# Initiatives in Systems Engineering: A Service Viewpoint

## 2004 PEO/SYSCOM CONFERENCE

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# Trivia Question

**Who can Cite an Example of Systems Engineering Throughout History?**

# Trivia Answer

- Water Distribution Systems in Mesopotamia 4000 BC
- Irrigation Systems in Egypt 3300BC
- Urban Systems such as Athens, Greece 400BC
- Roman Highway Systems 300BC
- Water Transportation Systems like Erie Canal 1800s
- Telephone Systems 1877
- Electrical Power Distribution Systems 1880

# Trivia Answer

## Modern Origins of Systems Approach

- British Multi-Disciplined Team Formed (1937) to Analyze Air Defense System
- Bell Labs Supported Nike Development (1939-1945)
- SAGE Air Defense System Defined and Managed by MIT (1951-1980)
- ATLAS Intercontinental Ballistic Missile Program Managed by Systems Contractor, Ramo-Wooldridge Corp (1954-1964)

# Army Status

- System Engineering Is Being Done in Army Programs; We Need to Ensure That It Is Consistent Across the PEOs.
- Training Is Widely Available but Standards Need to Be Established
  - One PEO/RDEC Has Established a Masters Program With a Local University. Is That the Right Benchmark?
- Metrics Are Widespread and Industry Focused; Need a Minimum Set of Common Metrics to Measure Overall Program Performance.
- Requirements Are Done Outside of the Se Process; Should SE Support the Requirements Generation Process?
- Army Needs to Establish an Easily Accessible Set of Best Practices That Can Be Shared Across PEOs.
- System Engineering Is Not Formally Integrated Into S&t Programs How  Should It Be Integrated Into S&t? At What Level

# Training

**Goal: Provide Consistent and Appropriate Levels of Training Across the Army Acquisition Community**

- Establish Technical Authority Level SE Training
  - Supports
- Establish PM/DPM SE Level Training
  - SE Management
  - Incorporate SE into PM Structure
- Establish Technical Level SE Training
  - Focus on Implementation and Execution of SE
  - Focus on PM SE
  - Lead to Certain Level of Certification

# Metrics

**Goal: Develop a Set of Metrics to Measure SE Programs at Each Phase**

- Architecture Completions
  - Requirement Allocation/ Analysis
  - Function Architecture
  - System Architecture
- Design/Development
  - SRR
  - PDR
  - CDR
- Configuration Management
  - Controls Levels of Requirements/Design
- Modeling and Simulation
  - Schedule
  - Performance
- Verification and Test
  - Appropriateness
  - Integration into Development and Design

# Requirements Generation

**Goal: To Integrate SE into the Requirements Development Process, Especially for Complex Interdependent Programs**

- Establish a Method to Support Requirements Generation at the System of Systems or Enterprise Level
- Allow a Prioritization of Requirements to Occur
  - Help Define Trade Space
- Stepping Stone to Joint System of Systems Requirements
- Generation Process (e.g. SIAP, SIGP, JBMC2, NCOE)
  - Without Joint Level Overarching Requirements, System Level Requirements Could Be Met and Still Not Meet Joint Requirements

# Science & Technology (S&T) Integration

**Goal: Lower the Integration Risk of Spiral Technologies**

- Focus Will Be to Incorporate Interface Requirements Where Available From Receiving System in S&T Programs Through the Technology Transition Agreement (TTA).
- Spiral Development S&T Program Must Address Integration Risk
- ATD and ACTDs Will Have Systems Engineering (SE) Plans

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