How Systems Engineering Contributes to Program Success

Real World Examples

Bob Scheurer, Lead Technologist / Associate Technical Fellow, The Boeing Company

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

Success Starts With The Right Ingredients

- People
- Leadership
- Customer
- Support System
- Environment

ScanEagle

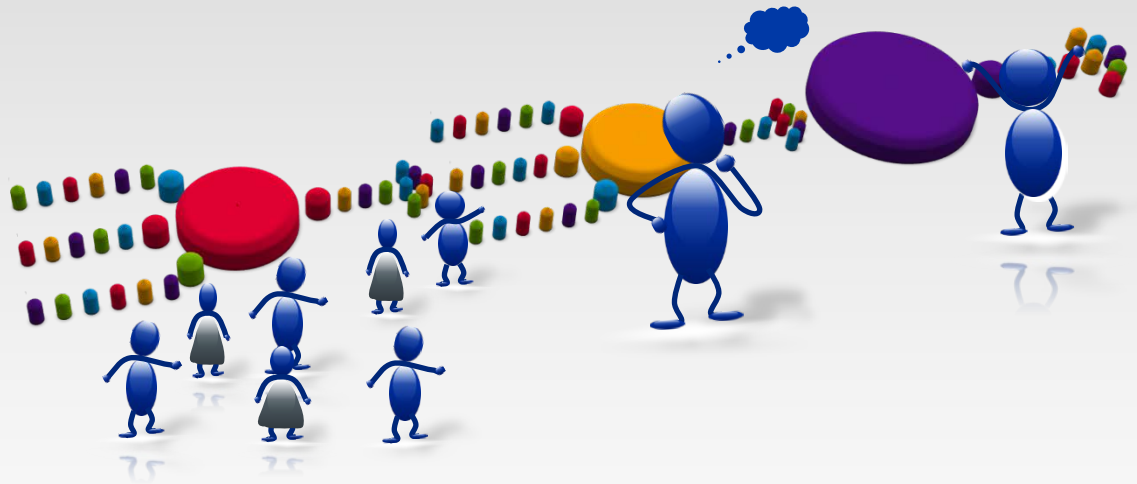
Getting The Inputs to SE Right Enables Successful Outcomes

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

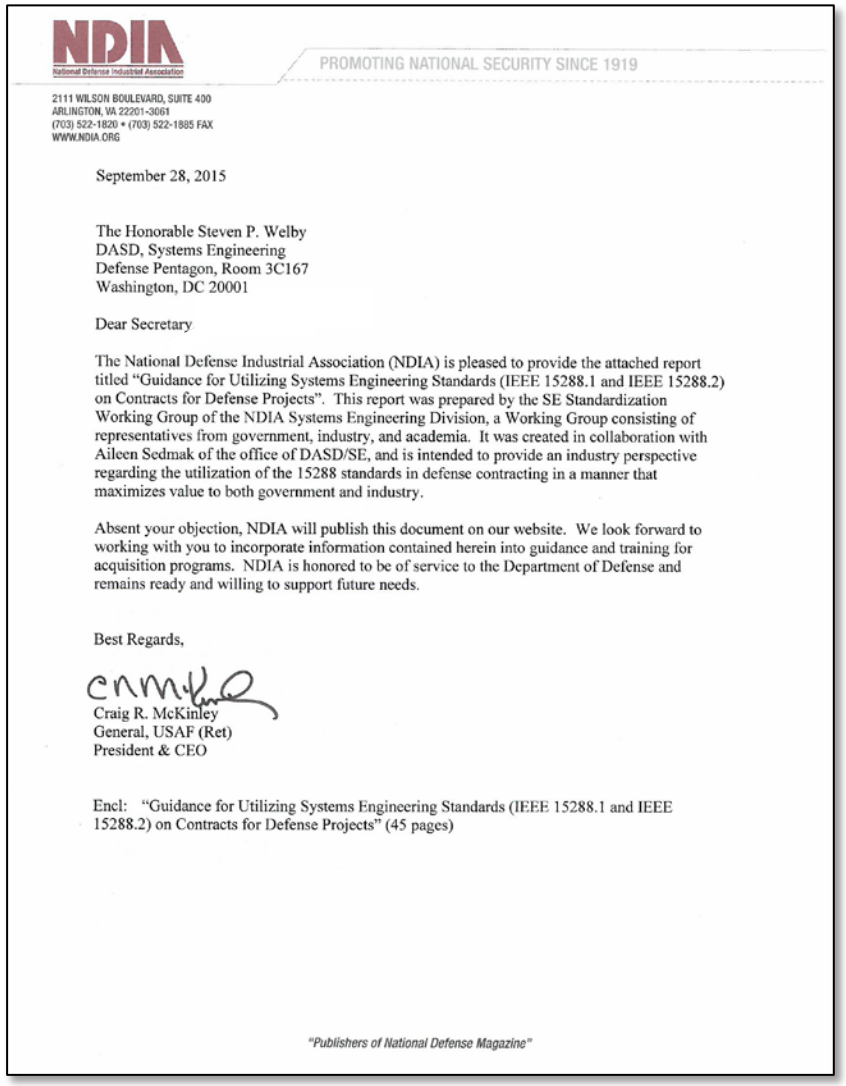


Customer Engagement

- **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



NDIA
National Defense Industrial Association

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September 28, 2015

The Honorable Steven P. Welby
DASD, Systems Engineering
Defense Pentagon, Room 3C167
Washington, DC 20001

Dear Secretary

The National Defense Industrial Association (NDIA) is pleased to provide the attached report titled "Guidance for Utilizing Systems Engineering Standards (IEEE 15288.1 and IEEE 15288.2) on Contracts for Defense Projects". This report was prepared by the SE Standardization Working Group of the NDIA Systems Engineering Division, a Working Group consisting of representatives from government, industry, and academia. It was created in collaboration with Aileen Sedmak of the office of DASD/SE, and is intended to provide an industry perspective regarding the utilization of the 15288 standards in defense contracting in a manner that maximizes value to both government and industry.

Absent your objection, NDIA will publish this document on our website. We look forward to working with you to incorporate information contained herein into guidance and training for acquisition programs. NDIA is honored to be of service to the Department of Defense and remains ready and willing to support future needs.

Best Regards,

Craig R. McKinley
General, USAF (Ret)
President & CEO

Encl: "Guidance for Utilizing Systems Engineering Standards (IEEE 15288.1 and IEEE 15288.2) on Contracts for Defense Projects" (45 pages)

"Publishers of National Defense Magazine"

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 100th Year!)
  - Classic capabilities and purpose-built designs
  - Boeing Research & Technology / Phantom Works
  - Modeling & Simulation
  - Immersive Development Environment

Summary

- **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**


BOEING