Summary

• IW Overview
• Individual Experiences & Takeaways
  • Paul White
  • Paul Nelson
  • John McCrea
• INCOSE Working Groups
  • Status – Alive, Growing, Dead
  • Configuration Management WG (Paul Nelson)
  • Digital Engineering Information Exchange WG (DEIXWG) (John McCrea)
  • Model-Based Enterprise Capabilities Matrix
  • Solicitation for involvement
• Discussion & Next Steps
INCOSE IW Overview

- 4 Days: January 26-29, 2019
- Torrance, California
- 200 sessions
- Up to 5 sessions running concurrently
- Most working groups were present
- 4 Town hall meetings
- Leadership meetings
- Receptions
- Networking
Paul White Takeaways

- Saw how big INCOSE really is and what is going on with working groups
- MBSE was 1/3 of the sessions—increasing focus on MBSE
- 50% of working groups were present – could see which were active and strong and what they were working on
- How can we improve membership recruitment and retention?
- Certification & Academic Equivalence
- Professional Development Portal
- Americas Sector Regional Model
- Future of Systems Engineering (FuSE) Initiative – SE on AI, Internet of Things (IoT), and distributed manufacturing
- SEP Reception
- Training opportunities for us in Utah
- Working Groups & Wasatch collaboration
Paul Nelson Takeaways

• Trends:
  • ~70% of the sessions were focused on the Systems Engineering function/silo and not the broader end to end systems engineering for a system of interest needs (e.g. program, enterprise system, etc.)
  • MBSE has almost a cult following without strong data/business justification; seems to be a marketing ploy to funnel more investment towards systems engineering (not necessarily a bad thing). Odd that MBSE has an agenda within the IW agenda. About 30-40% of the event is the MBSE track.
  • I observed some new attendees and comments about how “intimidating” of a conference INCOSE (lots of PhDs, critical thinkers who mean well, but can be unapproachable)
  • Very A&D heavy attendance (Customers, OEMs, Suppliers, Vendors)

• Takeaways:
  • Great event and a great opportunity to learn and grow from a career development standpoint; great for networking as well (receptions, lunches, etc.).
  • Most beneficial to attend IW if you are involved in the working groups; IS is better for observation
  • FuSE (Future of Systems Engineering) Initiative was interesting to me:
John McCrea Takeaways

- INCOSE is far more international than I realized, but still very US and specifically aerospace/defense focused
- Very different than traditional “conference”
  - best to get involved in 1-3 WGs and stick with those than hopping all over the place
- MBSE runs the world
- INCOSE IS 2020 is in South Africa!
- Challenges precede Working Groups
- Certification opportunities – free CSEP exam
- DEIX WG (Digital Engineering Information Exchange)
- Challenge - MBSE Enterprise Capabilities Matrix
- LOTAR (Long Term Archival and Retrieval)
- Training – internal and external opportunities
- INCOSE members can party!

Part of DEIXWG Team
## Working Groups & Status

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CM WG Purpose

… is to ensure that the **state of the art** and the **body of knowledge** in **CM** be used to enhance the state of the art and the body of knowledge of **SE**; and vice versa. The CM WG will lead this effort within INCOSE; in liaison with external CM related **experts**, **standardization bodies** and other **organizations** and **communities**, as appropriate.
CM Working Group Work Potential Products

- Identify Software Engineering CM practices and technologies (source code management, package deployment…) that should be carried over into existing engineering standards (CMII, EIA-649, ...)
- Identify scope of CM we want to tackle: release process, version management, variant management (PLE), branch and merge, ...
- Define accountability process for reconciling changes across disciplines integrated by MBSE (CM of CMs)
- Upgrade CM glossary to MBSE scope
- Describe CM vision in a digital thread/twin implementation
DEIX-WG

- Supports the strategic objective to accelerate the Transformation of Systems Engineering to a model based discipline
- Aspires to ensure Digital Artifact are transferable within industries with complex systems
- Successful fulfillment of this mission allows for the free flow of digital artifacts between buyers and suppliers throughout a global supply chain; as well as, enable the collaboration between disciplines within those industries
- **Thought Areas:**
  - Topical Encyclopedia for Digital Engineering Information Exchange (DEIXPedia)
  - Digital Engineering Information Exchange Model
  - Digital Viewpoint Model (DVM)
  - DEIX Standards Framework
• Scope includes the following activities:
  • The WG activities and products span the systems engineering lifecycle as it relates to Digital Engineering information inputs and outputs of ISO 15288 and 15289 digital artifacts.
  • The WG will also addresses the exchange of digital artifacts between various technical disciplines involved in the systems engineering lifecycle.
  • The WG covers the presentation of digital engineering information to classes of technical and non-technical stakeholders across the complex global supply chain.

• 12 week sprint increments
• Weekly meetings Friday Mornings
DEIXWG Digital Viewpoint Model (DVM)
Sub-Group Concept Model

Tamara Hambrick
DEIX-DVM Lead
Tamara.Hambrick@ngc.com
Northrop Grumman Aerospace Systems

Sean McGervey
DEIX- DVM Co-Lead
Sean.McGervey@jhuapl.edu
JHU/APL

Missy Wallace
DVM Advisor
Melissa.d.Wallace@gmail.com
General Atomics - ASI

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DVM Concept Model divided into 3 different ontologies: (1) Product, (2) Process, (3) Stakeholder
Example instance of the DVM Concept Model for a particular use case (review of cyber requirements for an SRR technical review)
Still have these open questions… Need answers to ensure that this is a valid model of the DVM domain

• How well does this model fit the scope of concepts we’re considering?
  • What are other types of Digital Information?
  • What are some forms of Models?
    • Matlab? Excel?
    • Then what constitutes a Model Element?
• What is the definition of “provenance” in the context of a Digital Artifact and how do we capture it?
• How well does this model capture the needs for expressing what a Digital View is and to what it must conform?
  • Example Domains?
  • Example Concrete Syntax?
  • Example Standards?
Model-Based Enterprise Capabilities Matrix

- Excel-based spreadsheet composed of descriptive model-based capability rows and columns that define the capability stage
- Identify a comprehensive set of model-based capabilities, credibly sourced, that can be used by organizations to plan the improvement of their model-based enterprise capabilities
- Users are encouraged to tailor the Matrix
Matrix Areas

- Workforce/Culture
- SE Processes/Methodology
- Program/Project Processes/Methodology
- Model Based Effectiveness
- IT Infrastructure
- Modeling Tool Construction
- Project Use
- Policy
Matrix Structure

- **Rows:** Range of Model-Based Engineering factors/attributes, grouped by areas, that directly or indirectly support/enable across the enterprise
  - Workforce/Culture, SE Processes/Methodology, Program and Project Process/Methodology, Model-Based Effectiveness, Tools and IT Infrastructure, Project Use, Policy

- **Columns:** Increasing Stages of Capability
  - Left-most column reflects non-MBSE/MBE Capabilities (i.e., Doc-centric)
  - Right-most column reflects fully mature MBSE/MBE Capabilities
  - Intervening columns reflect increasing, incremental Stages of Capability for each particular factor/attribute (row)

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