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

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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

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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

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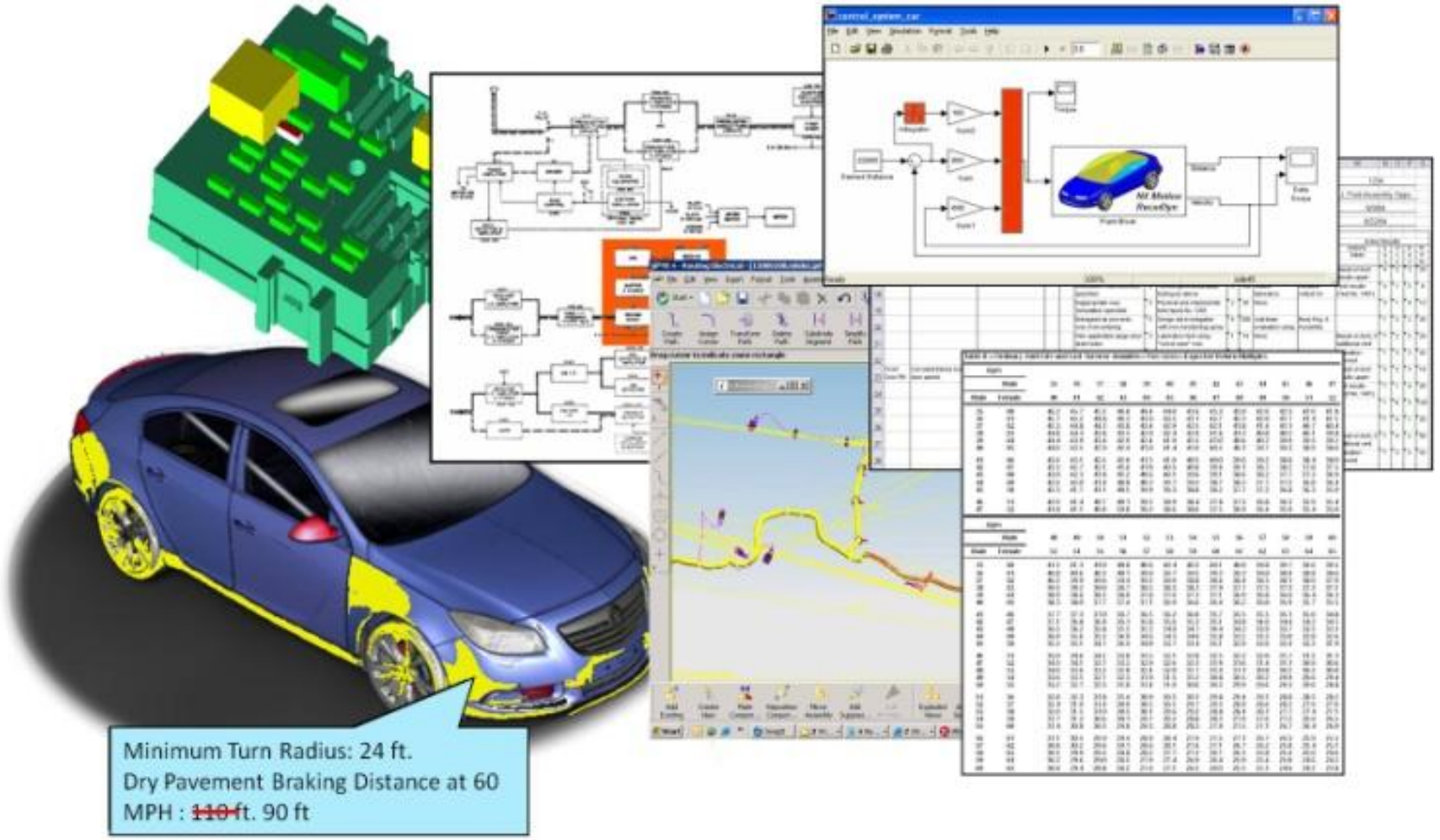
INCOSE - Integrated Systems Engineering Vision



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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

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Guest Speakers

- Rick Steiner, Raytheon
  - Modeling Practices at Raytheon

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Raytheon Publically Discussed Techniques and Methods

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

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- Conceptual Design of a successor to the existing Collins Class
- Going through multiple iterations

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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)

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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.

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Guest Speakers

- Chris Delp
  - Views and Viewpoints

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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

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Open Discussion

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

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