INCOSE IW 2012 MBSE Workshop

System Architecture and Requirements Modeling Breakout Session

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Objectives of Breakout Session

- To focus on the topic of System Architecture and Requirements
- To be a forum for information exchange
- To network with experienced model-based developers
- Share, learn and ask questions
Breakout Session Agenda

• About 40 People attended
• Session 1 15:30-17:30 Saturday (1 Hr 30 min)
  – System Modeling Context
    • John Watson, Lockheed Martin – 15 minutes
  – Two Guest Speakers: 45 minutes each
    • Modeling practices being used today
      – Share experiences, techniques, methods, etc.
      – Identify issues, i.e. Language, tools, training, management support, model management, etc
    • Rick Steiner, Raytheon
      – Modeling Practices at Raytheon
    • Paul Pearce, Deep Blue Tech
      – Introducing MBSE to a Submarine Concept Design Team
Breakout Session Agenda

• Session 2
  – Guest Speaker
    • Chris Delp, JPL - Views and Viewpoints
  – Open Panel Discussion
    • Where we are vs. where we want to go
Minimum Turn Radius: 24 ft.
Dry Pavement Braking Distance at 60 MPH: 110 ft. 90 ft.
Integration Benefits

• Improve communications across all domains and product lifecycle
  – engineering, manufacturing, management and support

• Uniform and Consistent Repository of the “Truth” integrated across all product lifecycle domains

• Improve ability to Measure Change Impact
  – A more thorough and complete assessment
  – Reduced time to access the change

• Enables better design space exploration and design optimization

• Reduces the number of defects and detects them earlier

• Environment for Automation
  – Electronic based
  – Programmatically Evaluated
Guest Speakers

• Rick Steiner, Raytheon
  – Modeling Practices at Raytheon
Software Innovation for Tomorrow (SWIFT)/Advanced Software Productivity Environments (ASPEN)
   – Appropriate application of Agile techniques, Domain Specific Languages and MDSD/MDA for Software Development

Virtual Solution Development (VSD™)
   – Rapid cross-domain collaboration toward a Point of Departure Design

Model Based Distributed Integration and Test

Concept Engineering/Mission Profiling

SE/SW Interface for Algorithm Development

Mechanical CAD Model Based Enterprise

Multi-Disciplinary Design Optimization

Physics Based Modeling for Embedded Systems

Lessons from MBSE on AWD
Summary Points

- Raytheon continues to be largely a technology-driven company
  - High-tech sensors and effectors comprise most of our business
  - Still have opportunities to leverage MBSE for large scale system integration of sensors and effectors.

- Top Management sees value in Model Based approaches
  - “The model is the design”
  - “Design anywhere, build anywhere, support anywhere”

- Ongoing corporate investment in various disciplines supports and compliments model based approaches

- Product Lines are becoming more important
  - Starting to understand development and governance issues
  - Starting to recognize MBE as an enabler for product line architectures

- “Model Based” needs an incremental deployment strategy

Raytheon is on the threshold of major MBE/MBSE deployment, and is still defining the desired impact on or our business & our people.
Guest Speakers

• Paul Pearce, Deep Blue Tech
  – Introducing MBSE to a Submarine Concept Design Team
• Conceptual Design of a successor to the existing Collins Class
• Going through multiple iterations
Early Principles

• Model-based approach to SE
  – Buy-in has been a challenge
• Adoption of SysML
• SE Process Framework and tools
• Traceability
• Levels of Abstraction (functional, logical, physical)
Going Forward

- Increasing perceived value to Naval Architects
- Leveraging the design process
- Promoting the System Model to help the team specify and develop submarine designs.
Guest Speakers

- Chris Delp
  - Views and Viewpoints
Overview

• Docgen at JPL and Across Industry
• Communication
  – Models and Views
  – Methods and Analysis
  – View Models and Linearization of the Story
  – Libraries and Reusability
• MBSE Success has a strong dependence on the capability to communicate with stakeholders and system implementers
Open Discussion

- **Agile**
- **Viewpoints**
  - Management
  - Validation
  - Views to support PDR/CDRV
  - Views to support management
- **Metrics**
  - ROI
  - Continuous measurement
  - Do we measure?