Open Technology Development & Testing

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Network-Centric Systems

- Can’t create new systems with old tools/processes
- Current methods of acquisition are good when purchasing static componentry
- Not so good at acquiring systems which need to be modular, networked, dynamic, open to unknowable future concepts of operation.

Fostering/enabling innovation is central to network-centric warfare

INCREASE TRANSACTION RATES*

- *"The future is here. It's just not evenly distributed."* - *William Gibson*

- *"If you want to succeed, double your failure rate"* - *Thomas Watson, Founder IBM*

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* Col. John Boyd

Problem 1: Current Acquisitions System

- Requirements and acquisitions process takes too long
- Needs in the field aren't being addressed in time to have impact
- Cost estimates for major weapons systems continually increasing
- Systems tend to be used to get-the-job done versus by-the-book

Problem 2: Rapidly Changing Threats

Opponents able to plan around our current and future planned strengths and capabilities

Implications:

Capabilities built to meet a moving target

→Red Queen Scenario, enemy evolving with us (co-evolution)

→Competitive disadvantage

As the need to react to rapidly changing threats increases so must our tactics, to include design & testing processes

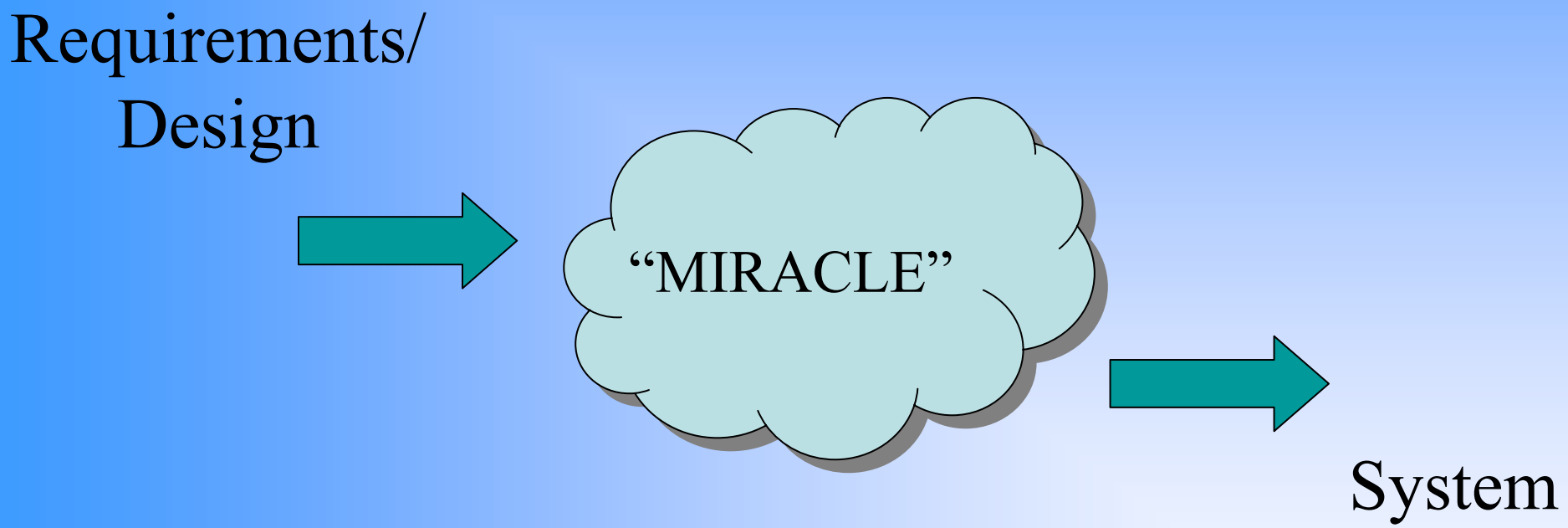
Current Design/Testing Methods

DOD acquisition system ill equipped to rapidly respond to rapidly morphing threats, leading to the creation of new entities to bypass existing acquisitions processes:

- ACTD Program
- Rapid Equipping Force
- Task Forces (IED, etc.)

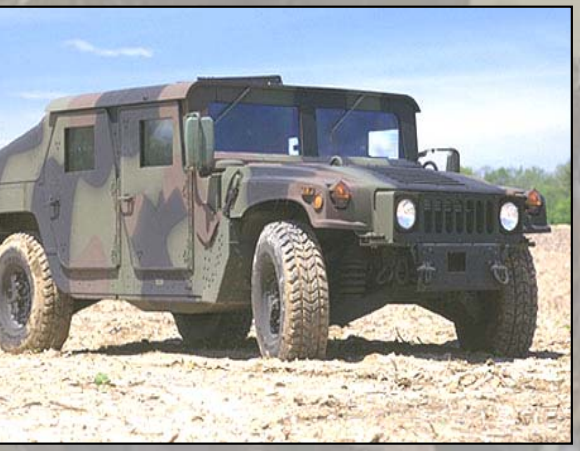
Why is this not the norm?

Large Acquisitions Programs



→ The Immaculate Acquisition

Fast and the Furious
UAH Production Acceleration



Oct 04 AOR Needs 8105* / Monthly Production

Jul 04 AOR Needs 5000* / Monthly Production 350

May 04 AOR Needs 4454 / Monthly Production 220

Jan 04 AOR Needs 4149 / Monthly / Production 138

Oct 03 AOR Needs 3279 / Monthly Production 81
First Acceleration Dollars Received

Aug 03 AOR Needs 1407 / Monthly Production 80

y 03 AOR Needs 235 / Monthly Production 15

Deficiencies

- DoD develops and has paid for large amounts of software code that isn't readily accessible or reusable.
- Interoperability issues across the services, commands and systems.
- Services constantly reinventing code
- Increasing complexity of software code
- Development costs outweigh COTS costs (if COTS available)
- Timely delivery of new solutions

How network centric systems are acquired influences behavior

Results:

- Stove-piped systems
- Inoperable systems
- Slow creation of systems, lack of agility
- Less innovation

Basic Premise of Solution

Two areas to change for creating network-centric systems

1. The environment for how systems are acquired, designed, utilized and shared
2. Methodologies for acquisitions

Change Methods

Open Technology Development (OTD) methodologies for hardware and software

DoD has spent huge amounts of money developing software code, which is rarely available for reuse.

- Information technology is the glue
- Open-source proven success in the private sector
- Better systems components are evolved, evaluated and tested through a distributed competitive collaborative network.

OTD Overview

- Transition of publicly available OSS into (and out of) DoD
- Development of DoD enterprise code ‘repository’* for reuse
- Enable collaboration across DoD on technology acquisition and development

*Not centralized

OTD Benefits

- Speed of technology deployment
- Avoid constant rebuilding of technology
- Improve technological collaboration
- Leverage external open source technology investments
- Focus new development in appropriate areas

OTD tools

- Manage the software development lifecycle and enable better documentation of code
- More than just a code repository – community and collaboration tools
- Increased code reliability and reduction of interoperability risks
- Increased awareness about developed code.
- Potential savings though reuse of code
- Breeding ground for new ideas
- Treats code as dynamic and evolving vs. static

Industry Understands the Benefits

- Corporate America is transitioning
- IBM - > $1B Investment in Open Source
- Apple - OSX built on open source
- HP - over 200 Open Source based products
- Microsoft uses open source methods internally
- CSC and BAE - Shifting to OSS Model

OT&E & OTD

- Testing & validation plays a key role in OTD
- Community of interest needed to rapidly test and evaluate new systems and rapidly share test technology
- Dynamic environment needed to match testing needs to IT development
- OT&E is part of a dynamic environment
- Testing of NCW systems must move from static testing to constant dynamic monitoring.

Not just Technology

- Need to focus on fostering the creation of an ecosystem that recognizes (and rewards) risk taking and innovation coupled with open architecture systems.

- Questions?
- For further information contact me for:
- AS&C, Open Technology Design Report
- NUWC report: *Network-Centric Warfare, Total Systems Design & Testing, June 2005.*
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Effort initiated by: Sue Payton, Deputy Undersecretary of Defense - Advanced Systems & Concepts

References & Additional Information

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- Open Source Software vendors: Collabnet, http://collab.net and SourceForge, http://sourceforge.net
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- Raymond, E.S., The Cathedral & the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary, O'Reilly Publishers, 2001
- Open Source Software Institute (deal with Gov issues), www.oss-institute.org
- Open Source and These United States -C. Justin Seiferth, http://skyscraper.fortunecity.com/mondo/841/documents/99-184.html
- Open Source Software for Imagery & Mapping, http://www.ossim.org (great example)