AFCEA Keynote

20 June 2013

Al Shaffer
Acting Assistant Secretary of Defense
for Research and Engineering
Defense Strategic Guidance
January 2012

• The military will be smaller and leaner, but it will be agile, flexible, ready and technologically advanced.

• Rebalance our global posture and presence to emphasize Asia-Pacific and the Middle East.

• Build innovative partnerships and strengthen key alliances and partnerships elsewhere in the world.

• Ensure that we can quickly confront and defeat aggression from any adversary – anytime, anywhere.

• Protect and prioritize key investments in technology and new capabilities, as well as our capacity to grow, adapt and mobilize as needed.
Defense Strategic Guidance
Driving FY14 Defense Planning Guidance

• Maintain at least zero percent real growth in Basic and Applied Research
• Maintain at least zero percent real growth in the aggregate of DoD Priorities

Seven S&T Priorities
• Cyber
• Electronic Warfare / Electronic Protection
• Counter Weapons of Mass Destruction
• Autonomy
• Data-to- decidections
• Human Systems
• Engineered Resilient Systems (ERS)

• Four Strategic Priorities: Counter Anti-Access/Area Denial (A2/AD), Building Partnership Capacity, Agile Operations, Tailored and Adaptive Systems

Maintain Zero Real Growth in Anti-Access/Area Denial (A2/AD)
“Our current security challenges are more formidable and complex than those we faced in downturns following Korea, Vietnam, and the Cold War. There is no foreseeable "peace dividend" on our horizon.”

GEN DEMPSEY, CJCS
Testimony to SASC, 12 Feb 2013
During Previous Budget Pressures, DoD Protects the Future through R&E

Constant FY2013 Dollar (Millions)

<table>
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<tr>
<th>Year</th>
<th>USD(R&amp;E) Perry Strategic Choice</th>
<th>SecDef Perry Strategic Choice</th>
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Pres Bud Requests FY1998-2018
Appropriated FY1962-2013
DoD Top Line FY1962-2018
A New Reality: Global Dimensions Affect DoD S&T

Pace of Technology

Technical Surprise

Rise of the Commons

Technology Fielding

Expanding Global Knowledge Base

Systems Complexity

Information Agility

Mass Collaboration

Cloud Computing

Information Agility

Mass Collaboration
The Pace of Technology Development and Market Availability is Exceeding the Pace of Acquisition

It took 23 years to go from modeling germanium semiconductor properties to a commercial product.

The carbon nanotube was discovered in 1991; recognized as an excellent source of field-emitting electrons in 1995, and commercialized in 2000.
Rise of the Commons

Military Operations Increasingly Depend on Being Able to Operate in Places “No One Owns” – *The Enablers*
Expanding Global Knowledge Base

The Research Talent Base is Growing and Shifting at an Accelerating Rate
Apple and AT&T released the iPhone on 29 June in an exclusive agreement. Hotz spent ~500 hours working on his “summer project” and the hack was available in July.

Information Agility

This is the New Asymmetry—Victory Goes to the Agile and Innovative
Mass Collaboration

DARPA Network Challenge

• Winter 2009
• DARPA “Red Balloon Challenge”
• Mark 40th Anniversary of ARPANet
• Basic research issues such as mobilization, collaboration, and trust in diverse social networking constructs

Ad-hoc Groups Can Quickly Solve (or Create) Massively-Complex Problems
Defense Systems have experienced significant growth in development time and cost with increasing complexity.
Technology Surprise: S&T Connect to Intelligence

Near Term
Specific potential adversary system performance

Mid Term
Strategic force development plans

Far Term
Understanding investment in research coupled with assessment of potential adversary capabilities

Prepare for an Uncertain Future
Defense S&T Investment
An Emerging Strategy

“Protect and prioritize key investments in technology and new capabilities, as well as our capacity to grow, adapt and mobilize as needed.”

-SECDEF, January 2012 Strategic Guidance

1. **Mitigate** new and emerging capabilities
   - Electronic Warfare
   - Cyber
   - Counter Space
   - Counter-WMD

2. **Affordably** enable new or extended capabilities in existing military systems
   - Systems Engineering
   - Data Reuse
   - Engineered Resilient Systems
   - Developmental Test & Evaluation

3. Develop technology **surprise** through science and engineering
   - Autonomy
   - Basic Research
   - Data-to-Decision
   - Human Systems

ASD(R&E) Should Lead the Future

Technology Needs

- Middle East Instability
- North Korean Nuclear Ambitions
- Anti-Access/Area Denial
- Cyber Attacks
- Electronic Warfare
Communications Enterprise at the Tactical Edge

- A wide range of solutions are used to provide communications to forward deployed forces
- Communications is the backbone of modern operations
Communications in an A2AD Environment

Unaddressed Threats remain

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<th>Physical</th>
<th>EW</th>
<th>Cyber</th>
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<td>Denial-of-Service</td>
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<td>Deception</td>
<td>Jamming</td>
<td>Spoofing</td>
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<tr>
<td>Detection</td>
<td>Spoofing</td>
<td>Traffic Analysis</td>
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<td>Loss of</td>
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• Broad range of attacks can compromise communications
• Current communications enterprise not robust against threats
  – Threats have evolved, communications systems capabilities have lagged
Examples of key capabilities

1. Robust / improved tactical data links
2. Resilient weapons data link
3. Detection, correlation and re-planning
4. Cross-platform air-to-air connectivity
5. Surface connectivity without SATCOM
6. Contested ISR dissemination
7. Robust ground waveforms
8. Mid-tier ground connectivity
9. Interoperability
10. Dealing with Heterogeneity

Assured communications requires both new solutions to fill gaps and effective technology for integration
Industry Outreach
Defense Innovation Marketplace

Reinvigorate industry’s independent research and development and protect the defense technology base

DFARS Change
231.205-18 Independent research and development and bid and proposal costs.

(a) Definitions. As used in this subsection—

IR&D Project Inputs
1975 - 2012

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A Guide to Help You Think

Initiatives

- Achieve Affordable Programs
- Control Costs Throughout the Product Lifecycle
- Incentivize Productivity & Innovation in Industry and Government
- Eliminate Unproductive Processes and Bureaucracy
- Promote Effective Competition
- Improve Tradecraft in Acquisition of Services
- Improve the Professionalism of the Total Acquisition Workforce

For additional information: http://bbp.dau.mil
“(Ladies and) Gentlemen, we are out of money. Now we must think!”

Winston Churchill to Parliament during World War II
(Stolen from Ernest Rutherford)