



**NORTHROP GRUMMAN**

DEFINING THE FUTURE



# **SI/SE Revitalization - Industry/DoD Cooperation and Collaboration**

**PEO/SYSCOM CONFERENCE**

**November 16, 2004**

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Sector Vice President, Program Integration**

FROM UNDERSEA TO OUTER SPACE TO CYBERSPACE



# Challenges

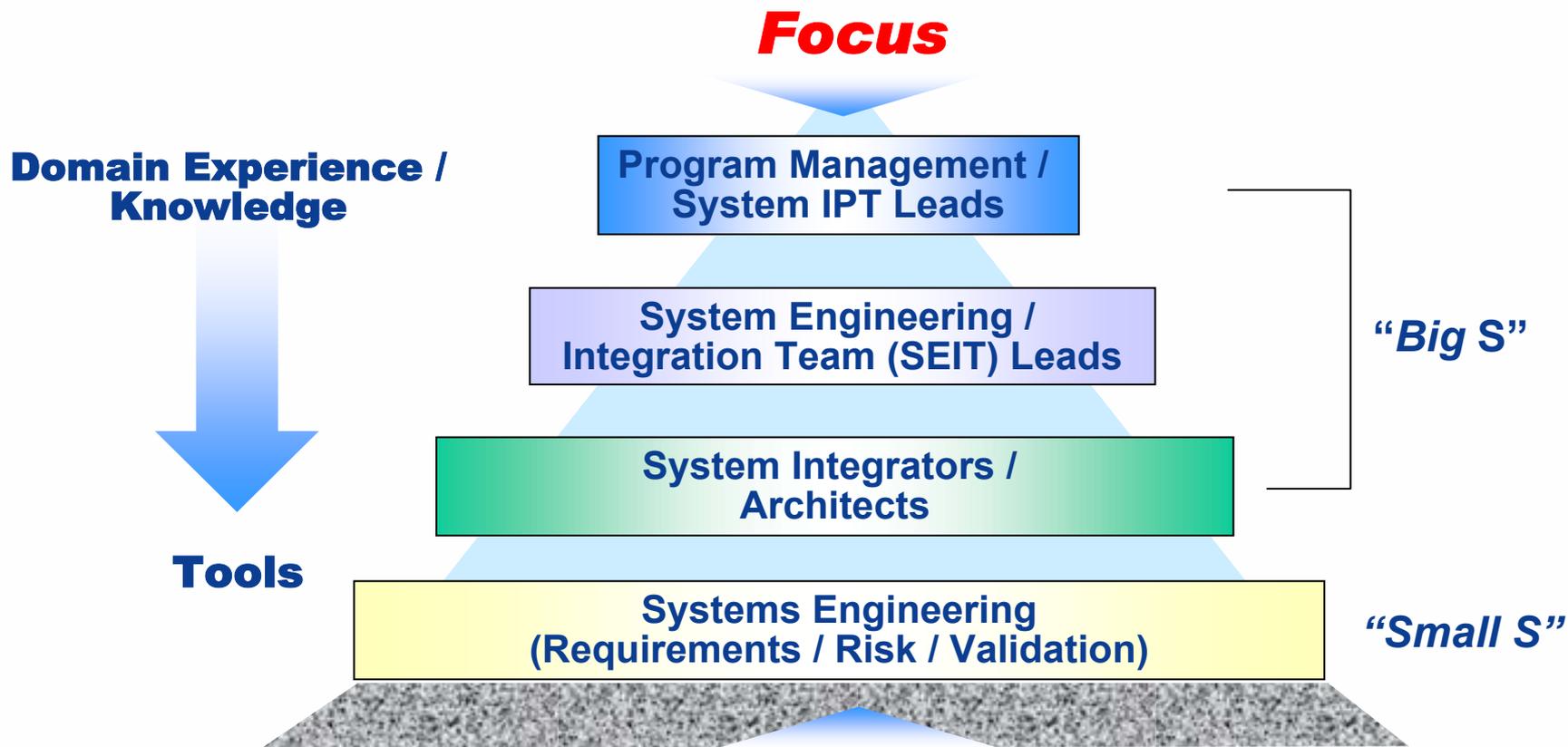
- Acquiring Systems-of-Systems
- Making Decisions in a Joint / Mission Context
- Assessing Complexity (and the Ability to Perform and Execute)
- Modeling and Simulation for SE
- Contracting for SE
- Resources (Finding the Right People)
- Determining the Value of SE
- Transitioning Technology



***Achieving Mission Success***

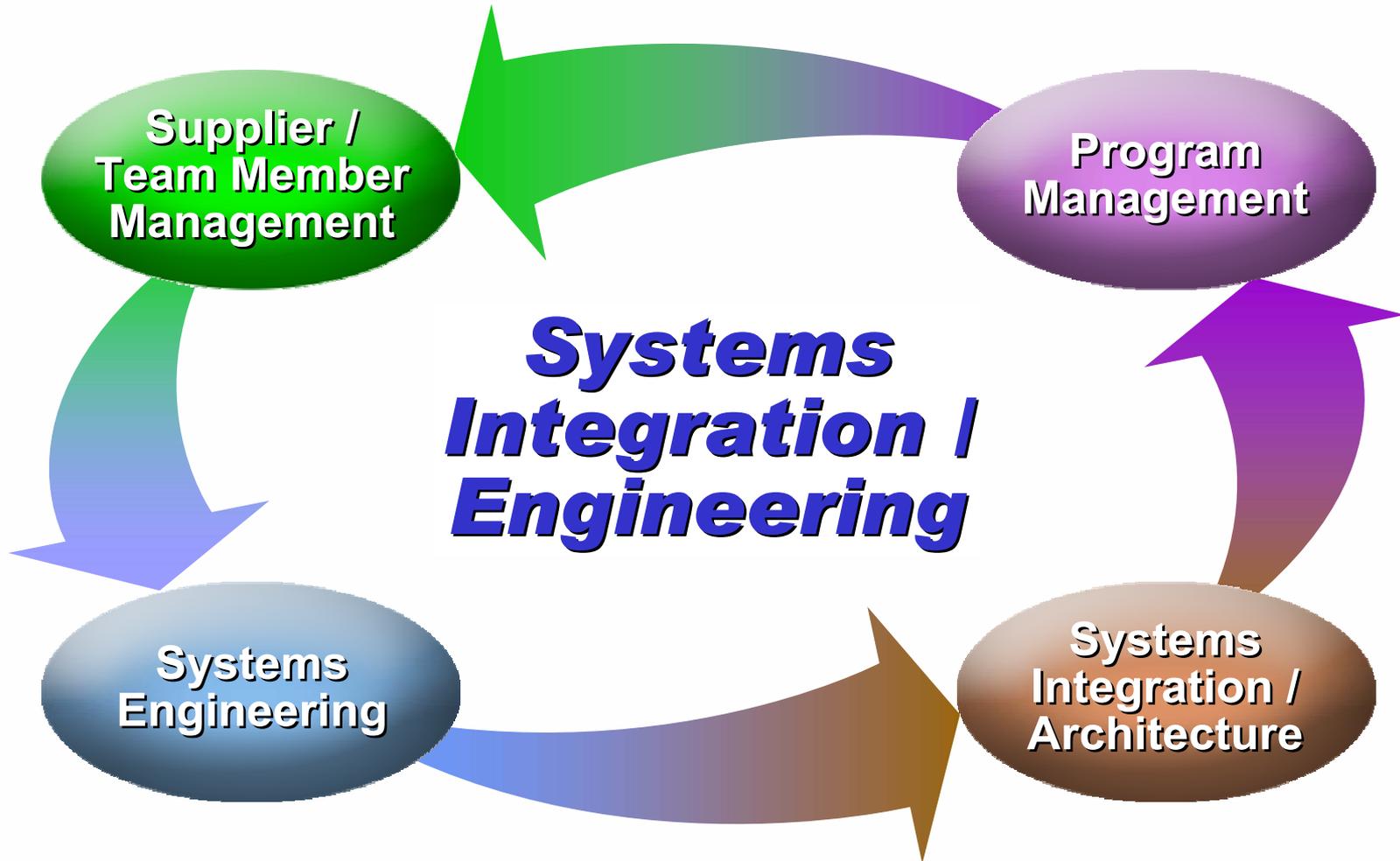


# Successful Program/Systems Integration



**Program Management... the First and Last Line of Defense In Guaranteeing Program Success**

# The Cornerstones



# Enhancing PM/SI/SE Capabilities

- 3 Week Corporate Wide Program Manager /SE Training

- SE/SI Training (Internal / External/Pull-Based)

- University / DoD Training Collaboration

- Architects / Integrators as **People** Recognized Disciplines

- Accelerate Domain Knowledge Acquisition

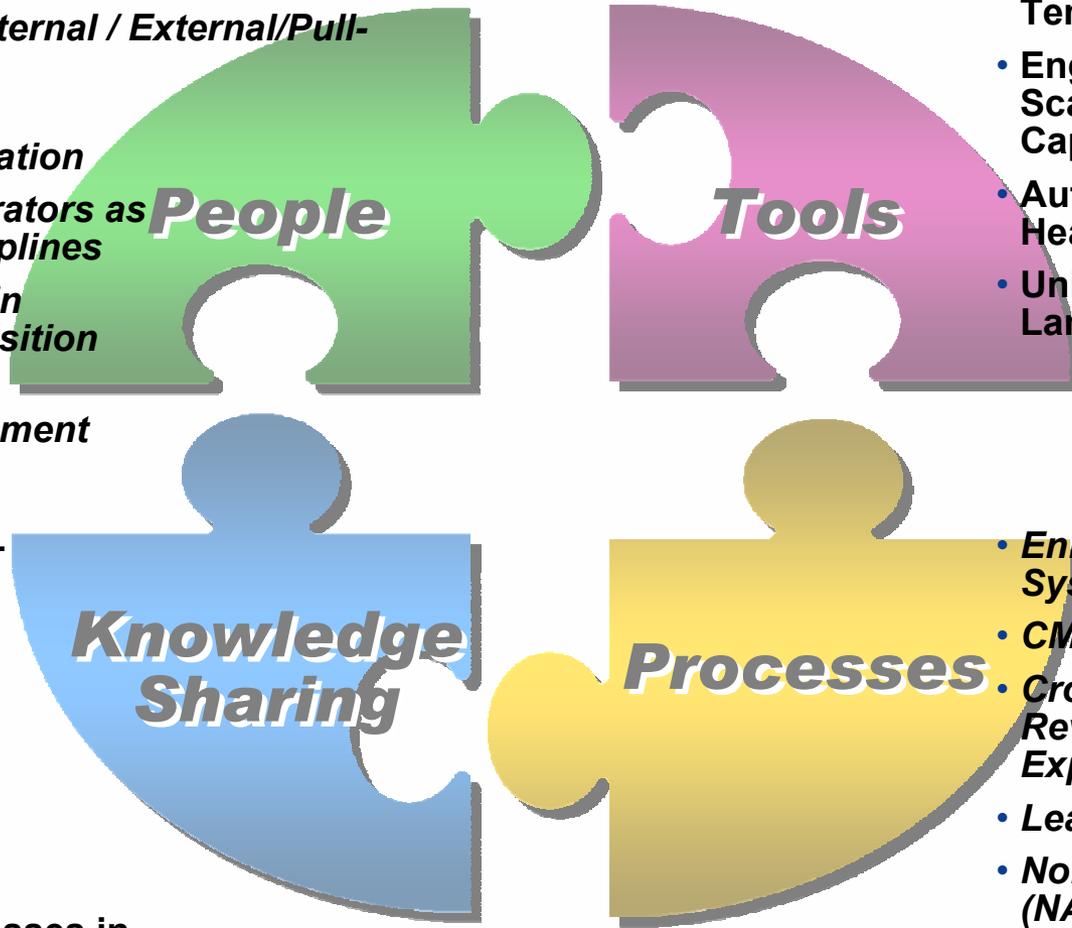
- Strengthening Material / Procurement PM Talent Pool

- Corporate (Cross-Business Area) Councils – SE Advisory Group

- SE Community of Practice & User Groups

- People-to-People Contact Tools

- Embedding Processes in “Closed Loop” Workflows



- Willoughby-Like Program / Product / Process Templates

- Engineering Based Large Scale Simulation Capabilities

- Automated Program Health Visibility Systems

- Unified Modeling Language Tools

- Enhanced/Common ERP Systems

- CMMI (SW/SE/IPPD/SS)

- Cross-Program Peer Reviews With Domain Experts

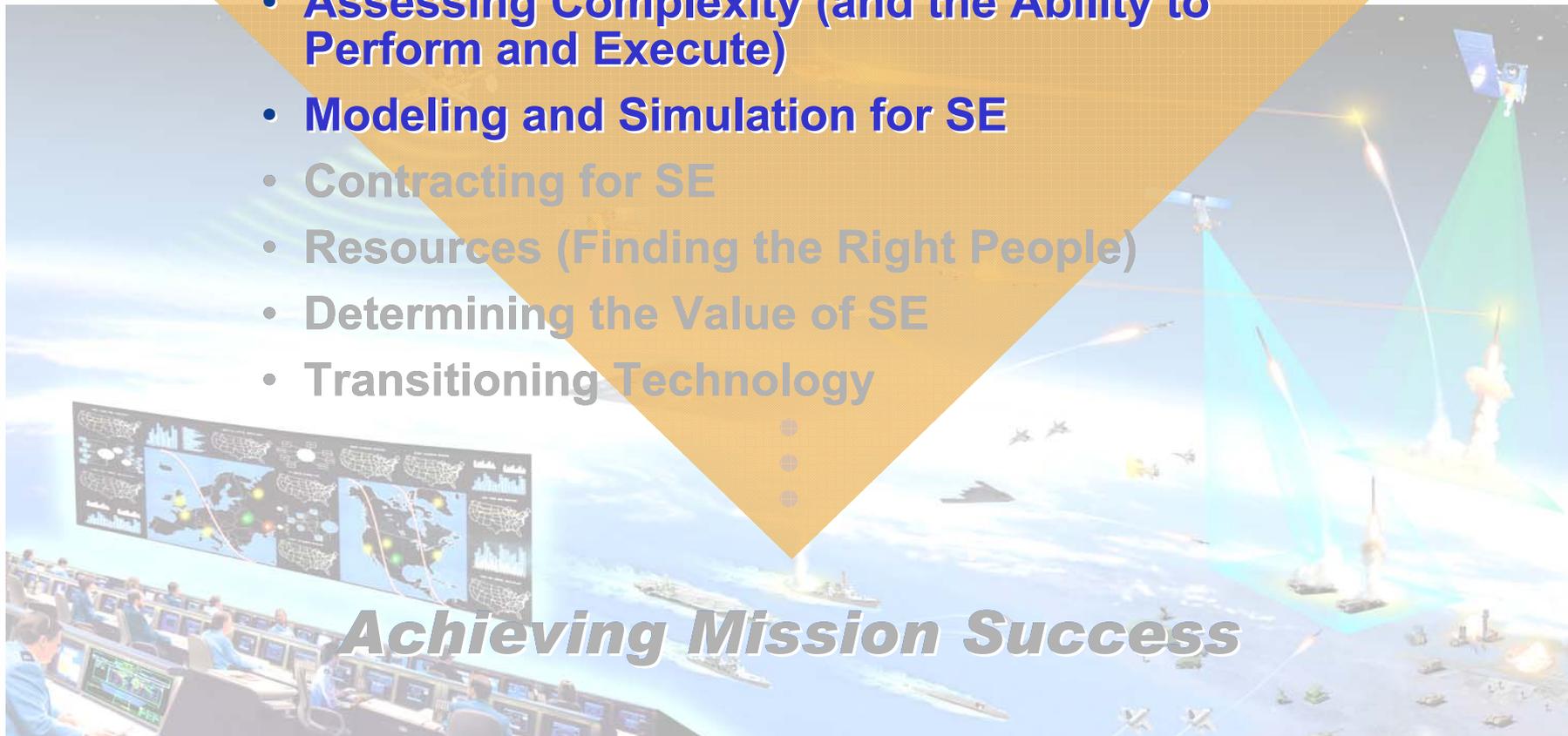
- Lean / 6σ

- Non-Advocate Reviews (NAR) / Independent Cost Evaluations (ICE) Prior to Proposal Submittals

# Challenges

- **Acquiring Systems-of-Systems**
- **Making Decisions in a Joint / Mission Context**
- **Assessing Complexity (and the Ability to Perform and Execute)**
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***Achieving Mission Success***



# Large Scale Distributed Simulation Tools

- **A Distributed Virtual Systems Engineering Environment**
  - Controlled, Repeatable, Multiple Security Levels
  - C2&ISR / EW / IO / Strike Simulation / Visualization Capability



- **ConOPS / Mission Rehearsal**
- **Architecture Development / Evaluation / Implementation**
- **Distributed Weapon System Training Nodes**



**Engineering Based Models Spanning Land, Sea, Air and Space**

# Challenges

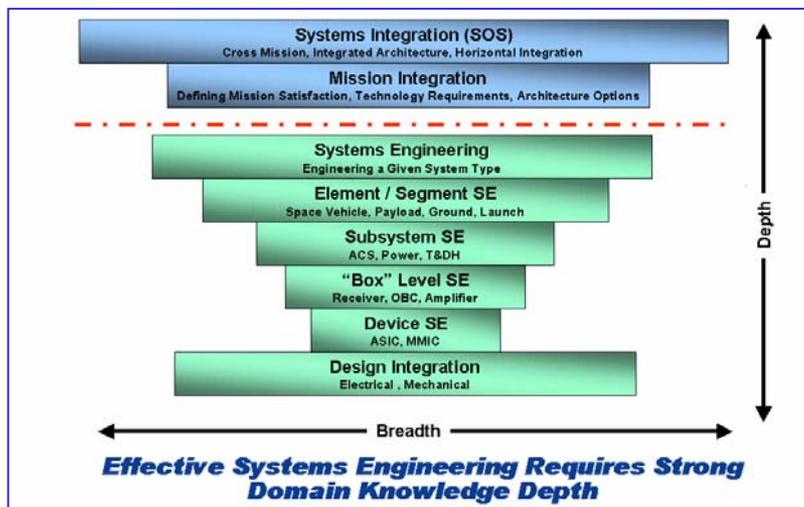
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- Making Decisions in a Joint / Mission Context
- Assessing Complexity (and the Ability to Perform and Execute)
- Modeling and Simulation for SE
- **Contracting for SE – *Mil Handbook 881***
- **Resources** (Finding the Right People)
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- Transitioning Technology

***Achieving Mission Success***

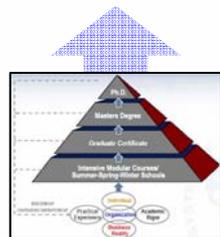
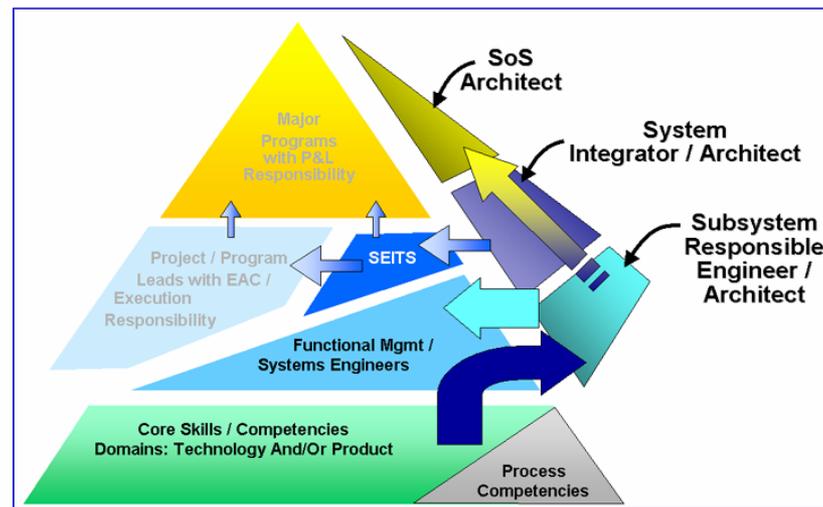


# SE/SI Work Force Development

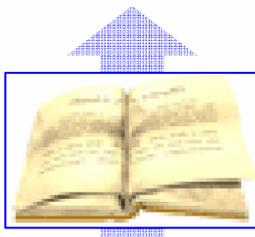
## Expand Domain Expertise



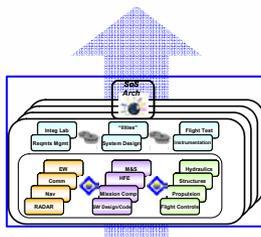
## Unique Career Tracts for PM and SE/SI Talent Pools



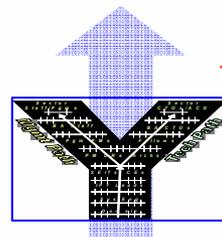
**Education**



**Domain Design Essentials**



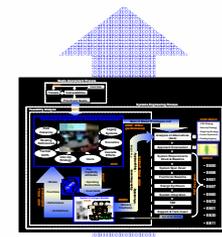
**Multi Discipline Rotation Program**



**Career Path Planning**

- Keep SE Community Current
- Tech Domain Courses + SoS/OA
- Tools Awareness and Tutorials
- SE Community Structure-BA,IS,NG
- Disseminate Relevant Dynamics of Industry Environment
- Fellow Mentoring
- Certifications
- Program Billet SOP Readiness
- Subcontractor Relationships

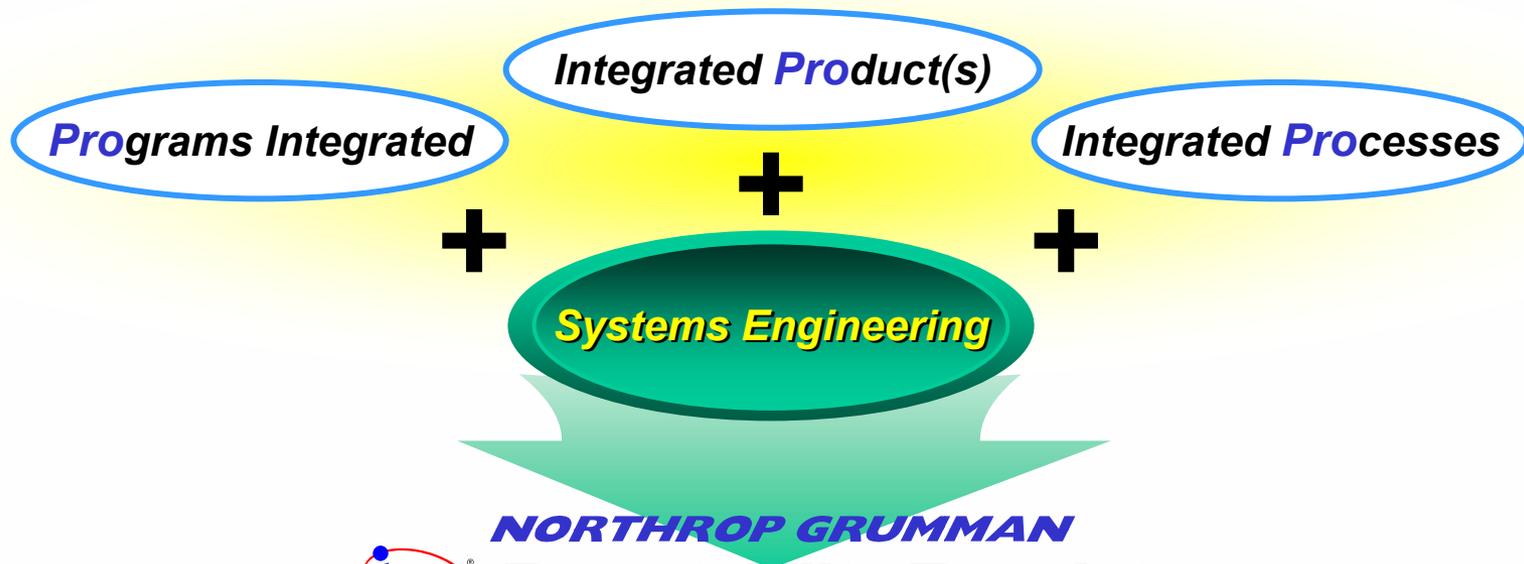
**Training**



**Improved SE Processes & Tools**

## Six Pronged Approach

# Integrating and Delivering What's Promised



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## **Executability Templates**

*(Similar in Format to Original Willoughby Templates)*

- Tailored by Product Life Cycle
- Product Complexity
- Re-Uses Industry Best Practices, STDs, etc.
- "Simple"
- **Expert System**

**Re-Using Best Practices and Already Learned Knowledge**

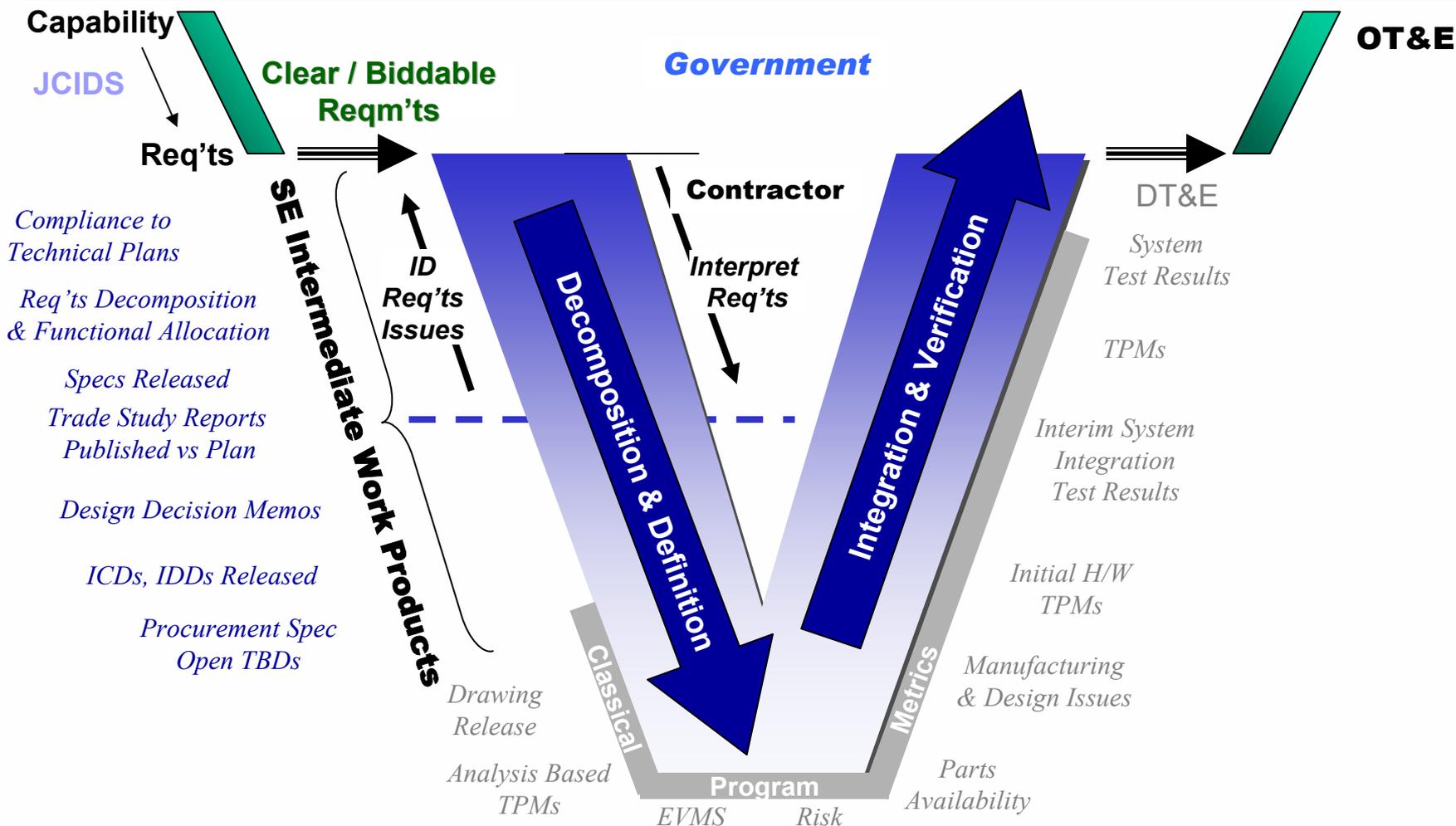
## **Recent OSD (AT&L) Initiatives**

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- ***SE Plan / Guidebook***
  - ***DAU Curriculum Updates***
  - ***Industry Outreach***

***Achieving Mission Success***

# Clear Requirements Set the Stage



**Track Release and Quality of Intermediate SE Work Products To Identify Ambiguities / Conflicts in Requirements**

## Summary

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- **Build on the Foundation Laid by Systems Engineering ... *It's More Than Revitalizing Systems Engineering***
- **It's About People With Domain Experience, and...**
- **How You Apply Products Like SE Plan (SEP) *After Contract Go-Ahead***
- **Kudos to Defense Acquisition University ... *Keep the (Distance) Learning Products Coming. Is it Time for Expert System Guides?***

# Sometimes Good SE/SI Is in the Eye of the Beholder



