How Systems Engineering Contributes to Program Success
Real World Examples

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Boeing Defense, Space & Security
The Boeing Company Overview

- **Boeing Commercial Airplanes**
  - Headquartered in Puget Sound, WA
  - 2012 Revenues of $49.1 Billion
  - Approximately 85,000 Employees
  - Family of Airplanes & Broad Portfolio of Services

- **Boeing Defense, Space & Security**
  - Headquartered in St. Louis, MO
  - Defense, Space, Intelligence & Communications
  - Commercial and Government Customers
  - 2012 revenues of $32.6 Billion

People Working Together As A Global Enterprise for Aerospace Leadership
Success Starts With The Right Ingredients

- People
- Leadership
- Customer
- Support System
- Environment

Getting The Inputs to SE Right Enables Successful Outcomes
People

- **A team where each participant knows their job & role**
- **Considerations:**
  - Art of Systems Engineering
  - Science of Systems Engineering
- **Boeing:**
  - Collaborative planning / OneBoeing
  - Very strict and effective Requirements Management
  - Experiences based on previous success and business diversity
  - Mentoring
Leadership

- Program Managers who know how to motivate their team & defend or advance their program position
- Enterprise-level leaders providing enablement
- Considerations:
  - SEIT Lead / Chief Engineer joined at the hip with Program Management.
  - SEIT leads with experience and tenacity to plan and implement the “right” processes for the situation
- Boeing:
  - Longer-running programs: Enduring effectiveness/collaborative leadership
  - Newer programs: Exploiting low-risk technologies
  - Boeing Leadership Center
  - Systems Engineering Leadership Program
  - New Employee Training in Systems Engineering
Customer Engagement

- An engaged stakeholder who communicates a vision with the supplier team, joining with them in overcoming obstacles

Considerations
- Customer diversity
- DoD-5000.02 Acquisition Management System
- Alignment of technical planning (SEMP – SEP)

Boeing
- Recent development programs: Close customer coordination
- Modernization programs – Customer coordination and design integration across disciplines
- Modeling and Simulation / Immersive Development
Support System

- Use processes and tools known to be effective, tailored to meet the specific needs of the program

Considerations

- New Standards:
  - ISO/IEC/IEEE-15288.1 Application of Systems Engineering on Defense Programs
  - ISO/IEC/IEEE-15288.2 Technical Reviews and Audits on Defense Programs

- New tools with sufficient scale and integration to facilitate team execution / manage complexity over complete lifecycle

Boeing

- Model-Based Systems Engineering: Functional models and toolset
- Comprehensive SE planning; Program portals; Tailored processes based on program ConOps
- Advanced programs: Complexity identification / management
Environment

- Conditions that, while not controllable by the program stakeholders, can affect a program’s outputs and outcomes

- Considerations
  - Tests agility of processes and robustness of tools
  - Challenges quality and relevance of the planning
  - Determines the effectiveness of the program and enterprise leadership
  - Warrants strict Configuration control and Data management

- Boeing
  - Enduring platforms (Boeing’s 10th Year!)
  - Classic capabilities and purpose-built designs
  - Boeing Research & Technology / Phantom Works
  - Modeling & Simulation
  - Immersive Development Environment
People: Art and Science

Leadership: Cross Functional Integration

Customer: Enduring Relationships

Support System: Effective Processes

Environment: Agility and Integration

Leading the Next Generation Technologies and Solutions DELIVERS RESULTS