Systems Engineering Challenge Event
8-Aug-2018, Nexus Brewery

Ann Hodges, Facilitator

INCOSE
ENCHANTMENT CHAPTER

SE challenges submitted by Chapter Members

- **Collaboratively discuss the nature of the challenge**
- **Brainstorm suggestions to overcome issues, amplify positive aspects**

3 challenges

- **Ed Carroll: Guiding Your MBE Practice**
- **Eva Wallace: Connecting PLM and MBSE**
- **Rick Dove: Overcoming Male leadership Culture**

(Text above edited after the fact to reflect what occurred)

Challenge: a guide for your MBE practice?

Ed Carroll SE Challenge

A MODEL-BASED ENGINEERING (MBE) MANIFESTO

PURPOSE: *To motivate the transformation to Model-Based Engineering.*

Faced with increasing system complexity, interdependencies, breakdown of document-based methods, and other challenges, MBE provides the transformation in which we value:

1. ***Information** over artifacts*
2. ***Integration** over independence*
3. ***Expressiveness with rigor** over **flexibility***
4. ***Model usage** over **model creation***

We value the items on the right, but not at the sacrifice of the items on the left.

WITH THESE PRINCIPLES:

*On behalf of stakeholders, MBE increases emphasis on **describing** the nature and content of the **information** produced and consumed, compared to the traditional emphasis on engineering process and procedure.*

*We recognize that—**independent** of specific Information format, structure, language, syntax, the sequence or order of its production and consumption, and the domains and environments of our projects—the underlying nature (**semantics**) of the **essential** information we seek to discover and produce is **invariant** because of the very nature of engineering.*

*An essential and dynamically changing property of model information is its **credibility** to those people and processes which will **consume** that information. The critical nature of some **intended uses** of model information sets a higher bar on required investment in model **verification**, **validation** and **uncertainty quantification**.*

*Principles of **human-machine interaction** applied to the targeted stakeholders are vital to success. Application of advanced visualization methods **and augmented intelligence** capabilities can advance that success.*

*We seek an extended team across engineering disciplines with **common and integrated understanding** of the identity and nature of the model information as well as its content.*

*We seek effective **enterprise-wide reuse** of model-based information to more fully leverage past individual or local learning.*

Systems engineering performed according to the above principles is required for the Engineering System itself, a complex and evolving system.

THE TEAM:

The team was assembled by invitation, intentionally drawing together different perspectives.

Ed Carroll
Team lead-Sandia National Laboratories - Engineering Methods Research

Nancy Hayden
SNL - Autonomous Systems/ Engineering Policy

Sharon Trauth
SNL-Systems Engineering/ MBSE Practice

Dana Grisham
SNL-Data Governance/Agile Methods

Chris Schreiber
Lockheed Martin Space Systems-Systems Engineering Modernization

Bill Schindel
ICTT Systems Sciences-Systems Sciences

Frank Salvatore
Engility Corp-Systems Engineering/ Data Taxonomy

Eliot Rich
Univ at Albany, SUNY-System Dynamics

Teleconference participation from:

Steve Jenkins
JPL-Systems Semantics

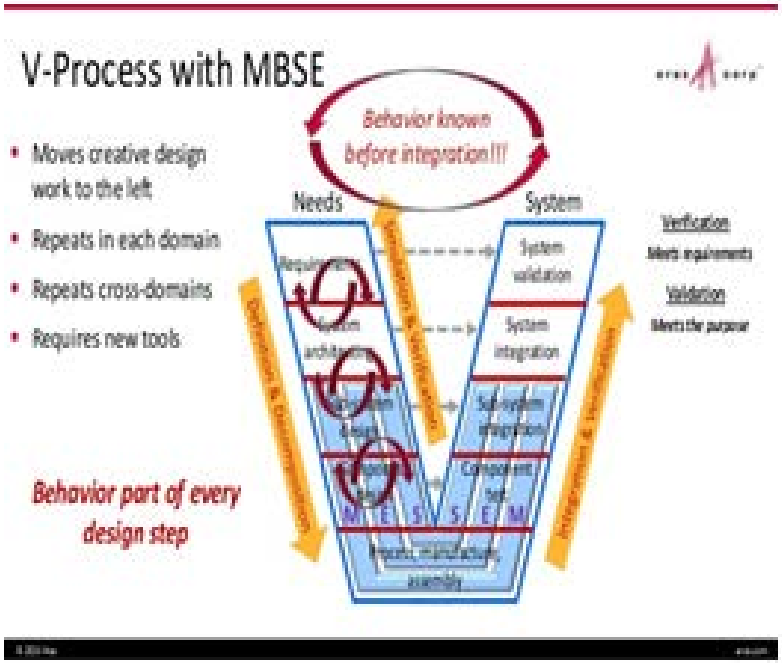
Anne O'Neil
Anne O'Neil Consultores-Organizational Transformation

Product Lifecycle Management (PLM) and Model Based Systems Engineering (MBSE)

Eva Wallace SE Challenge

Challenge: Can PLM and MBSE be connected and coexist to support mission success?

- What is the relationship between them?
- How can both be integrated into an organizational strategy to solve development challenges?



Overcoming the Male Leadership Culture

Rick Dove SE Challenge

Challenge: Reorienting male leadership and organizational culture to value, hire, and promote women as leaders in Systems Engineering.

Some problem reality:

- **Unconscious, primate/human behavior patterns favor male leadership dominance.**
- **Emotionally men feel their assumed position of privilege is threatened.**
- **Effective behavior-changing occurs for emotional reasons, not rational reasons.**

What is the personal bigger threat or compelling reward that overcomes the threat?