



AFCEA Keynote

20 June 2013

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**Acting Assistant Secretary of Defense
for Research and Engineering**

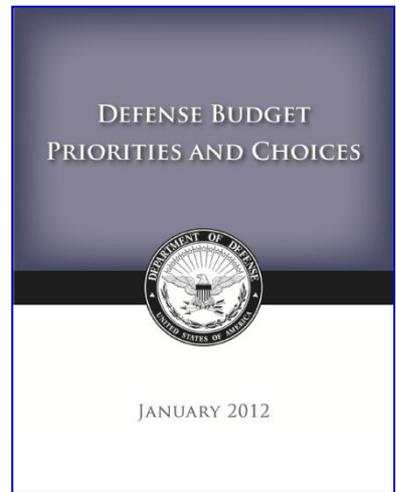
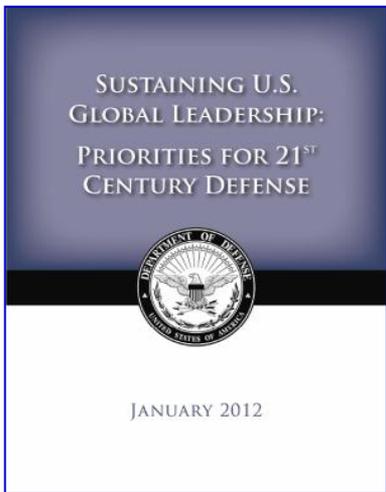


Defense Strategic Guidance

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

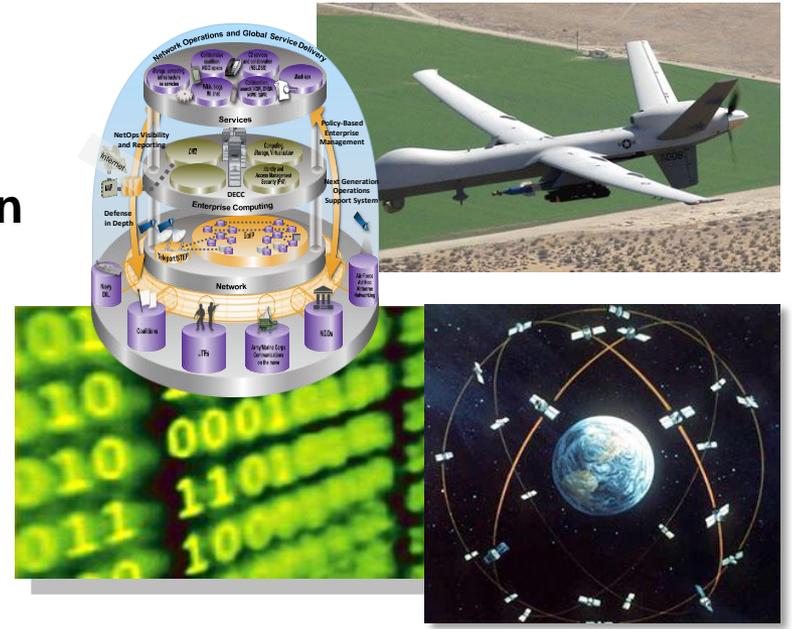
Driving FY14 Defense Planning Guidance



- 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-Decisions
- 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

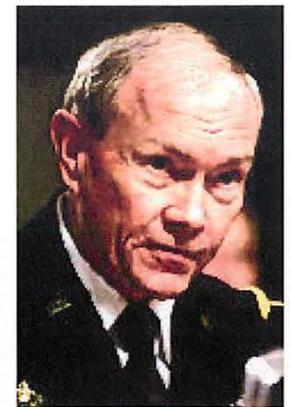
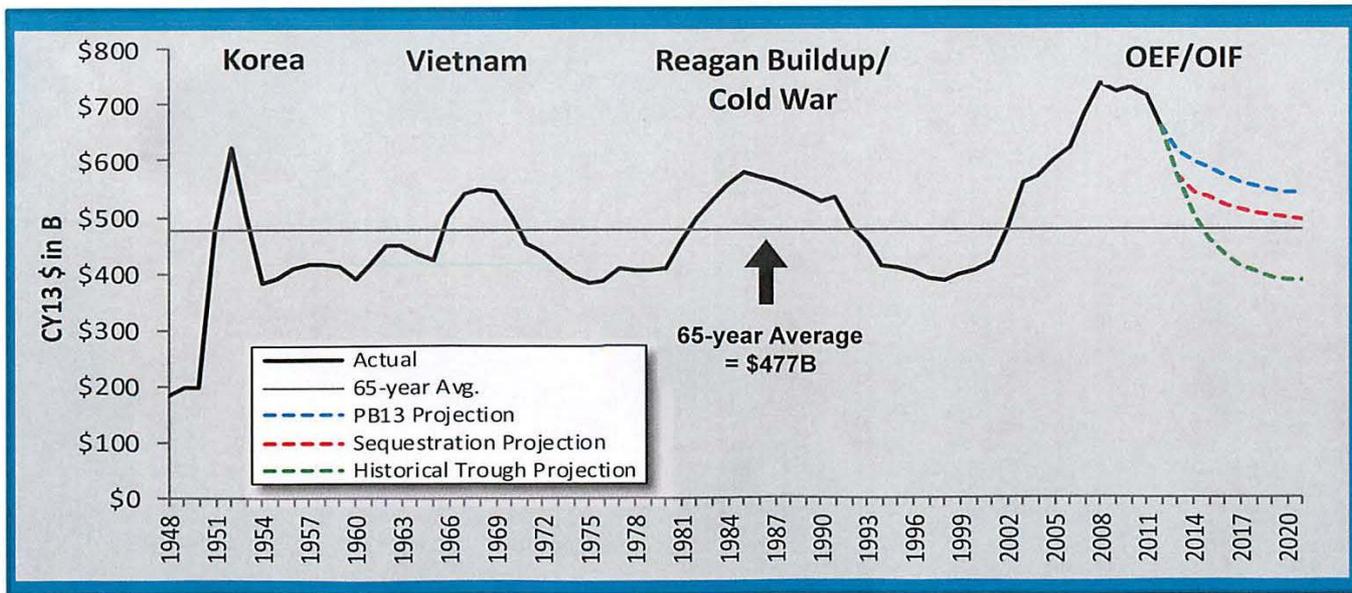
Maintain Zero Real Growth in Anti-Access/Area Denial (A2/AD)



The Reality....

“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.”

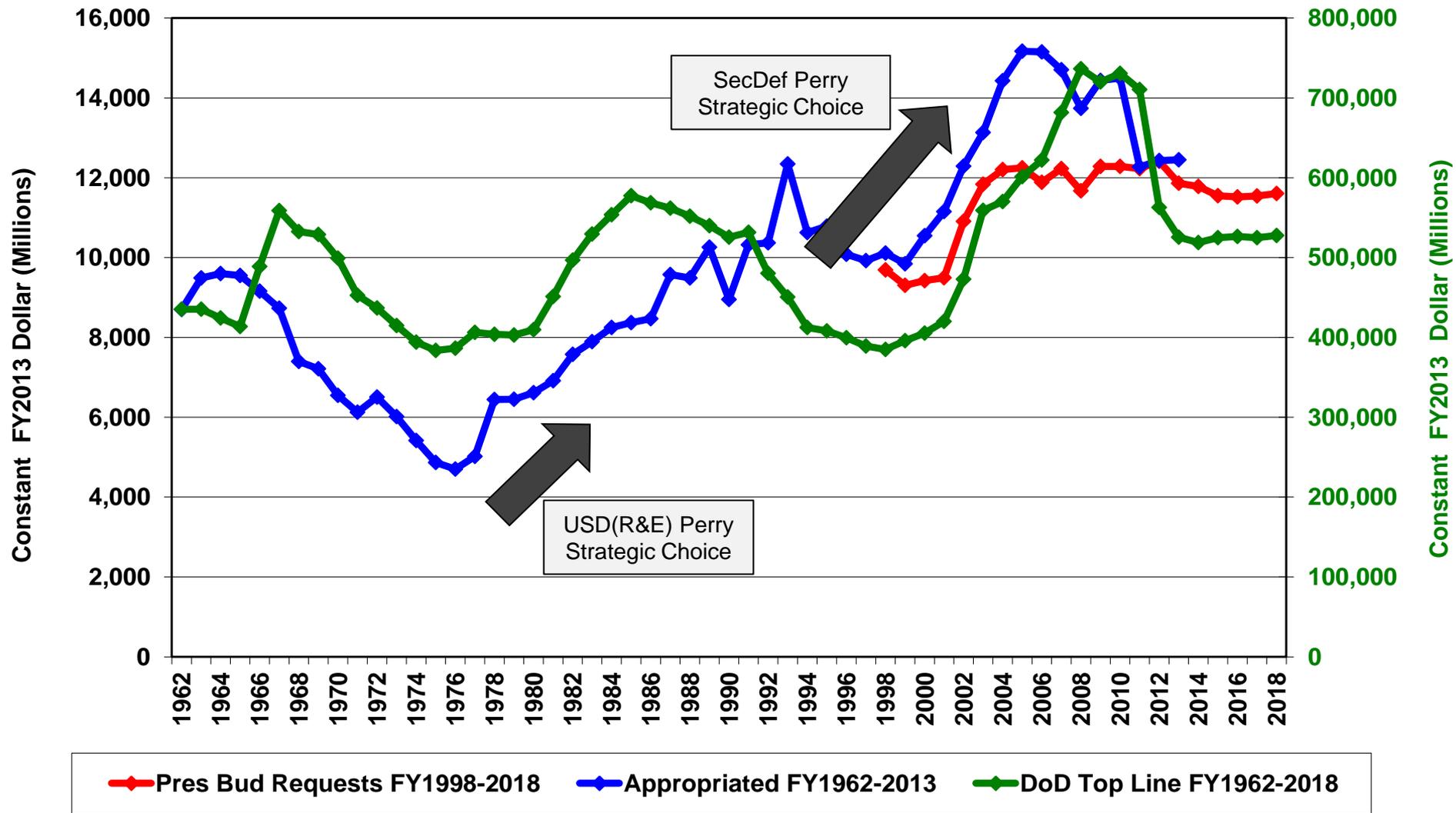
GEN DEMPSEY, CJCS
Testimony to SASC, 12 Feb 2013



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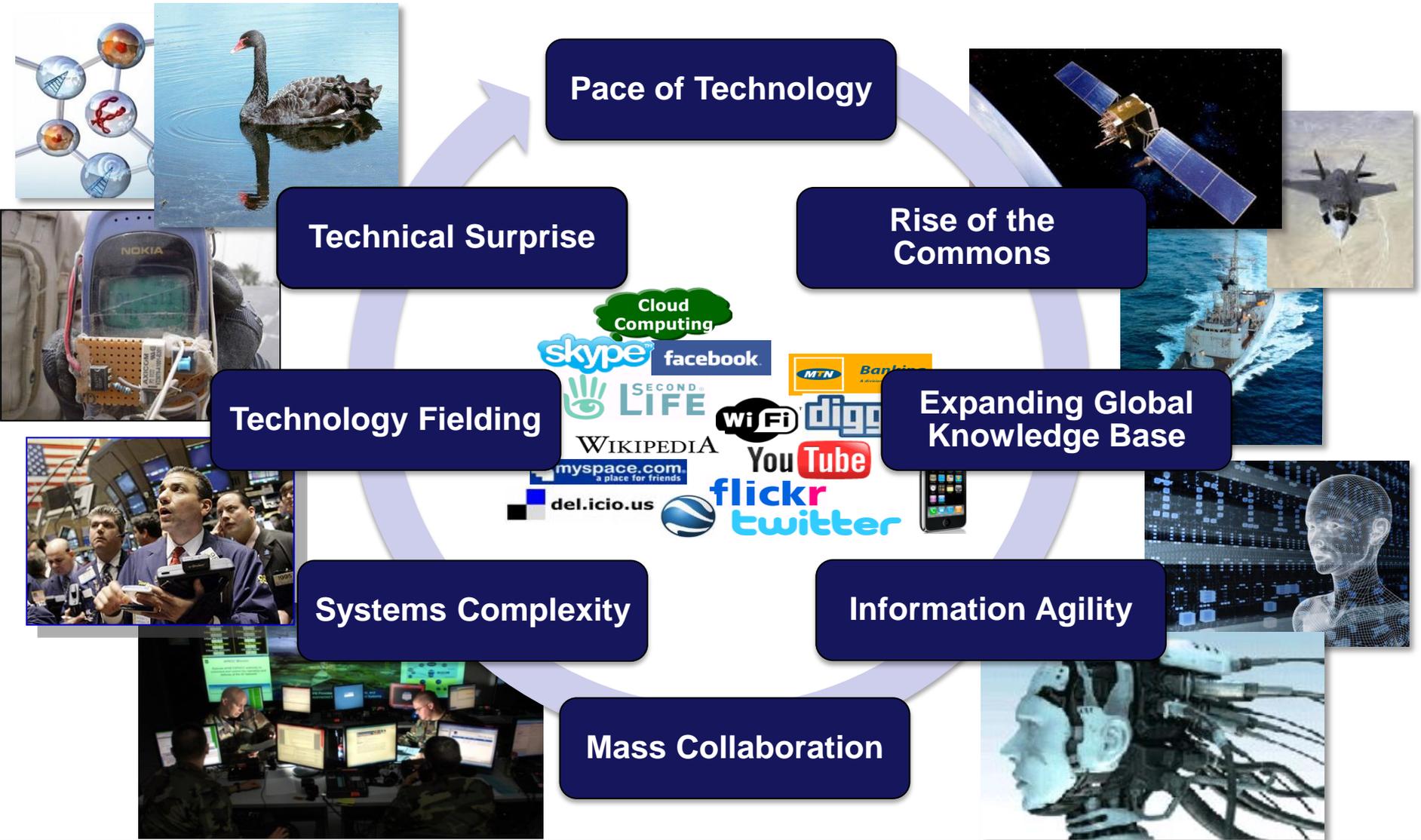


During Previous Budget Pressures, DoD Protects the Future through R&E





A New Reality: Global Dimensions Affect DoD S&T

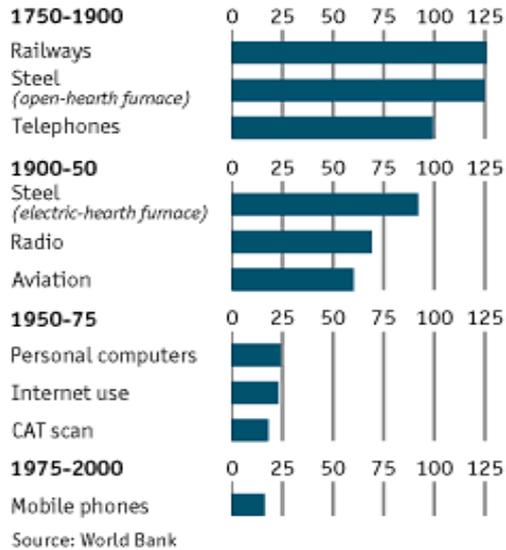




Pace of Technology

High-tech leapfrog

Number of years after invention for selected technologies to reach 80% country coverage

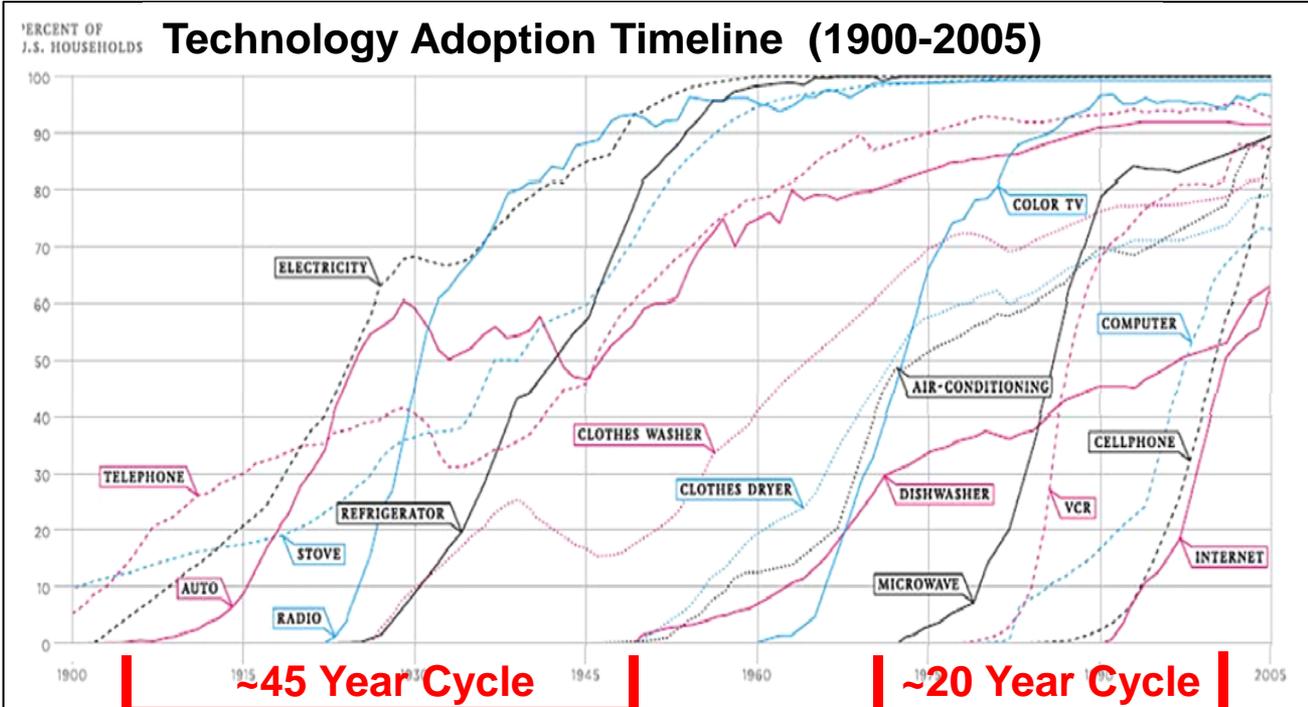


The Economist, Feb. 9, 2008

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

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

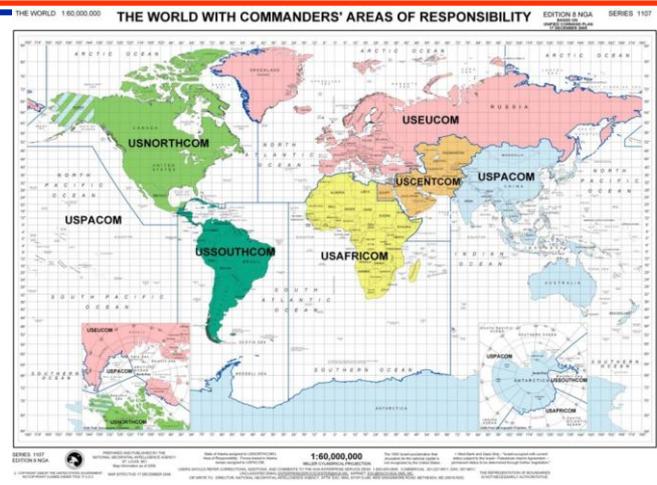




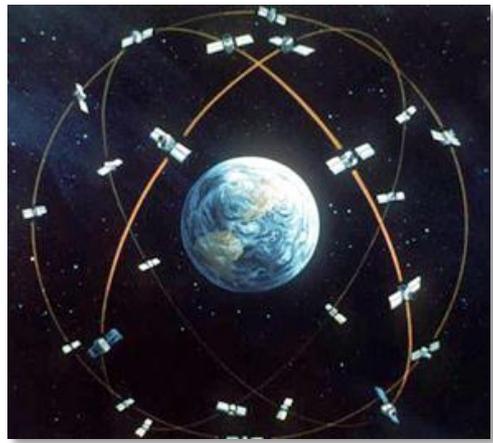
Rise of the Commons



Electronic Warfare



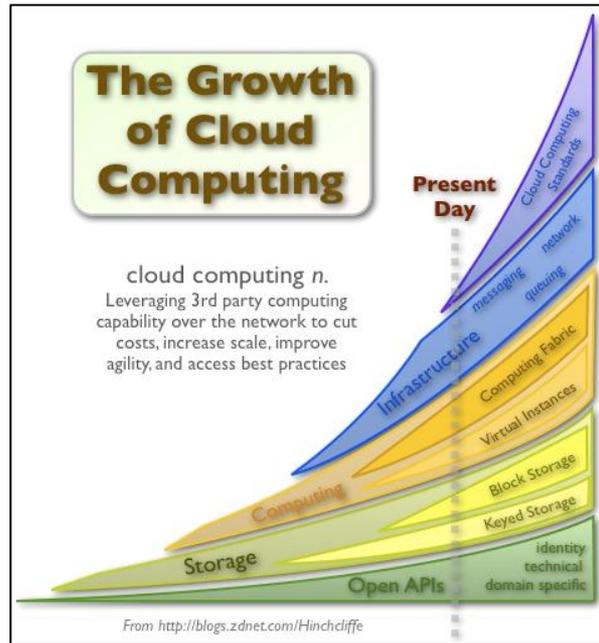
Oceans



Space



Cyber



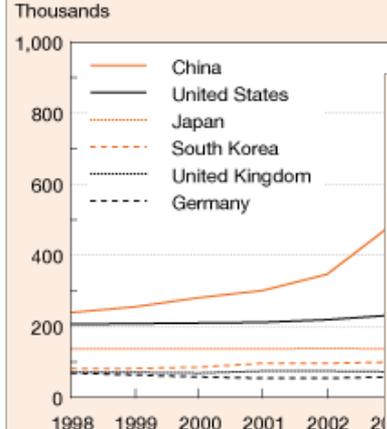
Ubiquitous Data

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

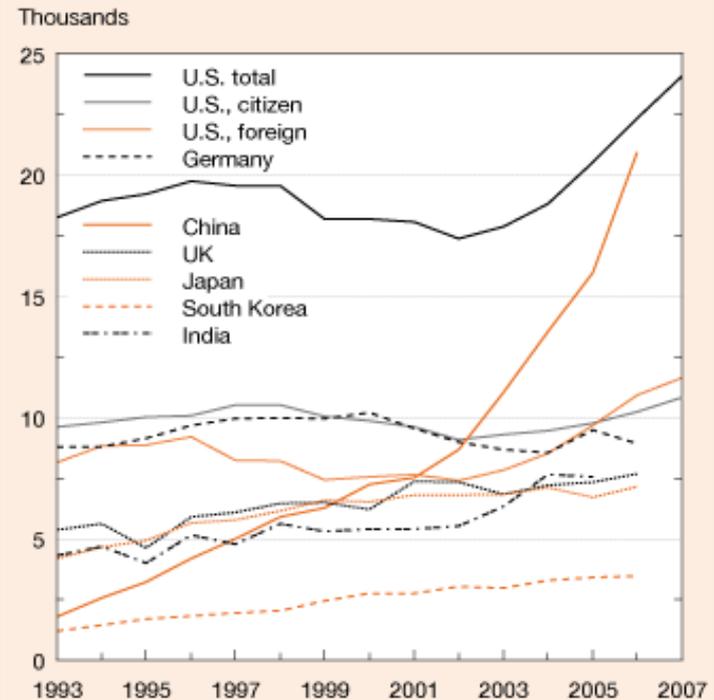


Expanding Global Knowledge Base

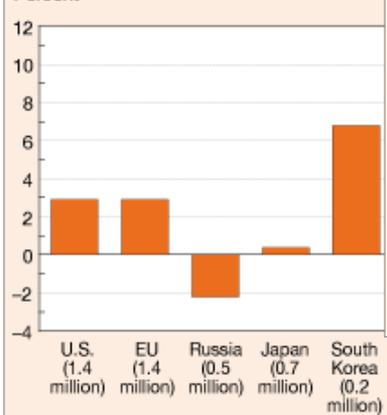
First university degrees in natural sciences and engineering, selected countries: 1998-2006
Thousands



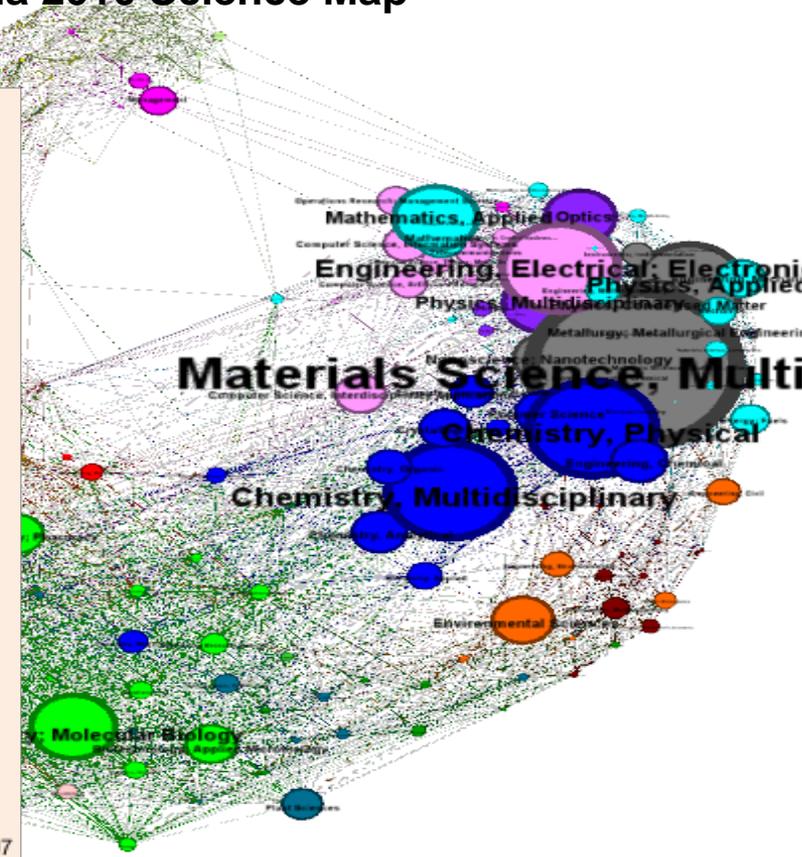
Doctoral degrees in natural sciences and engineering, selected countries: 1993-2007
Thousands



Average annual growth in number of selected regions/countries/economies
Percent



China 2010 Science Map



The Research Talent Base is Growing and Shifting at an Accelerating Rate

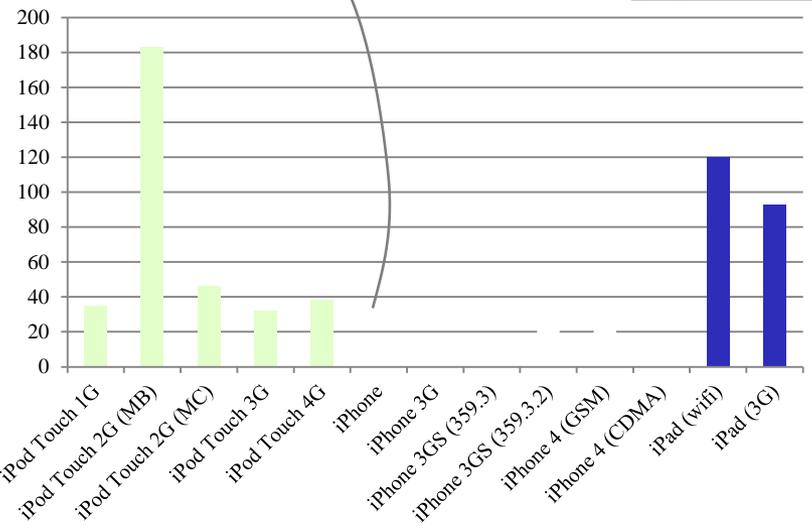


Information Agility

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.



Days to Break



Today's adversaries are light and agile, and rapidly react and innovate in response to US actions.

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



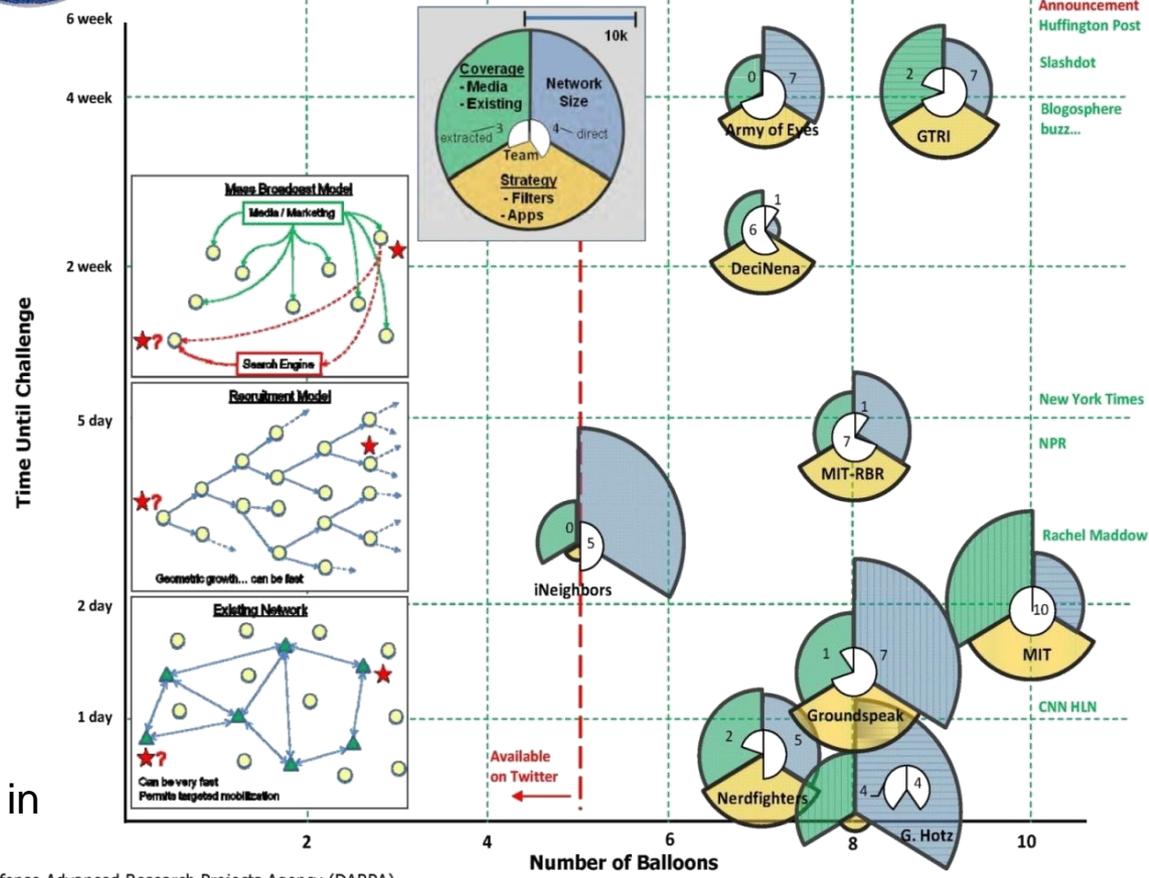
Mass Collaboration

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

DARPA Network Challenge Team Performance



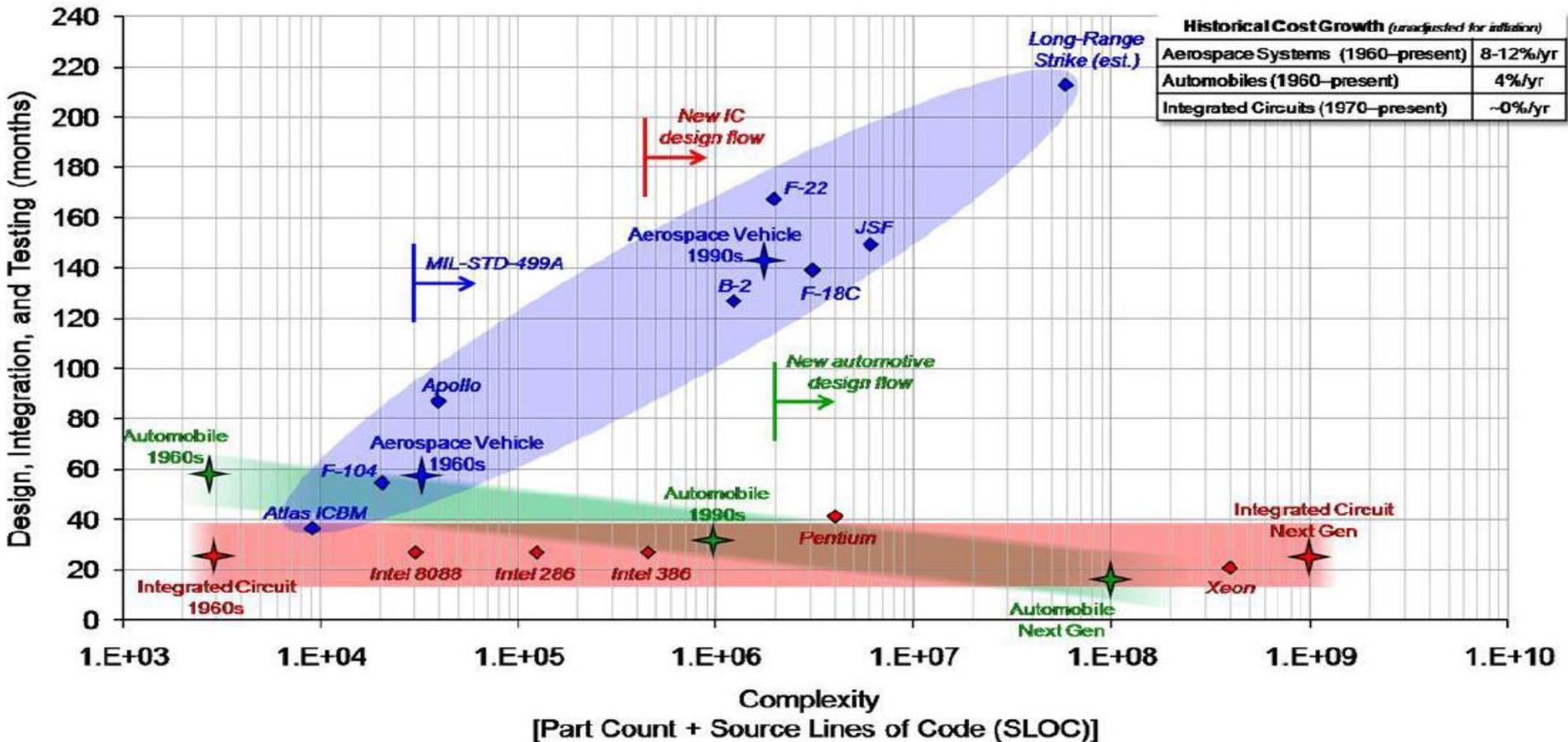
Defense Advanced Research Projects Agency (DARPA) 2009 Network Challenge

Ad-hoc Groups Can Quickly Solve (or Create) Massively-Complex Problems



Systems Complexity

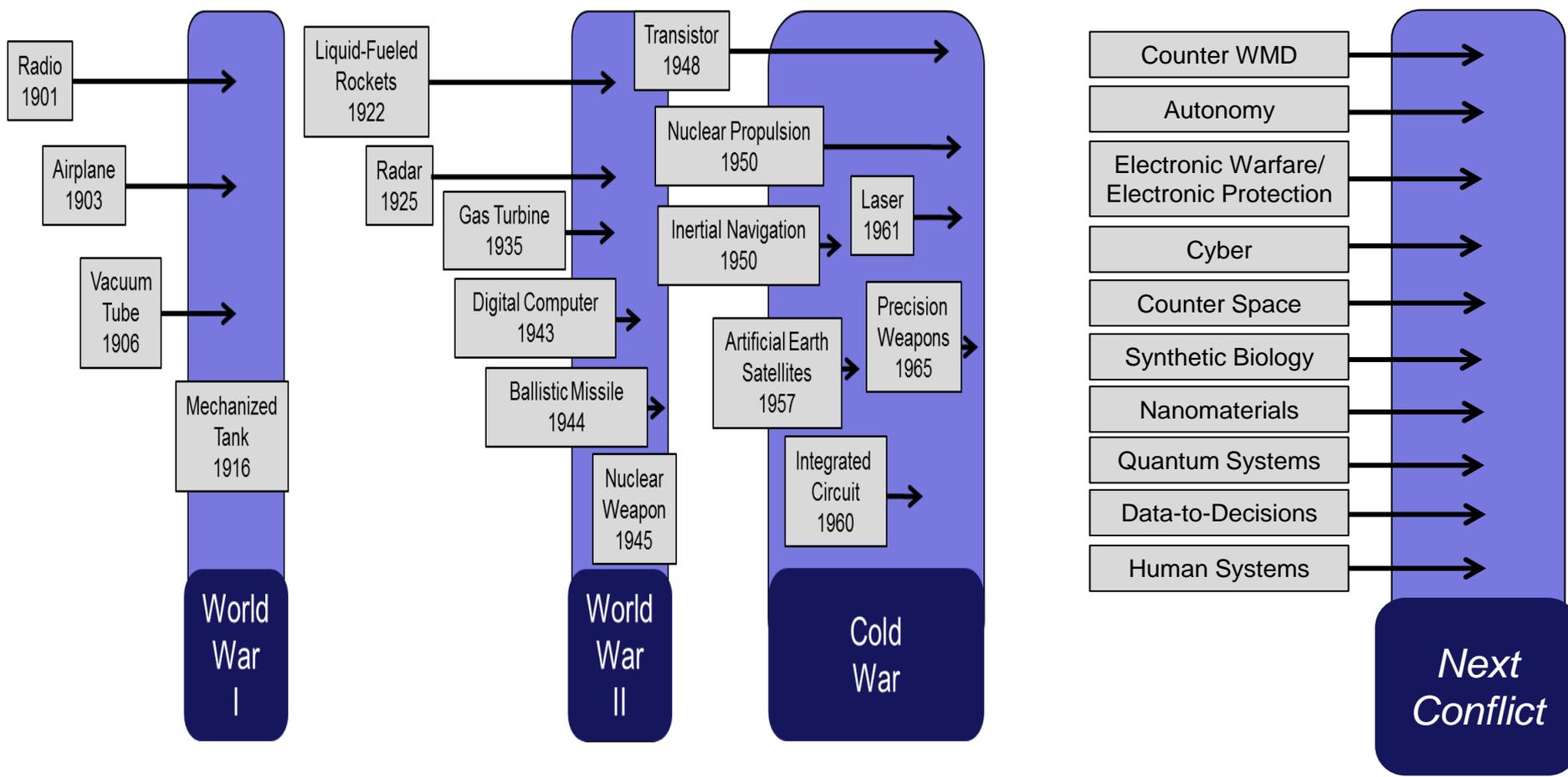
Defense Systems have experienced significant growth in development time and cost with increasing complexity





Technology Fielding

1900 1910 1920 1930 1940 1950 1960 1970 2013 Future





Technology Surprise: S&T Connect to Intelligence



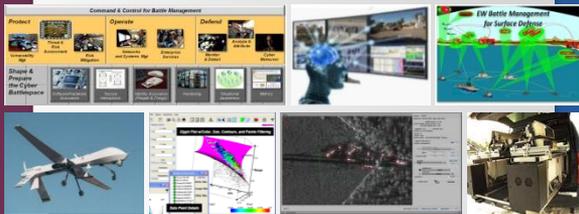
Near Term

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
- Counter Space
- Cyber
- Counter-WMD

2. **Affordably** enable new or extended capabilities in existing military systems

- Systems Engineering
- Engineered Resilient Systems
- Data Reuse
- Developmental Test & Evaluation

3. Develop technology **surprise** through science and engineering

- Autonomy
- Data-to-Decisions
- Basic Research
- Human Systems

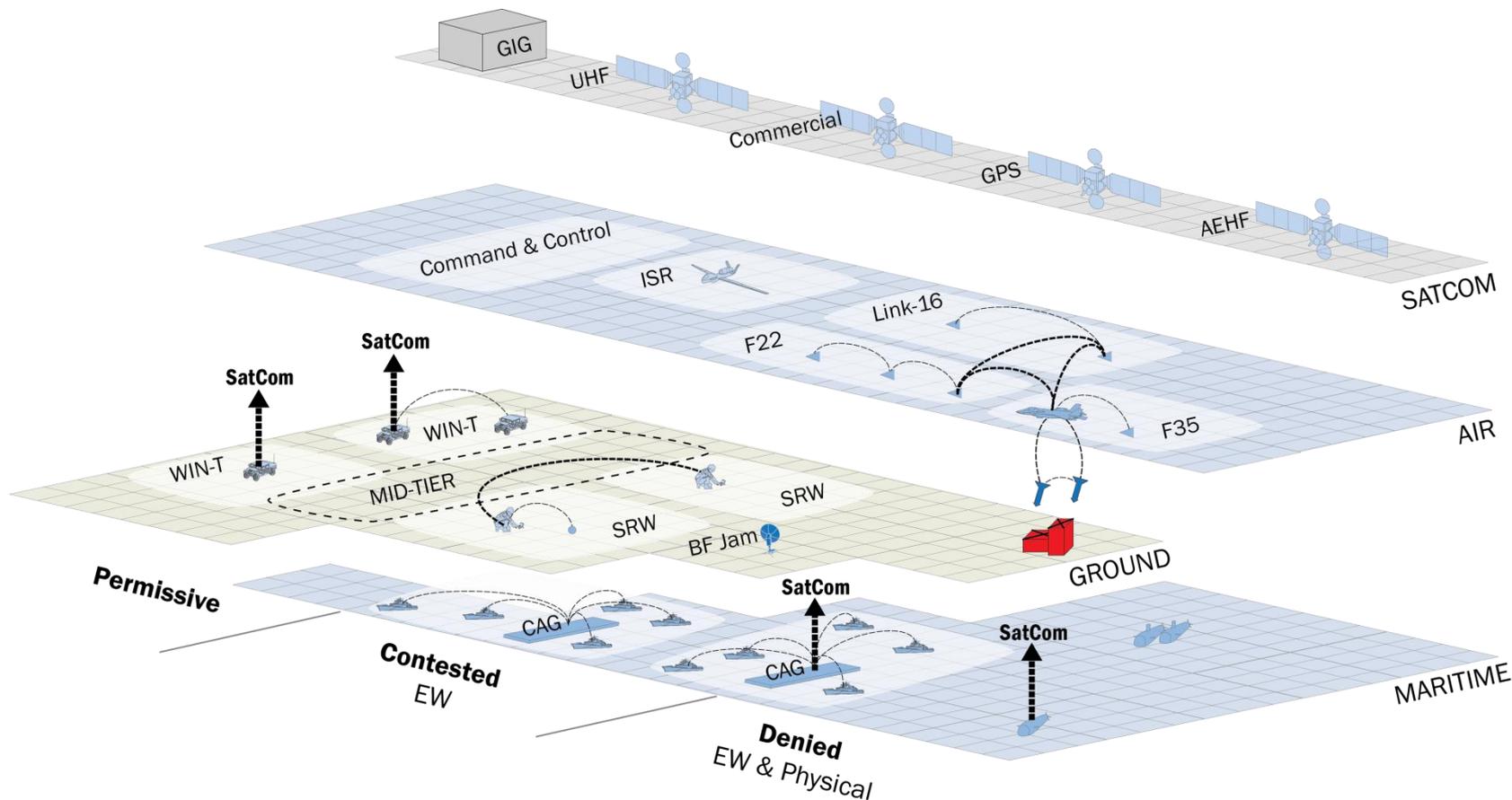
ASD(R&E) Should Lead the Future

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

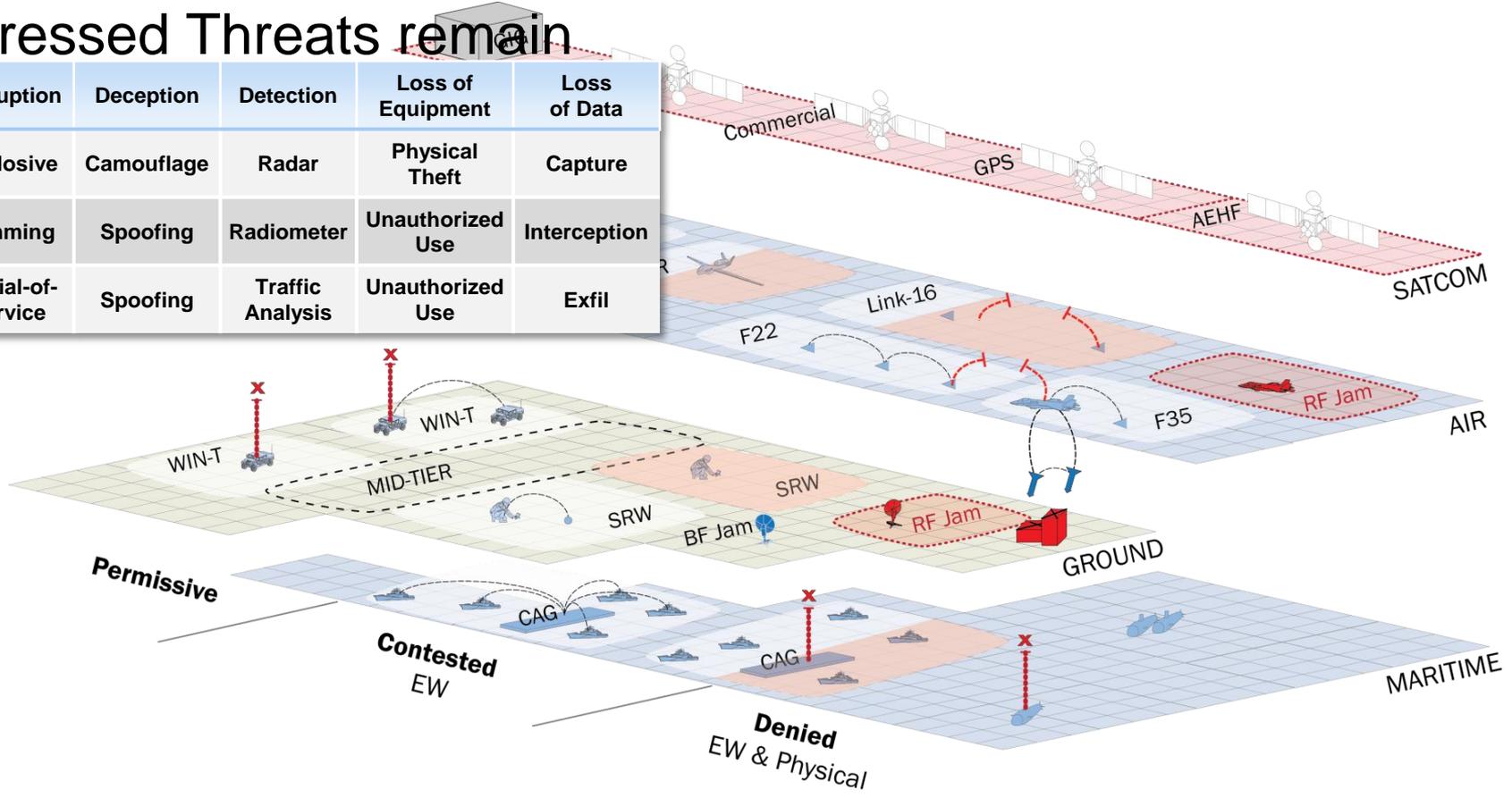


Communications in an A2AD Environment



Unaddressed Threats remain

	Disruption	Deception	Detection	Loss of Equipment	Loss of Data
Physical	Explosive	Camouflage	Radar	Physical Theft	Capture
EW	Jamming	Spoofing	Radiometer	Unauthorized Use	Interception
Cyber	Denial-of-Service	Spoofing	Traffic Analysis	Unauthorized Use	Exfil



- **Broad range of attacks can compromise communications**
- **Current communications enterprise not robust against threats**
 - Threats have evolved, communications systems capabilities have lagged

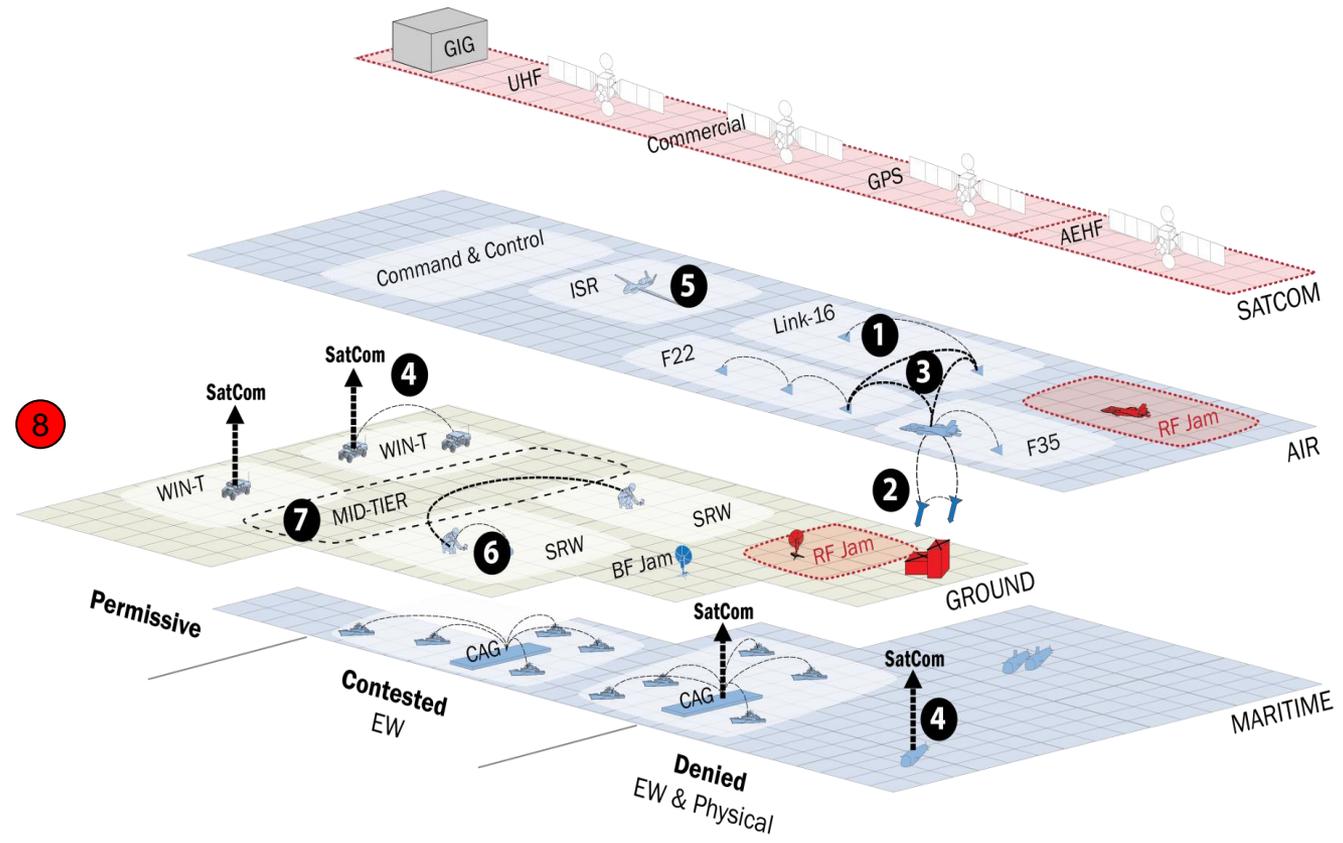


Key Capabilities for Assured Communications



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



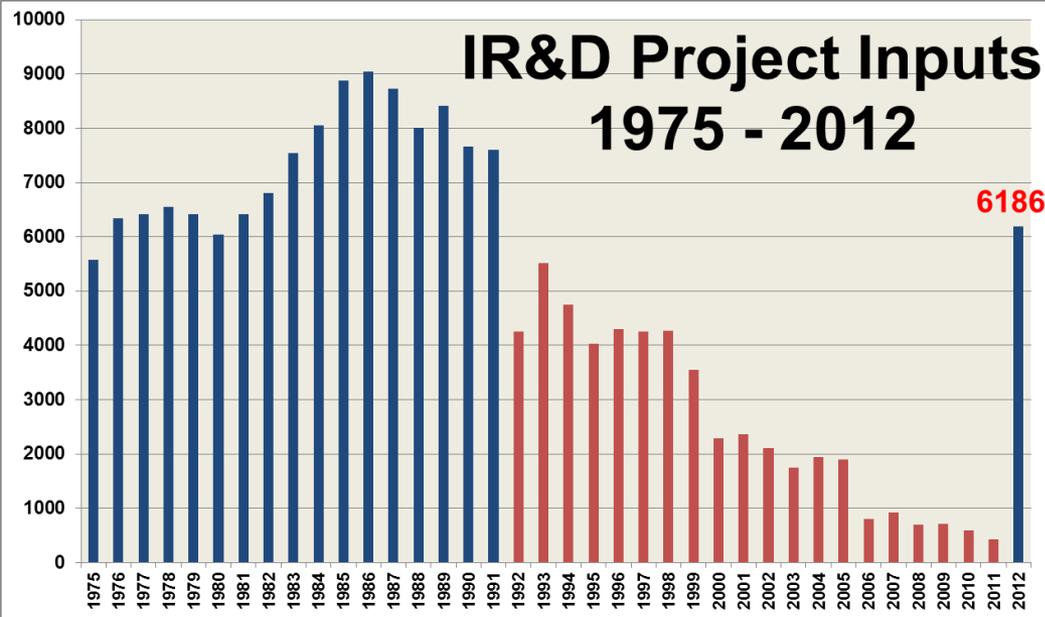
Reinvigorate industry's independent research and development and protect the defense technology base



DFARS Change

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

(a) Definitions. As used in this subsection—





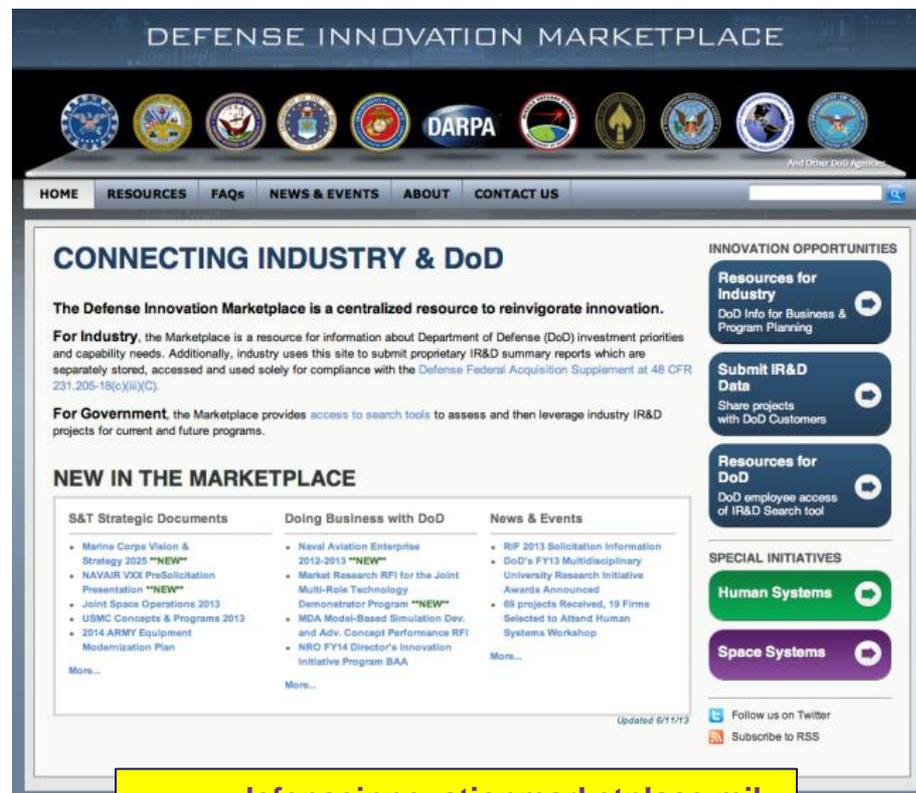
Better Buying Power 2.0

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



www.defenseinnovationmarketplace.mil

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)