**Practical Software and Systems Measurement
User's Group - 2016**

**Moving Defense Software
Maintenance/Sustainment to
"DevOps"?**

**Workshop Materials and Discussion
Topics**

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23 February 2016

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Problem Statement

Defense software maintenance has a pressing need to move towards delivering mission capability faster, cheaper and better than it is currently doing.

Can this be achieved for weapons system programs and/or automated information systems programs using a "DevOps" conceptual way of doing business?

If so, what are the implications (e.g., technologically, financially, contractually, culturally, etc.) that need to be considered?

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Workshop Objectives

The goal is produce practical guidance for DoD program/project managers thinking of moving towards a "DevOps Concept" approach; i.e., what would it take to be successful in face of the existing technical, policy, funding, etc. constraints?

Workshop Agenda

- **What types of DevOps activities are being seen in the field?**

- **What might create uncertainty, risk, problems & opportunities in moving towards a DevOps concept?**

- **Can DevOps live in current or future complex DoD software maintenance environment?**

- **What types of recommendations should be made in trying to move towards s DevOps concept in DoD?**

- **Summarize inputs and recommendations**

Intended Output

- **Determine whether a DevOps concept is feasible for DoD**

- **Identify the potential roadblocks to moving towards a DevOps approach**

- **Categorize and prioritize roadblocks in terms of difficulty to overcome**

- **Formulate recommendations**

What Do We Mean By DevOps?

Conceptual Goals

- **Undo silos of development and maintenance and remake into a continuous, integrated process**

- **Increase the speed of response to business needs**

- **Improve system reliability, stability and cost management**

Implementing DevOps:
Choose Your Analogy

- *Iterative on Speed?*

- *Agile/Lean on Steroids?*

- *A Bi-modal Hybrid?*

- *???*

Some "General" Assumptions

- **Relatively closed system**

- **Totality of system and work flow can be transparent & coordinated**

- **Someone somewhere can make critical trade-off decisions**

- **Funding is based on ROI (performance-based)**

Starting the Discussion: DoD Culture

"Acquisition processes pay too little attention to supportability and consistently trade down-stream sustainability for required capability or program survival. **Some Program Managers assert that 'logistics is their only discretionary account' making it a frequent target for inevitable resource reductions.** In acquisition decision reviews, sustainment is often relegated to the back-up charts. Hampered by functionally stove-piped organizational structures and lacking life cycle management qualifications in their diverse workforce, the logistics community fails to achieve effectively integrated and affordable Warfighter operational readiness. Instead, it remains focused on managing commodities, parts, and services."

"When looking for immediate O&S cost saving opportunities, **sustainment is a logical target** since it is a current year expense which encompasses 60 to 75 percent of the life cycle support costs. The majority of that cost is enveloped in its supply chain… **Supply chain visibility for developed software that is being incorporated into critical DoD systems is particularly troublesome.**"

DoD Weapon System Acquisition Reform, November 2009

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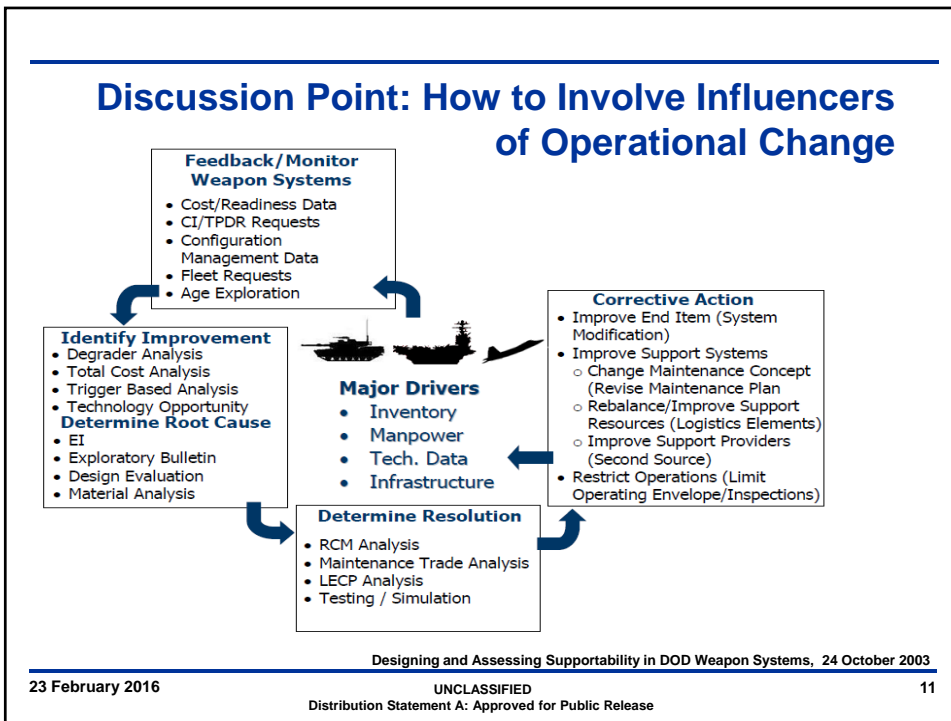## Discussion Point: Many Players, But Who Is In Charge?

A fundamental issue driving software sustainment and maintenance cost is that everyone and no one is in charge of it. Checks and balances to maximize readiness at the least cost are missing.

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Discussion Point: How to Involve Influencers of Operational Change

Feedback/Monitor Weapon Systems
- Cost/Readiness Data
- CI/TPDR Requests
- Configuration Management Data
- Fleet Requests
- Age Exploration

Identify Improvement
- Degrader Analysis
- Total Cost Analysis
- Trigger Based Analysis
- Technology Opportunity

Determine Root Cause
- EI
- Exploratory Bulletin
- Design Evaluation
- Material Analysis

Major Drivers
- Inventory
- Manpower
- Tech. Data
- Infrastructure

Corrective Action
- Improve End Item (System Modification)
- Improve Support Systems
  - Change Maintenance Concept (Revise Maintenance Plan)
  - Rebalance/Improve Support Resources (Logistics Elements)
  - Improve Support Providers (Second Source)
- Restrict Operations (Limit Operating Envelope/Inspections)

Determine Resolution
- RCM Analysis
- Maintenance Trade Analysis
- LECP Analysis
- Testing / Simulation

Designing and Assessing Supportability in DOD Weapon Systems, 24 October 2003

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Discussion Point: Technical Constraints

- When a system enters PPSS – many requirements are "locked" - use of COTS vs. an organic capability is basically decided at Milestone B – Executed at Milestone C (Production).

- Use of COTS products drives many sustainment requirements to include: license costs, Information Assurance Vulnerability Alerts, Certification & Accreditation, etc.
  - License – Legal financial obligation to use COTS product. Generally required throughout life.
  - IAVAs – Vulnerabilities associated with commercial product that must be analyzed/incorporated to software code – potential secondary impacts (IAVA impact other coding).
  - C&A – must be performed (regardless of COTS/GOTS); however, COTS drives many "findings".
- COTS drives secondary requirements – managerial/project lead time to manage/purchase COTS, adjust code to accommodate changes from other systems using COTS, additional releases, etc.
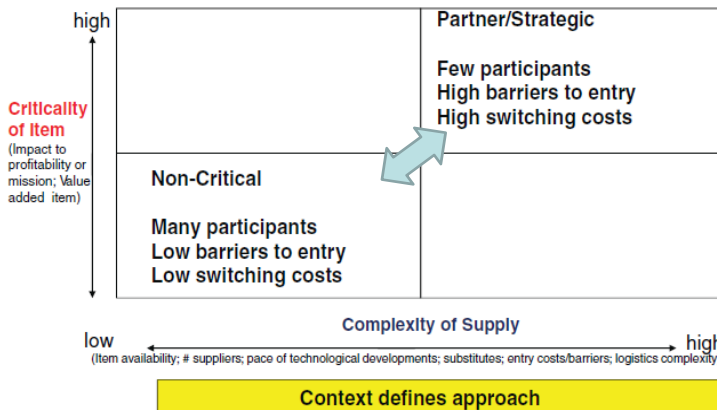
Director, AMC CECOM
Software Engineering Center
13 Nov 2012

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Discussion Point: Contracting for Maintenance
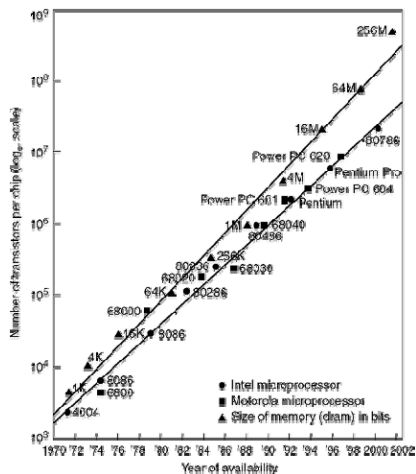
Typical Program Strategy Defaults

Examination of the U.S. Air Force's Aircraft Sustainment Needs in the Future and Its Strategy to Meet Those Needs,
National Research Council 2011

Discussion Point: Technology Obsolescence

In the 1960s, the expected market availability for computer chips was between 20 and 25 years; now it's between two and five.

- DoD systems have very long life cycles (F-22 needed 4 tech refreshes during acquisition alone)

- DoD systems are being kept for longer than planned (B-52 H: Built 1961, expected retirement ~1990 : now ~ 2044)

- DoD clout as major technology buyer lessened (DoD bought 100% of ICs produced in 1962 – it now buys less than 0.1%)

- Diminishing Manufacturing Sources and Material Shortages (DMSMS) affects *both* operational and support systems

- Speed and cost of technological obsolescence heightens consideration of using COTS systems & software

Discussion Point: System Convergence, Ownership & Funding

Upgrading a SoS

Software sustainment/maintenance coordination critical

Systems Engineering for Capabilities, Dahmann, J. S. et al. CrossTalk 2008

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Workshop Motivation: What We Seeing?

Need to talk to Cheryl? She has seen many organizations going towards a DevOps-lite approach.

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