



2021
Annual **INCOSE**
international workshop
Virtual Event
January 29 - 31, 2021



Systems Modeling & Simulation WG – Standards Ecosystem Focus Team

Standards Overview

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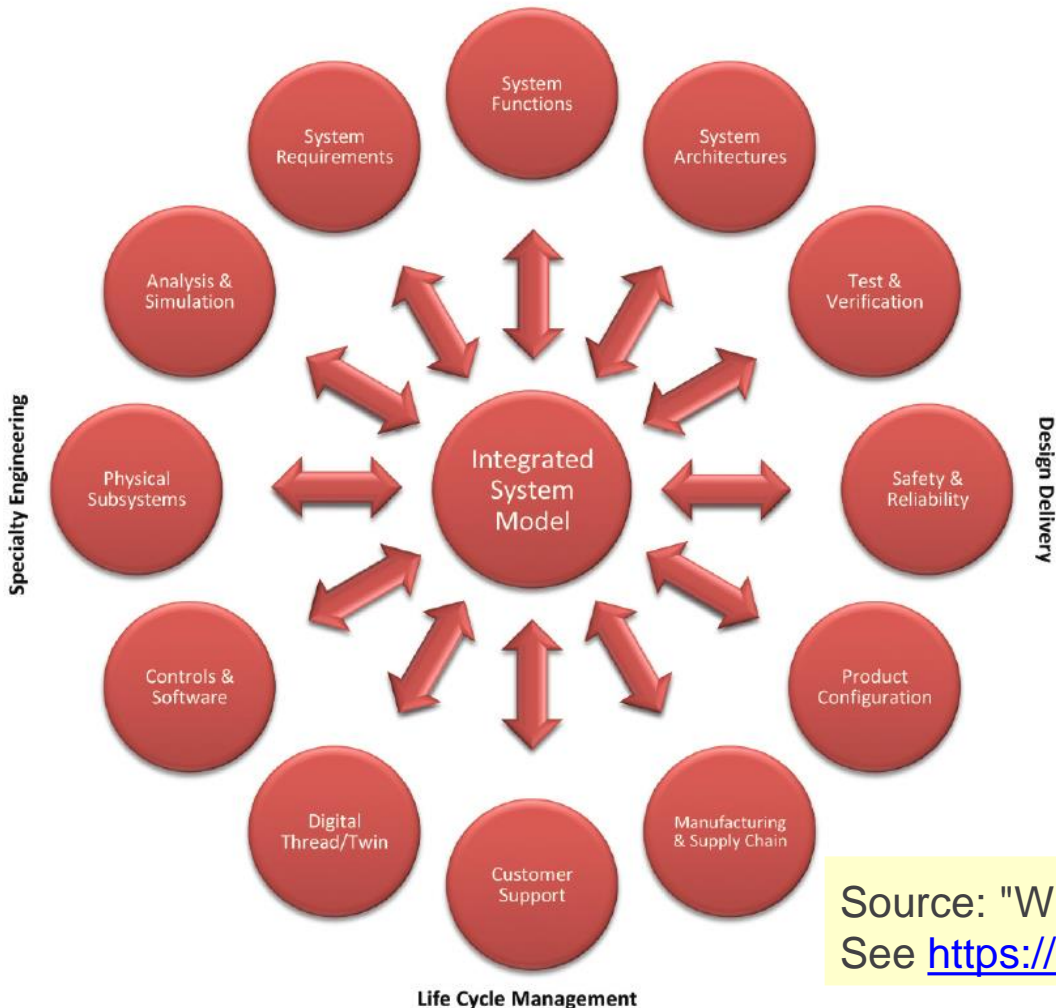
Why Open Standards?

- Collaboration is essential
 - for successful engineering of complex systems
 - across disciplines, organizations, life cycle stages, ...
 - Standardization on single set of tools?
 - Hardly ever possible, because ...
 - No single integrated set covers all needs
 - Training, licenses, customizations, different customers, ...
 - IT / tool landscape changes faster than projects
 - Point-to-point tool converters?
 - Can be temporary solution for a few tools, but an N^2 problem
 - Difficult and costly to maintain (version changes, test suites, interface control)
- ⇒ Stable open standards needed for sharing digital models

Multi-disciplinary Modeling & Simulation (1)



Cross – Disciplinary Systems Engineering

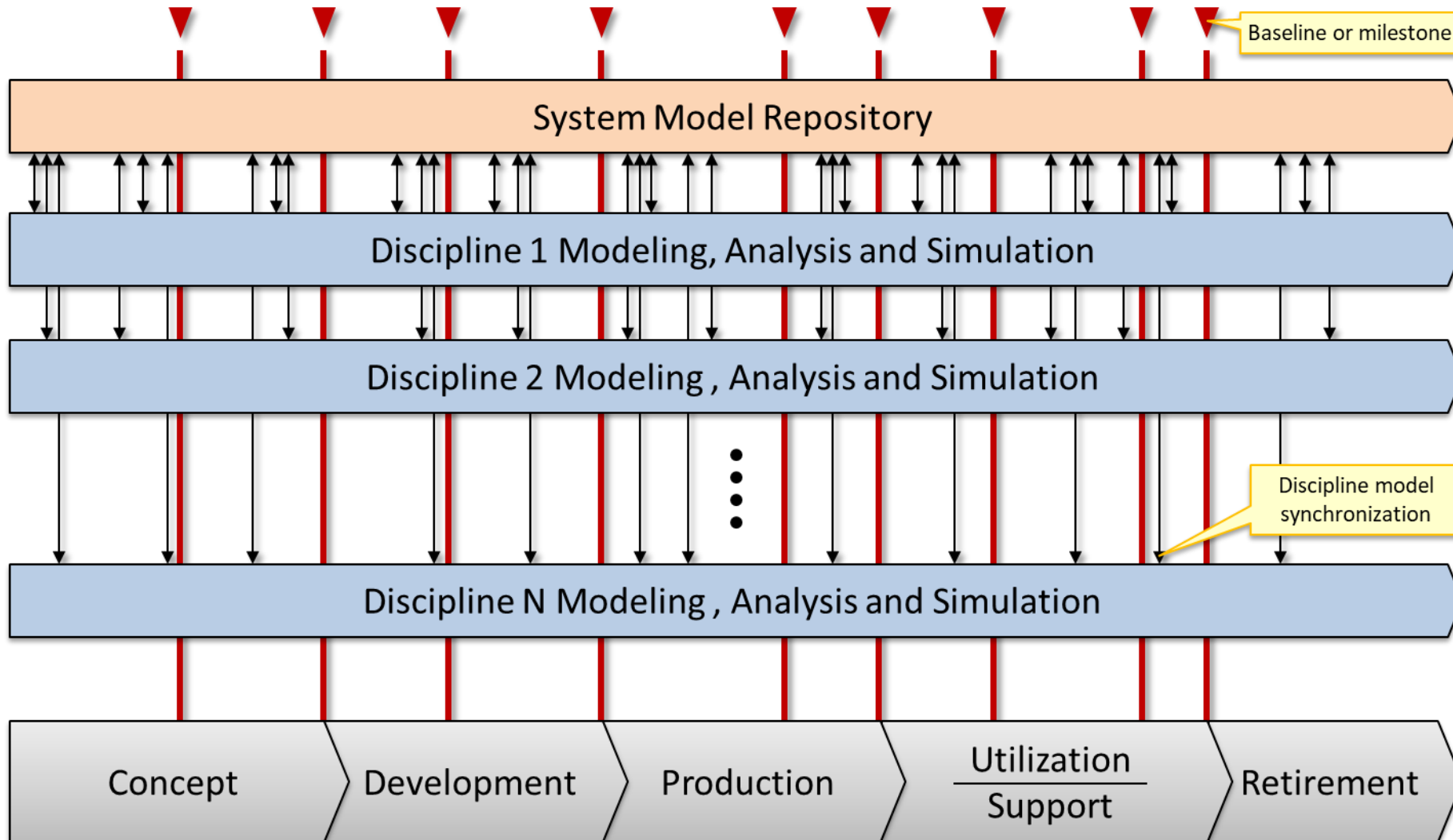


- Integration across all disciplines
 - Hub: Integrated System Model as "Authoritative source of truth" for essential system info
 - Spokes: synchronization with discipline models
- Responsibility of SE discipline: coordinate and ensure overall consistency

Source: "What is Systems Modeling and Simulation?" flyer by SMSWG
See https://www.nafems.org/publications/resource_center/wt10/



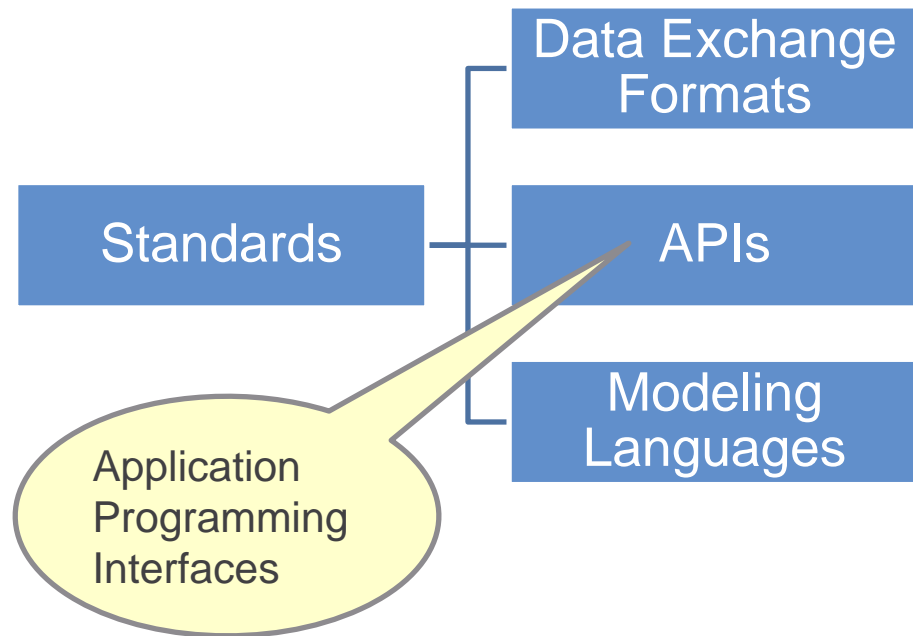
Multi-disciplinary Modeling & Simulation (2)



"Getting the right version of the right information to the right team member at the right time!"



Different Kinds of Standards



... satisfying different scopes and needs:

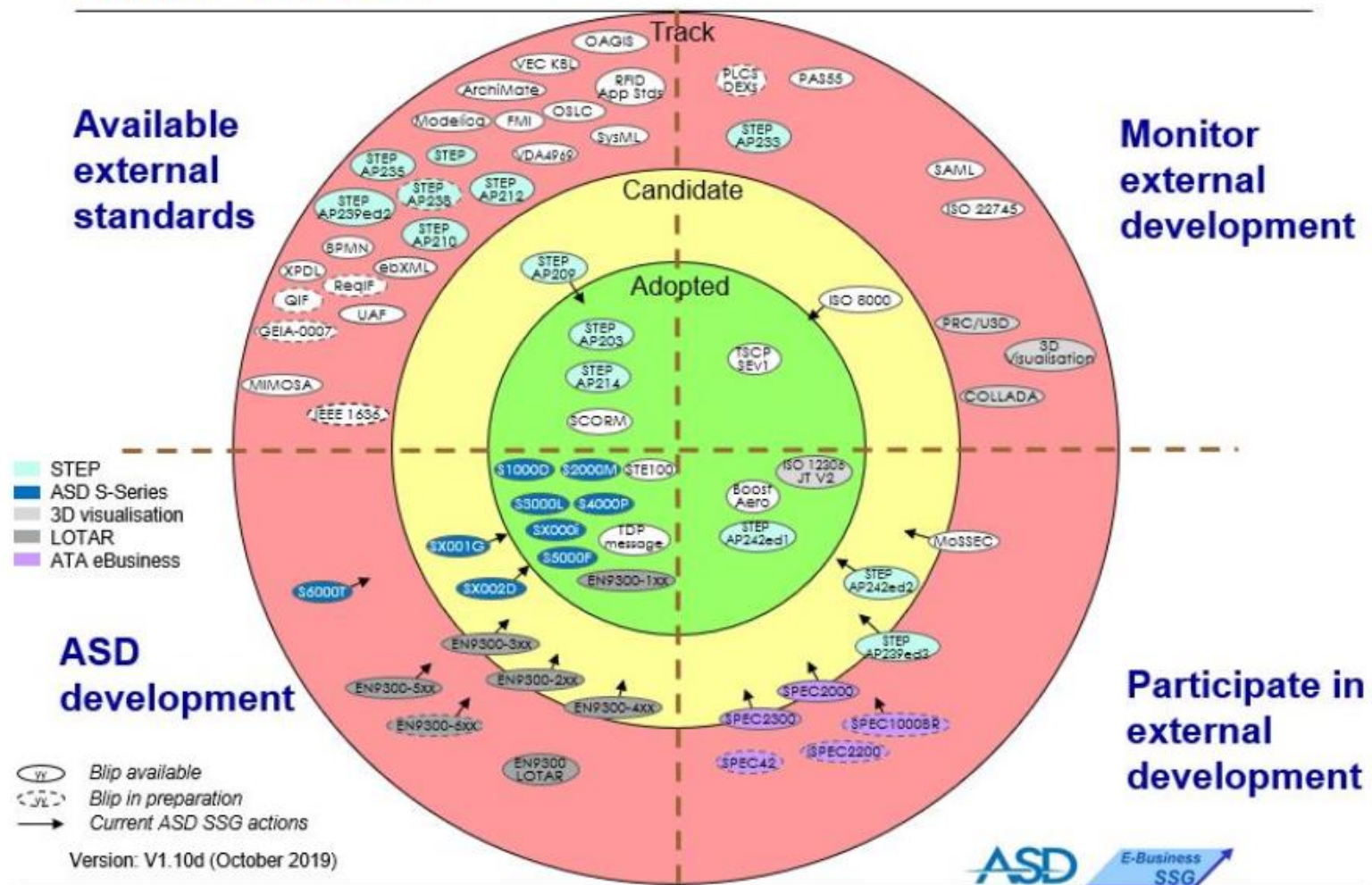
- Models / Experiments / Results
- Libraries / Catalogues / Extensions
- Support for Methodologies / Best Practices
- IPR protection: black box / white box
- Integration with PLM / CM
- Version control / branching / merging
- Interactivity / synchronization frequency
- Granularity / fidelity / data volume
- Long term archiving
- Software development / IT concerns



Overviews of relevant standards

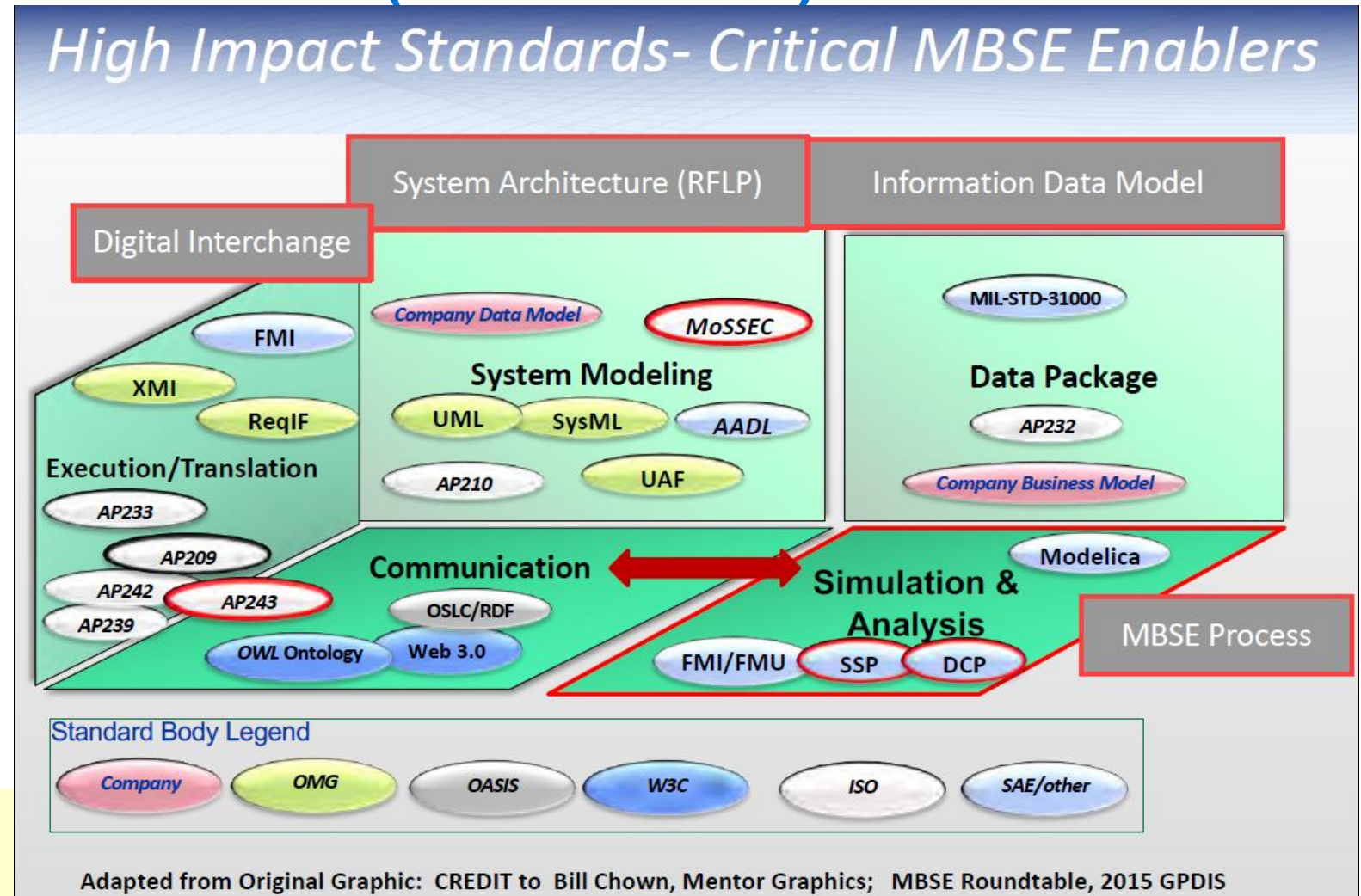
- Comprehensive overview by ASD – with compact descriptions in "Blips"
<http://www.asd-ssg.org/radar-chart>
- The NAFEMS Standards Initiative
<https://www.nafems.org/publications/standards/>
- SE Body of Knowledge
https://sebokwiki.org/wiki/Modeling_Standards
- INCOSE Tool Integration and Model Lifecycle Management Working Group, now SE Tools Database (SETDB)
<https://www.systemsengineeringtools.com/>
- MBSE Wiki
http://www.omgwiki.org/MBSE/doku.php?id=mbse:standards#modeling_standards (out of date)

Radar screen





Overview by Don Tolle (CIMdata)



Source: Don Tolle, NAFEMS Webinar on Emerging Standards for MBSE (2019-02-21)
<http://www.omgwiki.org/MBSE/doku.php?id=mbse:smswg:2019-02-21>



Ideas for Topics in 2021

- Update standards ecosystem resources at NAFEMS and INCOSE
- Presentations on progress with
 - Modelica / FMI related
 - MoSSEC / STEP AP242
 - SysML v2 (in particular on multi-disciplinary topics)
 - Model Characterization / MIC
 - ...
- How to improve standardization processes?
 - Lessons learned?
 - Trend towards APIs rather than data exchange files?
 - Model-based standards development?
 - Presentation Dov Dori (Technion, Israel) at IW21 (2021-01-30) on "ISO TC184/SC5/SG5: Model-Based Standards Authoring" (http://www.omgwiki.org/MBSE/doku.php?id=mbse:incose_mbse_iw_2021)
 - Standards as a Database Taskforce – Ongoing work at ESA / ECSS (<https://ecss.nl/>)
- Session on standards at NAFEMS WC 2021?