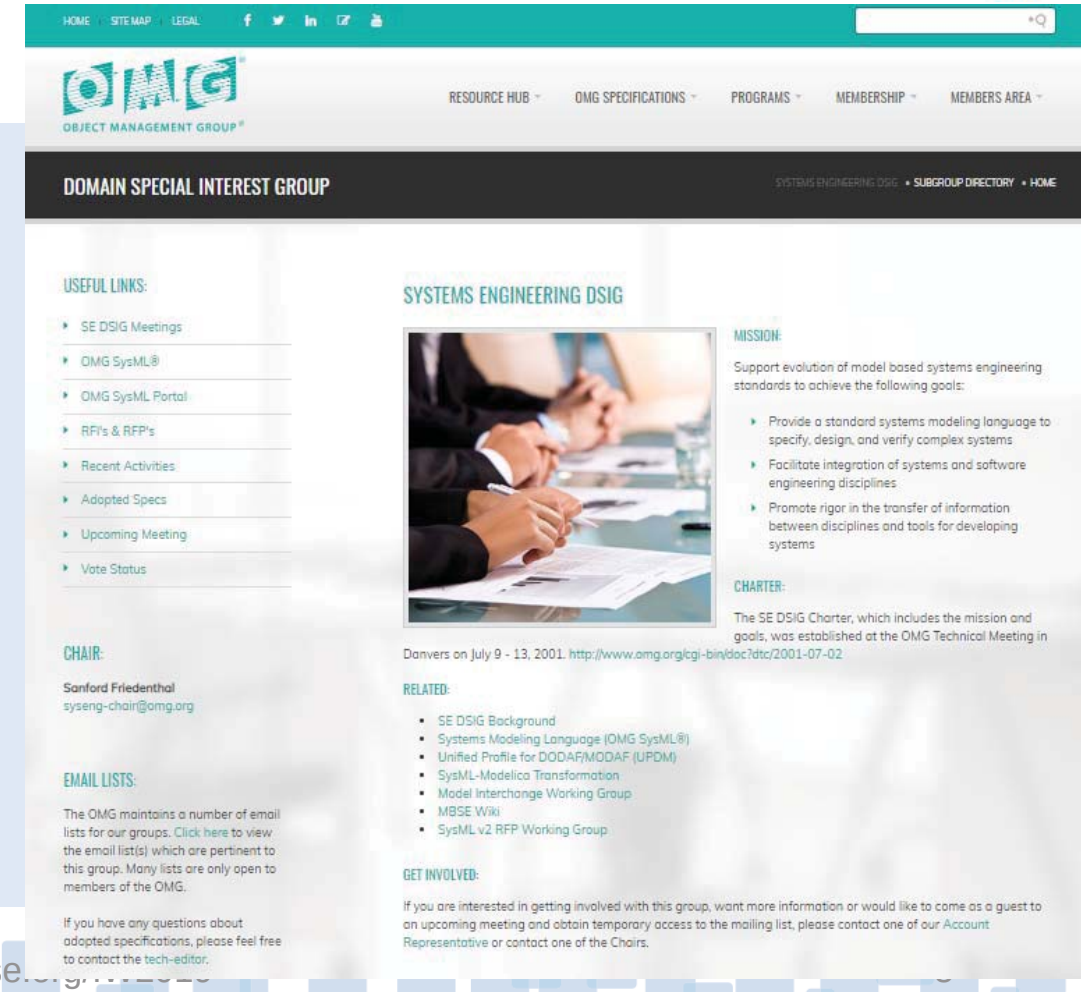
- In some cases there may be formalized INCOSE Memorandum of Understanding (MoU) agreements, but not necessarily so for the most recently started interactions:
  - We like to first reach a point of some identified subject that both parties have begun to demonstrate interest in pursuing together.
  - As we reach out further, at first we are just seeking joint awareness of each other's interests and activities.

Some successful **model-based** INCOSE external collaborations to date

Collaboration	INCOSE POC
OMG-INCOSE	INCOSE MBSE Initiative
NAFEMS-INCOSE	INCOSE MBSE WG
ISSS – INCOSE	INCOSE SSWG, Patterns WG
ASME – INCOSE	INCOSE Patterns WG
V4 Institute – INCOSE	" " "
IFSR – INCOSE	" " "
ST4SE - INCOSE	" " "
ASSESS - INCOSE	INCOSE MBSE Initiative
US DoD – INCOSE Collaboration	INCOSE DEIX WG
Others that you know about?	

OMG – INCOSE Collaboration

- One of INCOSE's earliest model-related collaborations.
- Now operating nearly 20 years—see most recently SysML V2.0.
- Led to definition of OMG SysML® standard modeling language for systems.



NAFEMS-INCOSE Collaboration

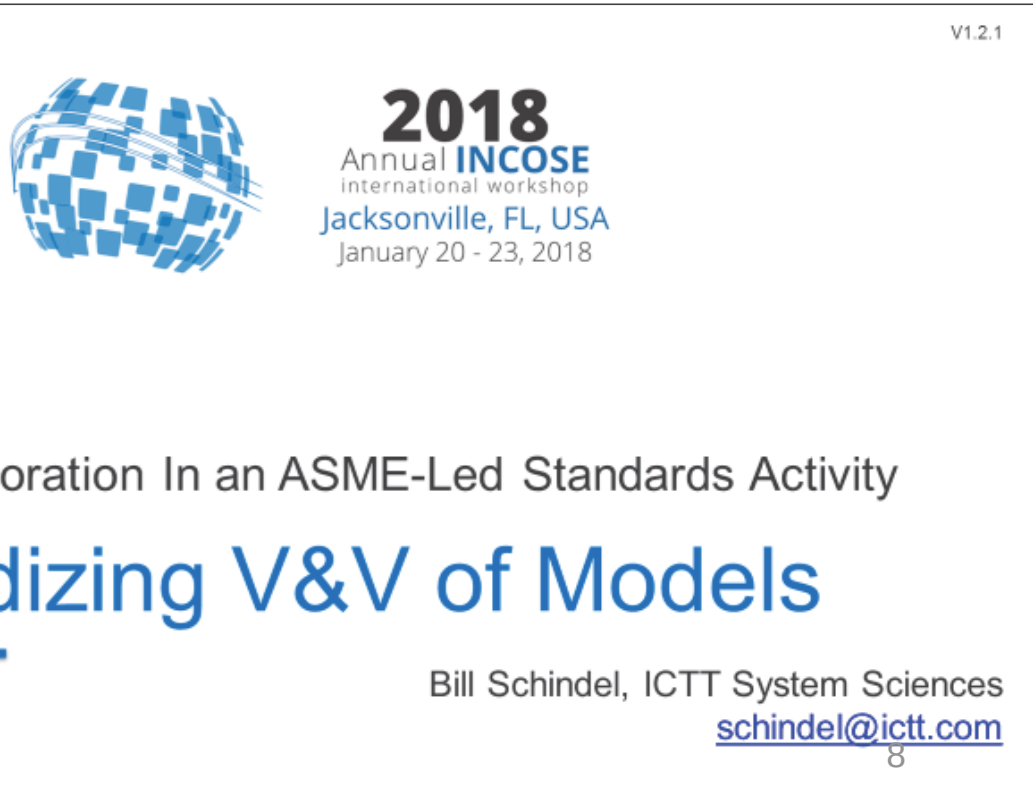
- SMS WG established seven years ago as NAFEMS - INCOSE collaboration.
- Defines best practices and standards for vendors to develop and manufacturers to follow
- Merging of engineering analysis with the overall systems behavior analysis to perform more realistic, accurate, and lifelike experiences.

ISSS – INCOSE Collaboration

- ISSS-INCOSE Collaboration for System Sciences / Systems Engineering, established 2011 by INCOSE SSWG.
- 2013-today: INCOSE MBSE Patterns WG joined collaboration with ISSS on model foundations of systems science.

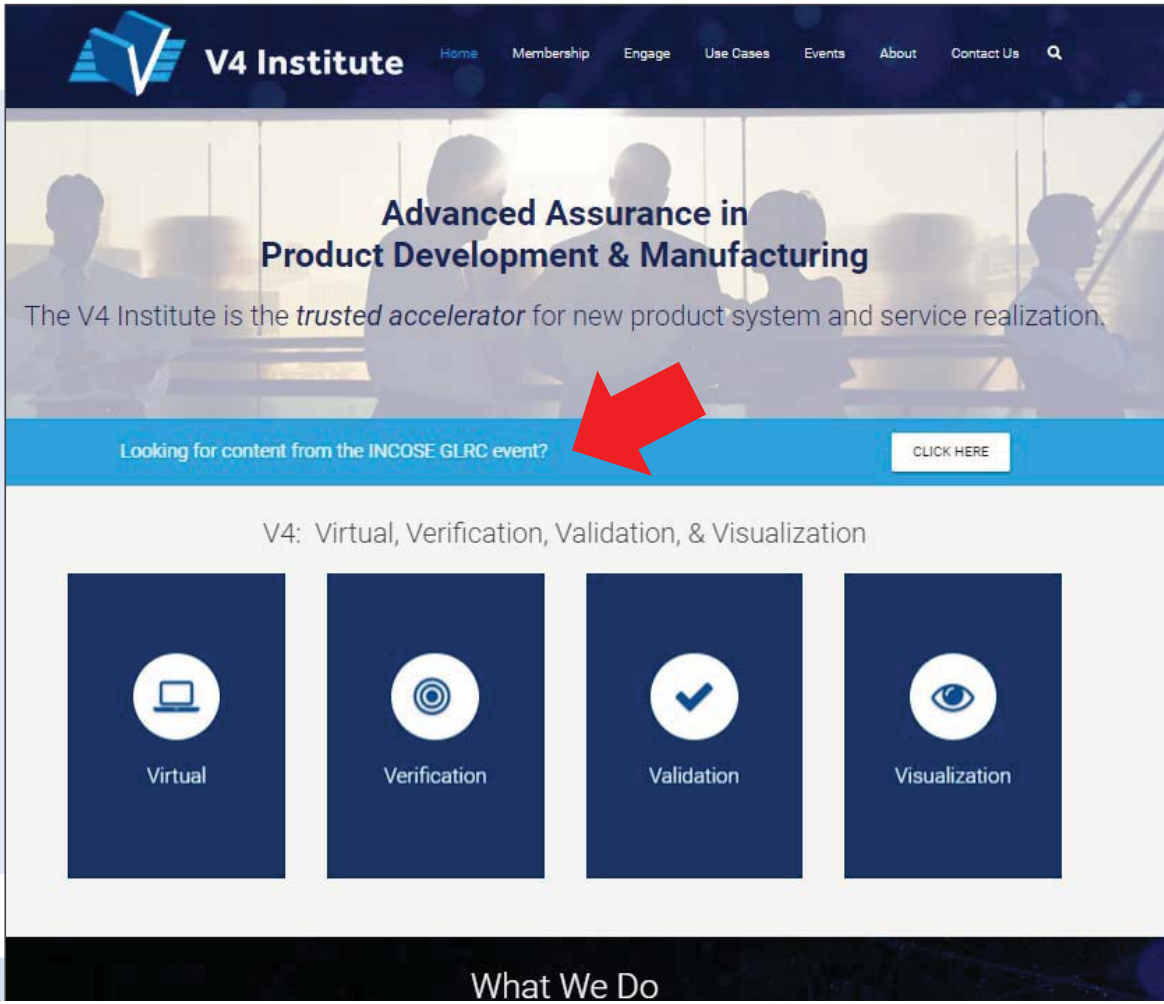
ASME – INCOSE Collaboration

- 2013: INCOSE Patterns WG joined into ASME Model VVUQ Standards Committee
- Authoring guidelines and standards for verification, validation, uncertainty quantification of models themselves (credibility of models).



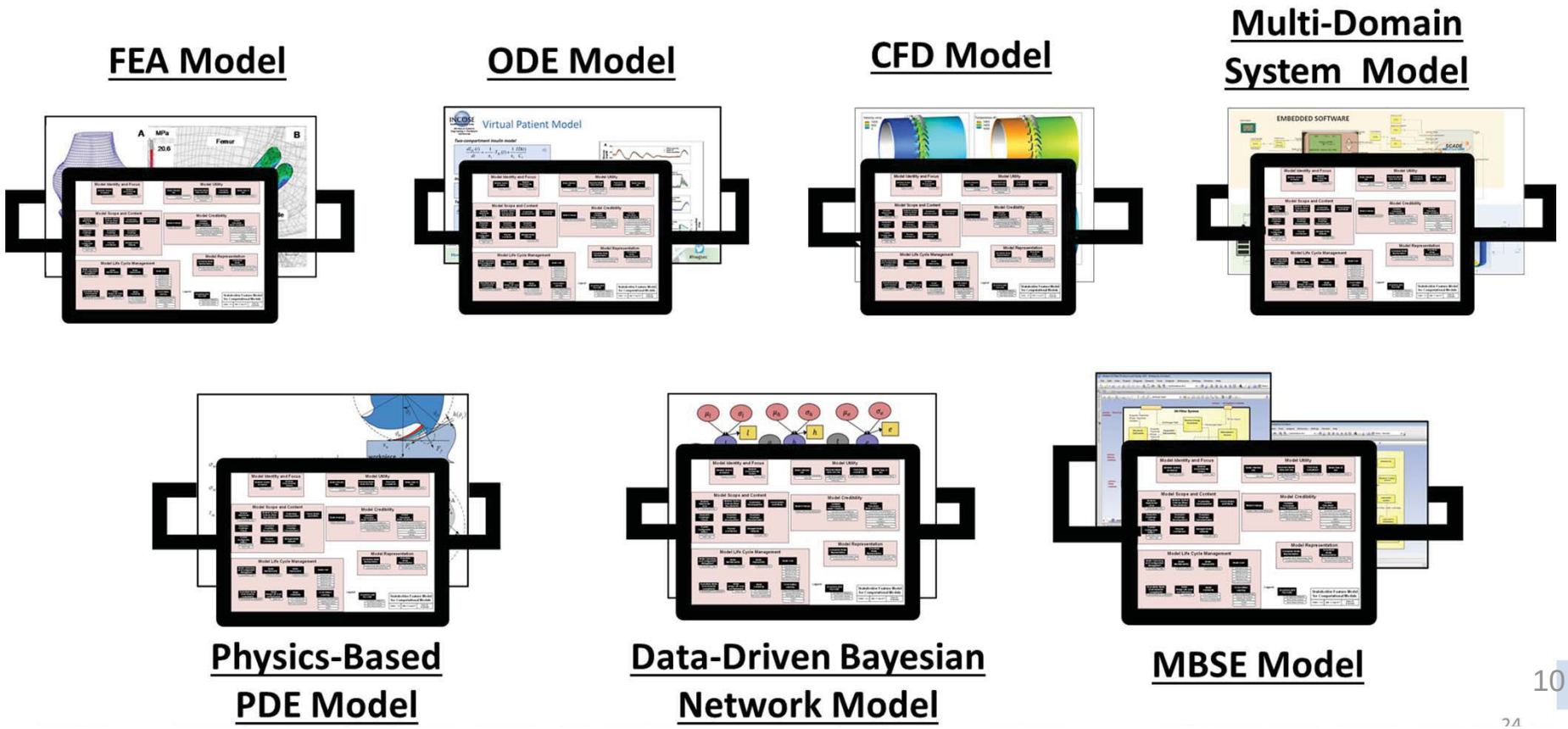
V4 Institute – INCOSE Collaboration

- Collaboration with INCOSE in advancing Virtual (model-based) Verification, Validation, and Visualization.
- V4I formed out of interest by ASME and INCOSE in 2016.



V4I-INCOSE Collab Example: Model VVUQ Pattern

- Uniform model “wrapper” describes all types of computational and representational models.
- Currently being used by INCOSE MBE Transformation to package diverse MBSE models.
- Developed with the INCOSE MBSE Patterns WG.

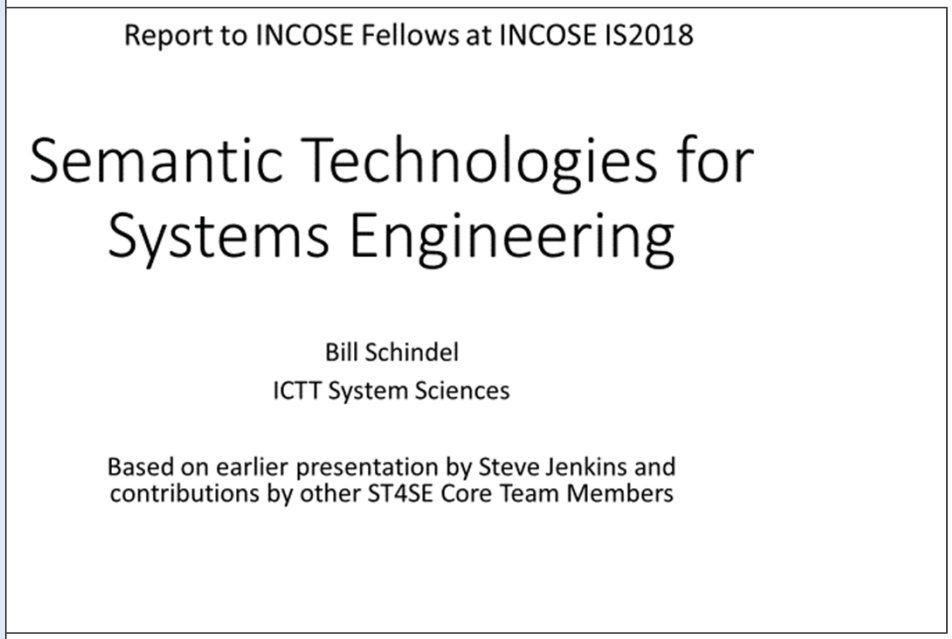


IFSR – INCOSE Collaboration

- INCOSE a member of IFSR since 2011
- Led by SSWG, several INCOSE WGs collaborating.
- At IFSR “Conversation” meeting of 2018-- authored the “MBE Manifesto”

ST4SE – INCOSE Collaboration

- Semantic Technologies for Systems Engineering (ST4SE).
- INCOSE collaborating with members from NASA, CSER, others.
- In support of shared ontology for systems engineering, supported by semantic technologies.



ASSESS – INCOSE Collaboration

- Historical ASSESS focus on simulations—particularly demand versus capabilities.
- Joint participation in both INCOSE IW MBSE Workshops and ASSESS Congresses.

US DoD – INCOSE Collaboration

- INCOSE Digital Engineering Information Exchange (DEIX) WG
- Not limited to defense focus, inviting civil enterprise, common interest.
- But encouraged by DoD to increase mutual leverage in shared Digital Engineering (DE) interests

All good, but barely scratching the surface

- Numerous other model-related communities
- Example: Many simulation societies
- Not just the “model creators” (modelers)—Much larger are the model user populations:
  - e.g., Decision-makers (e.g., management associations)
- Educators (e.g., ASEE)
- Other technical professional societies
- Simulation societies
- Model-oriented tooling suppliers
- Application domains (chemistry, construction, etc.)

Stakeholders in A Successful MBE Transformation (showing their related roles and parent organizations)

Population <-- Size (Log)		Industry & Gvmt. Initiatives	Orgs. Internalizing MBSE, Including Gvmt Contractors & Commercial Vendors of MBSE Tooling and Services		Academia and Researchers	Technical Societies, Other Non-Technical Organizations	
Model Consumers (Model Users):							
****	Non-technical stakeholders in various Systems of Interest, who acquire / make decisions about / make use of those systems, and are informed by models of them. This includes mass market consumers, policy makers, business and other leaders, investors, product users, voters in public or private elections or selection decisions, etc.	X	X			X	
**	Technical model users, including designers, project leads, production engineers, system installers, maintainers, and users/operators.	X	X			X	
*	Leaders responsible to building their organization's MBSE capabilities and enabling MBSE on their projects	X	X			X	
Model Creators (including Model Improvers):							
*	Product visionaries, marketers, and other non-technical leaders of thought and organizations	X	X		X	X	
*	System technical specifiers, designers, testers, theoreticians, analysts, scientists	X	X		X	X	
*	Students (in school and otherwise) learning to describe and understand systems				X	X	
*	Educators, teaching the next generation how to create with models	X	X		X		
*	Researchers who advance the practice		X	X	X		
*	Those who translate information originated by others into models	X	X		X	X	
*	Those who manage the life cycle of models	X	X		X	X	
Complex Idea Communicators (Model "Distributors"):							
**	Marketing professionals	X	X	X		X	
**	Educators, especially in complex systems areas of engineering and science, public policy, other domains, and including curriculum developers as well as teachers	X	X	X	X		
**	Leaders of all kinds	X	X	X	X	X	
Model Infrastructure Providers, Including Tooling, Language and Other Standards, Methods:							
*	Suppliers of modeling tools and other information systems and technologies that house or make use of model-based information			X			
*	Methodologists, consultants, others who assist individuals and organizations in being more successful through model-based methods	X	X	X	X		
*	Standards bodies (including those who establish modeling standards as well as others who apply them within other standards)	X				X	
INCOSE and other Engineering Professional Societies							
*	As a deliverer of value to its membership					X	
*	As seen by other technical societies and by potential members					X	
*	As a great organization to be a part of					X	
*	As promoter of advance and practice of systems engineering and MBSE					X	

INCOSE Outreach Planning & Work Session

- At INCOSE IW2019: Tuesday, January 29
- Available 8:30 – 11:30 AM PT (come & go)
- Salon H -- or dial-in
- Purpose: Start improving our collective understanding of the different model-based community segments, relationships, how we gain by improving awareness and interaction:
  - Including awareness & support for current outreach efforts by others.
- Along with ideas on additional actions that INCOSE and others can take to improve our effectiveness as a connected community advancing the practice of model-based approaches.

Remote participation in this meeting

PARTICIPANT GlobalMeet Join Details - Join as GUEST

Meeting Details Web Address:
https://incose.pgimeet.com/GlobalmeetFourteen

Dial In Numbers:

USA /Canada (toll free): 1-877-860-3058
USA/Canada: 1-719-867-1571

Guest Passcode: 288 747 4803

Or attend on site:
Salon H at IW2019

Meeting/Work Session Agenda

- Objectives
- Introductions
- Some existing INCOSE examples
- Model community segments
- Identification of organizations, interests
- Contact tree: contributions and follow ups
- Generation of initial directory
- Other next steps

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