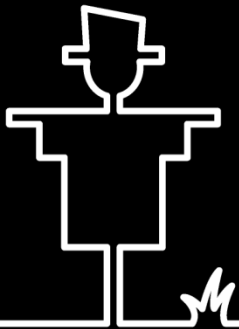


WELCOME

SCARECROW
CONSULTANTS



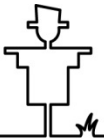
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Hot Topics In MBSE

INCOSE UK AWG & MBSE WG Joint Workstream

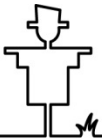
J Towers

5th November 2019



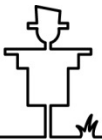
Hot Topics

- SysML 2
- Automatic Verification
- Dynamic Visualisation
- Integrated Validation
- Integrated RAMS analysis
- Model Based Variant Management
- Others?



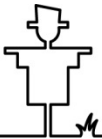
SysML 2

- Current Timetable:
 - SysML v2 RFP issued December, 2017
 - Initial Submission: November, 2019 -> June 2020
 - Revised (Final) Submission: November, 2020 -> June 2021 ?
 - SysML v2 API & Services RFP issued June, 2018
 - Initial Submission: February, 2020
 - Revised (Final) Submission: February, 2021

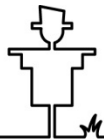
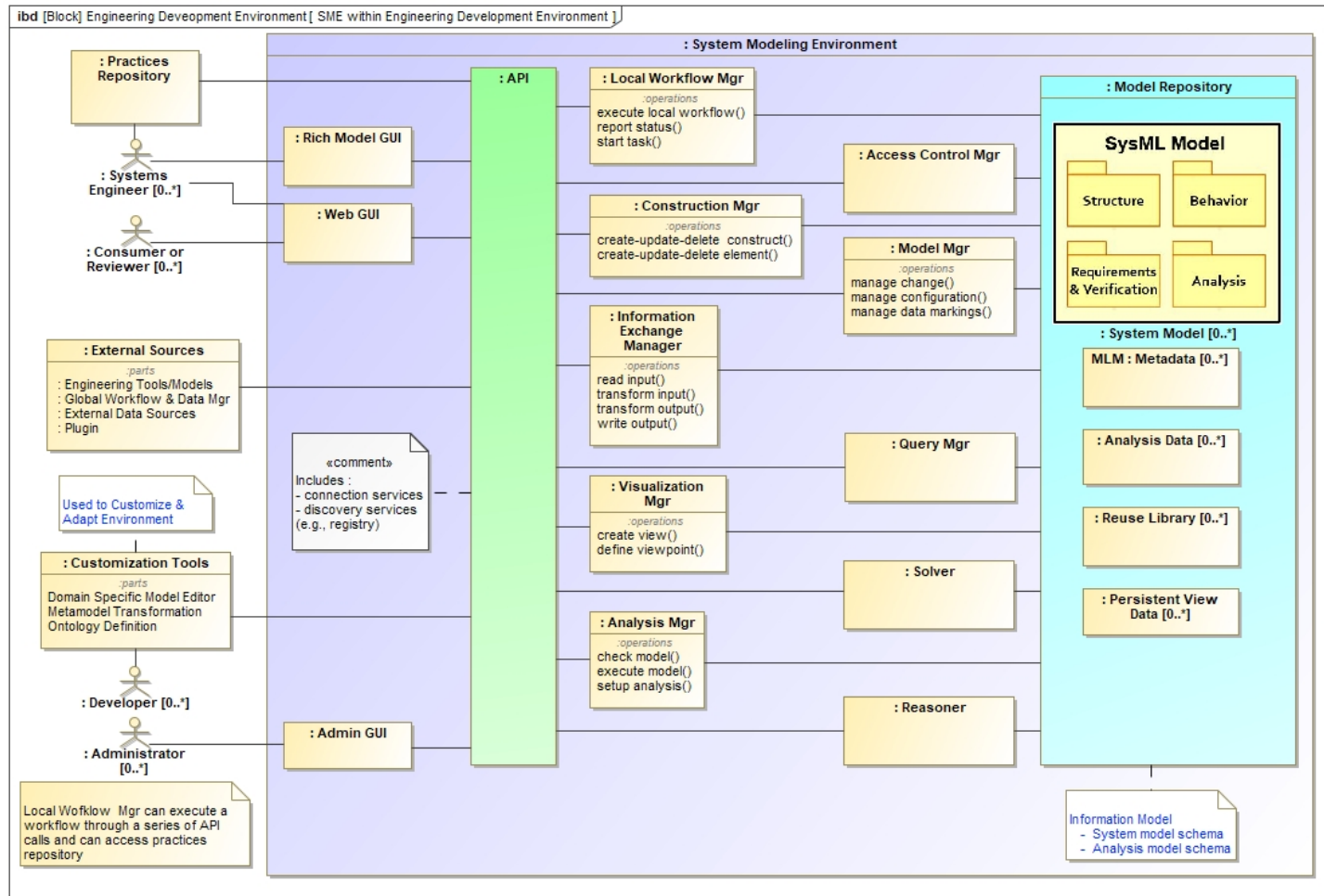


SysML 2 Content

- New metamodel not constrained by UML
 - Grounded in formal semantics
 - 4D concepts
 - Backward Compatibility via UML Profile
- Robust visualizations based on flexible view & viewpoint specification and execution
 - Graphical, Tabular, Textual
- Standardized API to access the model
- Textual Language Representation

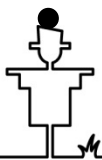


SysML 2 Logical Architecture



Automatic Verification

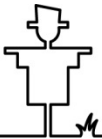
- Parsing of textual requirements into formal constraints
 - Or alternatively use of formal RQ languages
- Increased use of Simulation and Parametric Solving
- Better integrated engineering analysis
 - Trade Studies
 - Monte Carlo Analysis



Automated Testing (Regression)

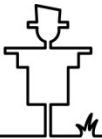
Dynamic Visualisation

- Improved and tailored views
 - Other notations other than SysML (Graphical or Text)
 - Tailored to audience and generated as required
 - Animations
- SysML 2 APIs should open this up to 3rd parties (not underlying tool) vendors
- Graphical Diff



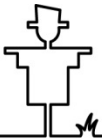
Integrated Validation

- Capability to publish views of the model for review
 - Manage Workflow
 - Collate Comments (Text and Graphical)
 - Track Status
 - Automatically create all required traceability
- Again it's hoped the SysML 2 API approach will expediate this



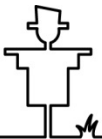
Integrated RAMS analysis

- Formal language development by OMG
- Increased capability to show traditional notations in MBSE (SysML) tools
 - Fault Tree Analysis (FTA)
 - Goal Structure Notation (GSN)
 - (Design) Failure Mode and Effect Analysis (D)FMEA Tables
- Increasing Support for Safety & Security Standards – i.e. IEC 61502 SIL v ISO 26262 ASIL



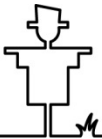
Safety Integrity Levels

Approximate cross-domain mapping of ASIL					
Domain	Domain-Specific Safety Levels				
Automotive (ISO 26262)	QM	ASIL-A	ASIL-B/C	ASIL-D	-
General (IEC-61508)	-	SIL-1	SIL-2	SIL-3	SIL-4
Aviation (ED-12/DO-178/DO-254)	DAL-E	DAL-D	DAL-C	DAL-B	DAL-A
Railway (CENELEC 50126/128/129)	-	SIL-1	SIL-2	SIL-3	SIL-4



Model Based Variant Management

- Ability to define 150% configuration, variation points, variation rules, features and feature sets all within the model
 - Better integration with PLM software
- Ability to generate valid variant(s) based on chosen feature sets
- Ability to run automatic validation (defined against 150% model) on generated variant(s)



Questions

- Anything else?

