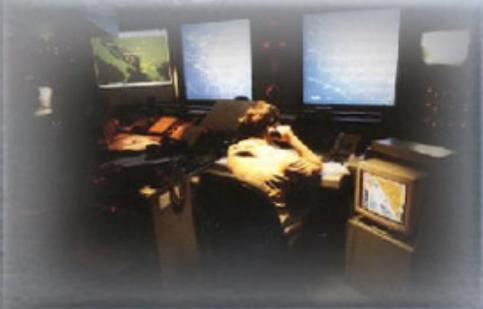


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Software Process Improvement Initiative OSD Software Collaborators Workshop



16 October 2007



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Introduction

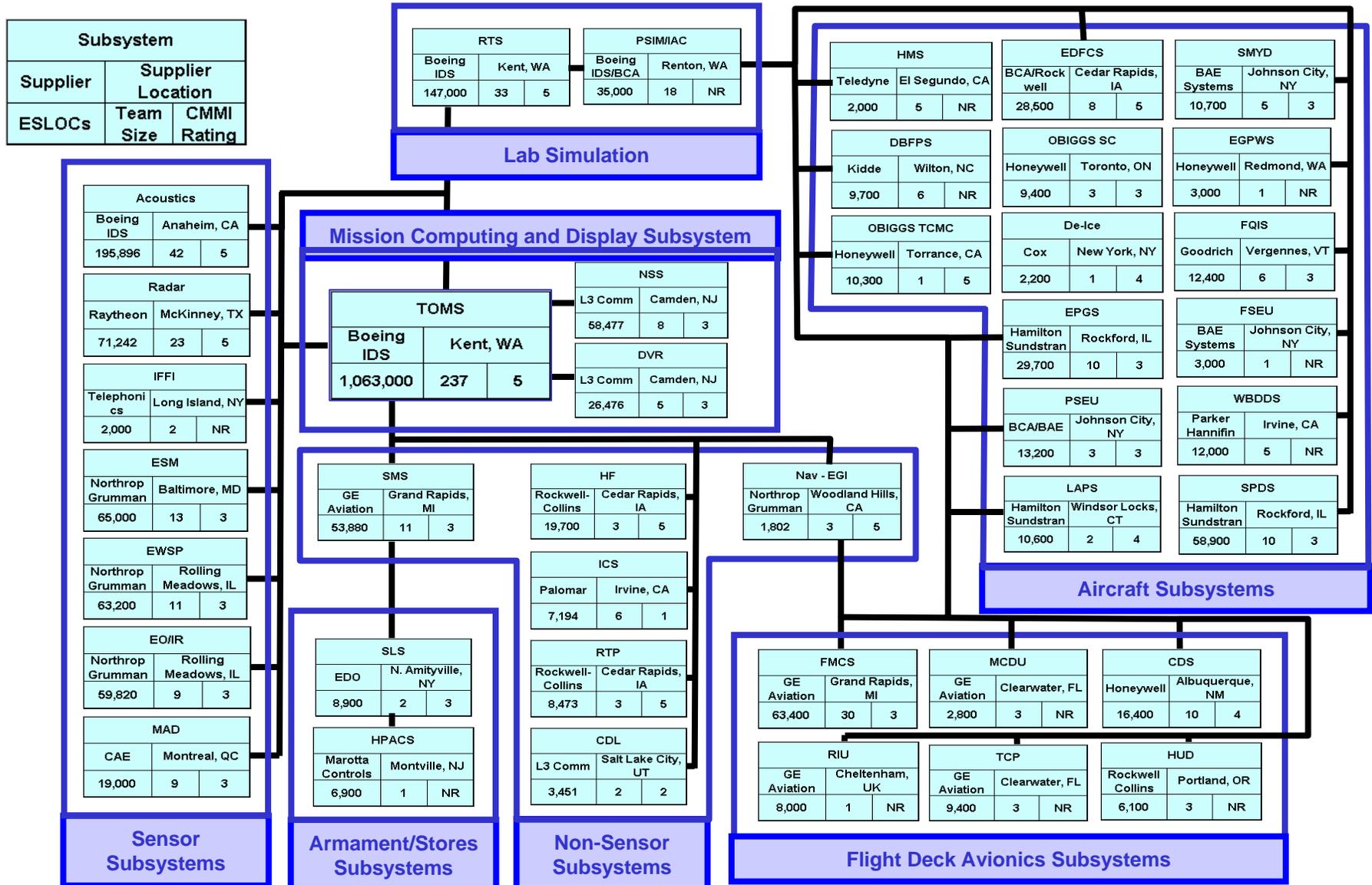
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The development, acquisition and delivery of software is key to giving our war fighters and business leaders the ability to conduct operations in the most effective and efficient environment possible



Developmental Software Products

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Software: Looking Ahead - Challenges

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- ◆ Increased Functionality => Complexity
- ◆ Move Towards Networking, Interconnecting Systems
- ◆ Distributed Computation Models
- ◆ Splicing-into operating Systems-of-Systems
- ◆ Reconfigurability, Dynamic Modifications
- ◆ Code, States, and Modes Correctness
- ◆ Safety Concerns (Operating, Maintaining, Training)
- ◆ Security (unmanned weapons...)
- ◆ Shortage of Skilled Programmers



Navy: Software Process Improvement

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- ◆ Navy answered Section 804, took a long look at ALL previous studies (NRAC, SMRT, DSB etc.)
- ◆ Department of the Navy recognized *Big Problem*



Navy: Software Process Improvement (Cont.)

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- ◆ Holistic Systems Engineering Approach focused on key functional areas:
 - Software Acquisition Management
 - Software Engineering Practices
 - Business Implications
 - Software Development Techniques
 - Human Resource

End Game: Institutionalize



Software Acquisition Management

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- ◆ Re-confirmed findings...
 - Inconsistently applied policy
 - Incomplete or misaligned personnel training and turnover
 - Cost and schedule estimates lack rigor and accountability

- ◆ Navy now is improving to:
 - Consolidate Navy software acquisition policy
 - Added a centralized website
 - Establish core software metrics feeding up to a central using ASN RDA Dashboard
 - Define a Tailorable Organizational Structure and with critical software billets



Software Systems Engineering

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- ◆ Re-confirmed findings...
 - Navy conducted Program Office Survey addressed need to integrate software with systems engineering

- ◆ Navy now is improving to:
 - Infuse software into systems engineering – Use Systems Engineering Technical Review (SETR) process e.g.:
 - Systems Software Review handbook and checklist
 - Software Integration Release Review and checklist
 - Integration Readiness Review handbook and checklist



Business Implications

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- ◆ Re-confirmed findings...
 - Visibility into software development
 - Software contract guidance or language

- ◆ Navy now is improving to:
 - Use 17 Nov 06 Contract Language and Guidance Memo
 - Require a Software Development Plan (SDP) in RFP Response, and use IEEE 12207
 - Address SW complexity throughout the acquisition lifecycle, including Pre-Solicitation thru Contract Execution
 - Intellectual Property (IP) and Data Rights
 - Guidance language under development



Software Development Techniques

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- ◆ Re-confirmed findings...
 - Limited guidance for assessing applicability and risk of proposed development methodology

- ◆ Navy now is improving to:
 - Use Software Development Techniques Report 10 July 07:
 - Existing software development techniques
 - Predictive and adaptive
 - Emerging software development techniques
 - Guidance for the use and evaluation of the software development techniques and tools



Human Resources

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- ◆ Re-confirmed findings...
 - Existing SW acquisition training and curriculum appears to be inadequate

- ◆ Navy now is improving to:
 - Send everyone to SAM 101 and Intro to CMMI training - ASN RDA quick hit action: 15 May 06 Memo
 - Implement Role Based Right Fit Training
 - Study found: Competency review across key positions (program management, systems / software engineering, acquisition logistics, test & evaluation engineering, contract management, and legal)

Bigger than Navy



Naval Institutionalization Strategy

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- ◆ Software “infusion” into Systems Engineering Technical Review process
- ◆ Incorporation of core software metrics in ASN RDA Dashboard
- ◆ Leverage Role Based Right Fit education and training effort with OSD and DAU
- ◆ Development of Guidebook for Acquisition of Software Intensive Systems

Still Not Enough



Critical Software Issues

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- ◆ Software Integration with System Engineering
- ◆ Core Metrics
- ◆ Engage contracting and legal
- ◆ Trained Software Intensive Systems Acquisition Stakeholder Team

Effective: Enable Capability Based Acquisition



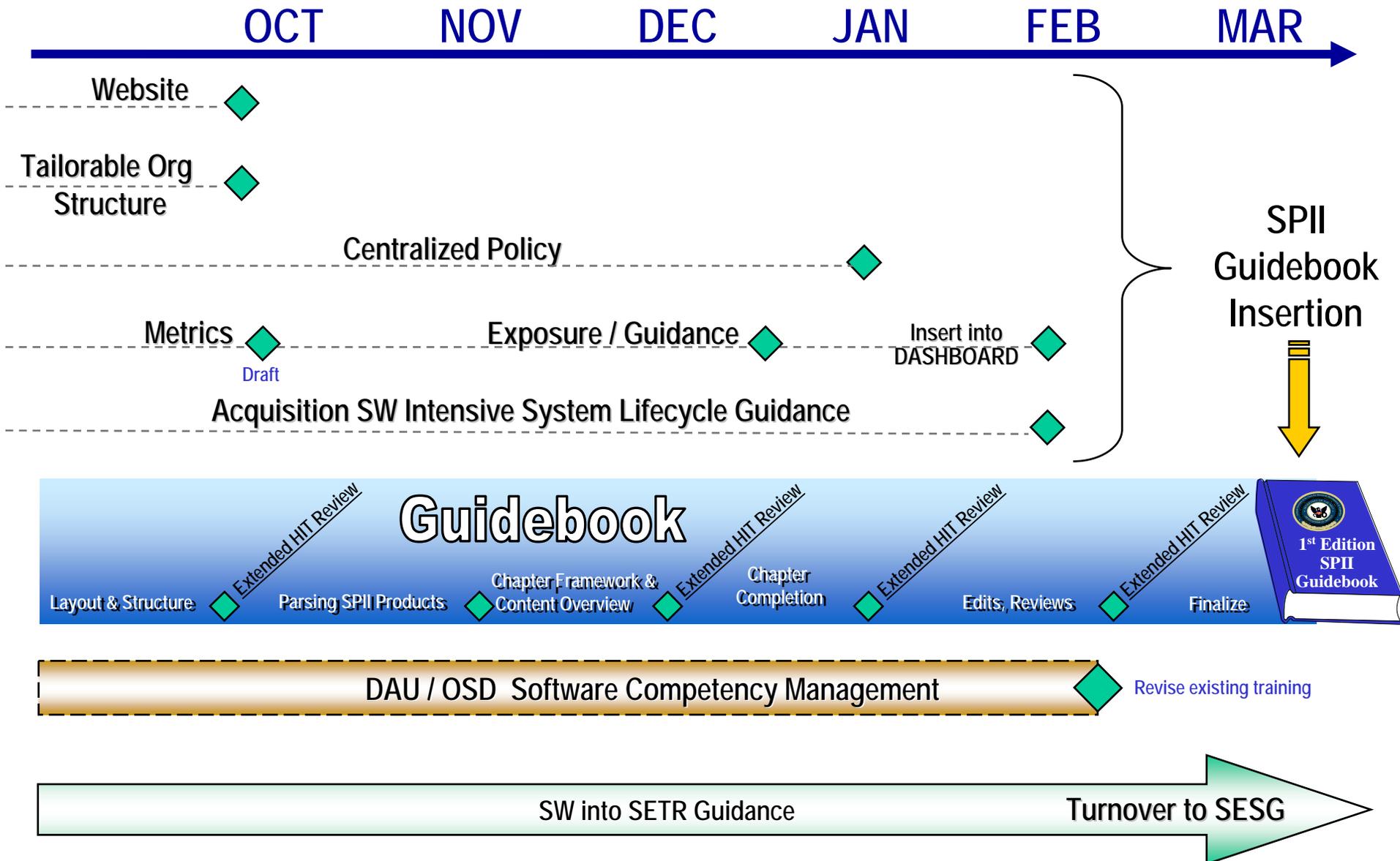
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Backups



SPII Institutionalization Timeline

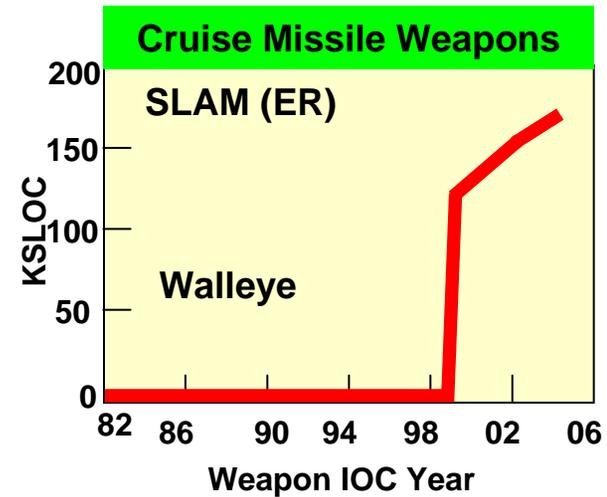
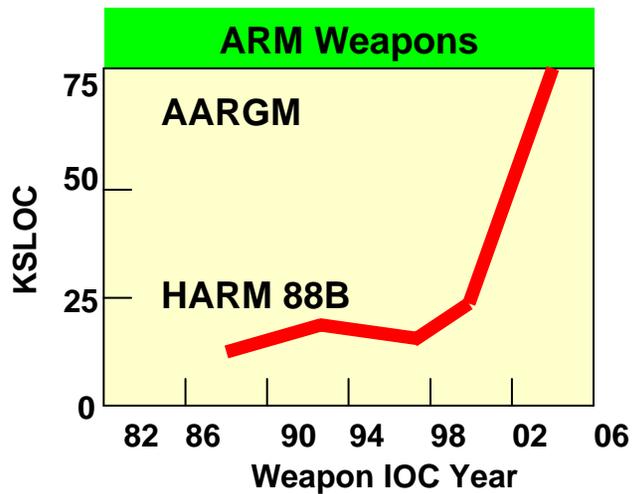
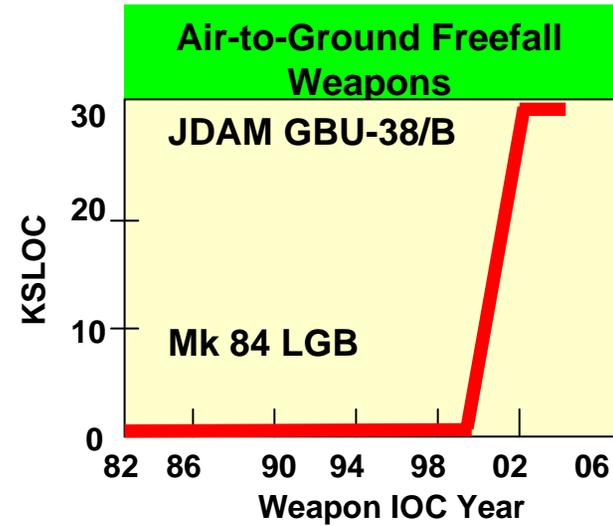
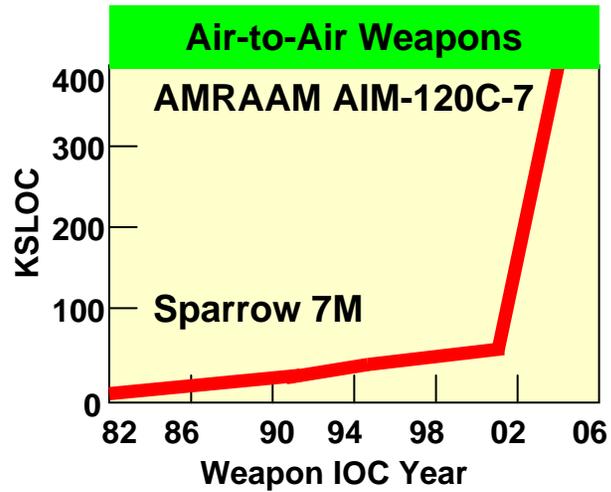
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Weapons Environment

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Software Development

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- ◆ Traditional Software
 - Low Level Programming
 - Ad Hoc Approaches
 - Stand-alone, Static Implementations
 - Custom Systems
 - Little Code Re-use
 - V & V is labor intensive (e.g. F/A-22)

- ◆ Result is
 - Prolonged Design Schedules
 - Excessive Cost
 - Difficulty in Maintenance/ Upgrade/ Retrofit
 - Limits on Functionality
 - Integration Coordination



Critical Issues are Bigger Than Navy

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- ◆ Software Acquisition Management
 - Contract language needs DoD-wide policy corrections
 - Managers and metrics need one taxonomy
- ◆ Software Systems Engineering
 - Systems-of-Systems, especially Joint SoS, will increase complexity and lower visibility unless DoD shifts together to an SoS architecture approach
 - Metrics must be real, real-time, and apples-to-apples
- ◆ Business Implications
 - Savings, through COTS and Open Architecture, require DoD-wide similar Contract Language and metrics
- ◆ Software Development Techniques
 - Savings, through re-use, requires DoD-wide similar assessment techniques
- ◆ Human Resources
 - DAU “Core-Plus” is just the first mandatory improvement to on-demand role-based training
 - Software Engineer Competency DoD-wide required