DoD Research and Engineering

Science and Technology Breakfast

National Defense Industrial Association

Mr. Stephen Welby
Assistant Secretary of Defense for Research and Engineering

June 2, 2016

Defense R&E Strategy

Mitigate current and anticipated threat capabilities

Affordably enable new or extended capabilities in existing military systems

Create **technology surprise** through science and engineering

Researchers and Engineers doing game-changing work

Preserving Technological Superiority

40 year technological advantage of US and Allies

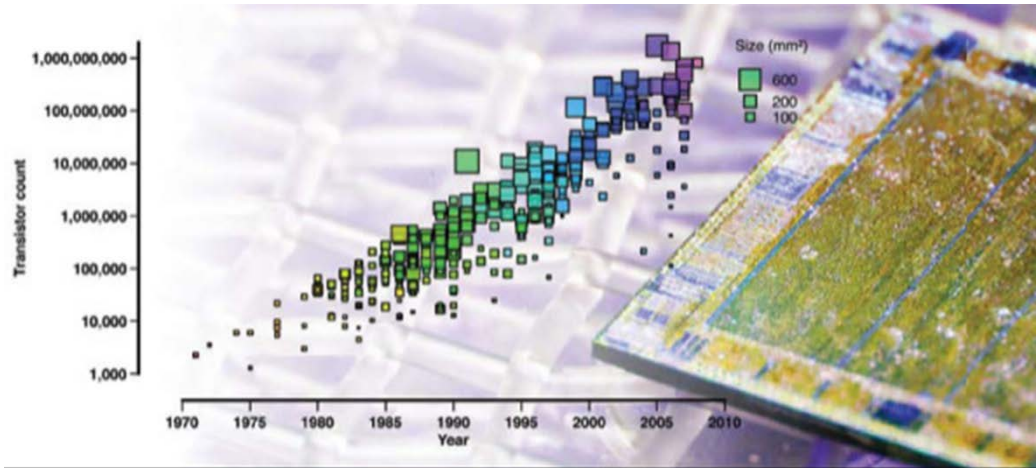
What has changed:

Global access to resources, technology and talent

Competitors investments

Speed and pace of technical opportunity

Cost and cycle time



DoD Innovation

DoD seeks competitive advantage through innovation…

Leveraging all sources of innovation opportunity

Time to market matters

Speed transition from Laboratory to Fleet

Innovation enables Strategy

Increasingly, technical innovation is coming from commercial and non-traditional sources, DoD needs the ability to harness advanced technology from all possible sources.

Innovation Influences Strategy

Offset - ***asymmetrically compensating*** for a disadvantage

Rather than match - ***changing the competition***

Seeks to ***maintain competitive advantage*** over long periods of time ***while preserving peace*** where possible

"…he [Secretary Carter] asked us to seek game changing technologies and make more discreet technological bets that exploit our advantages as well as adversary weaknesses. "

– Bob, Work, Deputy Secretary of Defense, Budget Rollout Brief, 9 Feb 2016

Previous Offset Strategies

"First Offset Strategy" – 1950s

Nuclear deterrence to avoid a large increase in defense expenditures to conventionally deter Warsaw Pact forces during the 1950s

"Second Offset Strategy" – 1970s

Disruptive technologies that shaped, in many ways, the U.S. military of today

These Offset Strategy's technologies continue to enable U.S. global precision strike today

Toward a Third Offset Strategy
Capabilities and Operational Concepts

Autonomous Learning Systems

Delegating decisions to machines in applications that require faster-than-human reaction times

Human-Machine Collaborative Decision Making

Exploiting the advantages of both humans and machines for better and faster human decisions

Assisted Human Operations

Helping humans perform better in combat

Advanced Manned-Unmanned System Operations

Employing innovative cooperative operations between manned and unmanned platforms

Network-enabled, autonomous weapons hardened to operate in a future Cyber/EW Environment

Allowing for cooperative weapon concepts in communications-denied environments

DoD Research and Engineering
World Class Talent

113,796 professional and dedicated scientists and engineers*

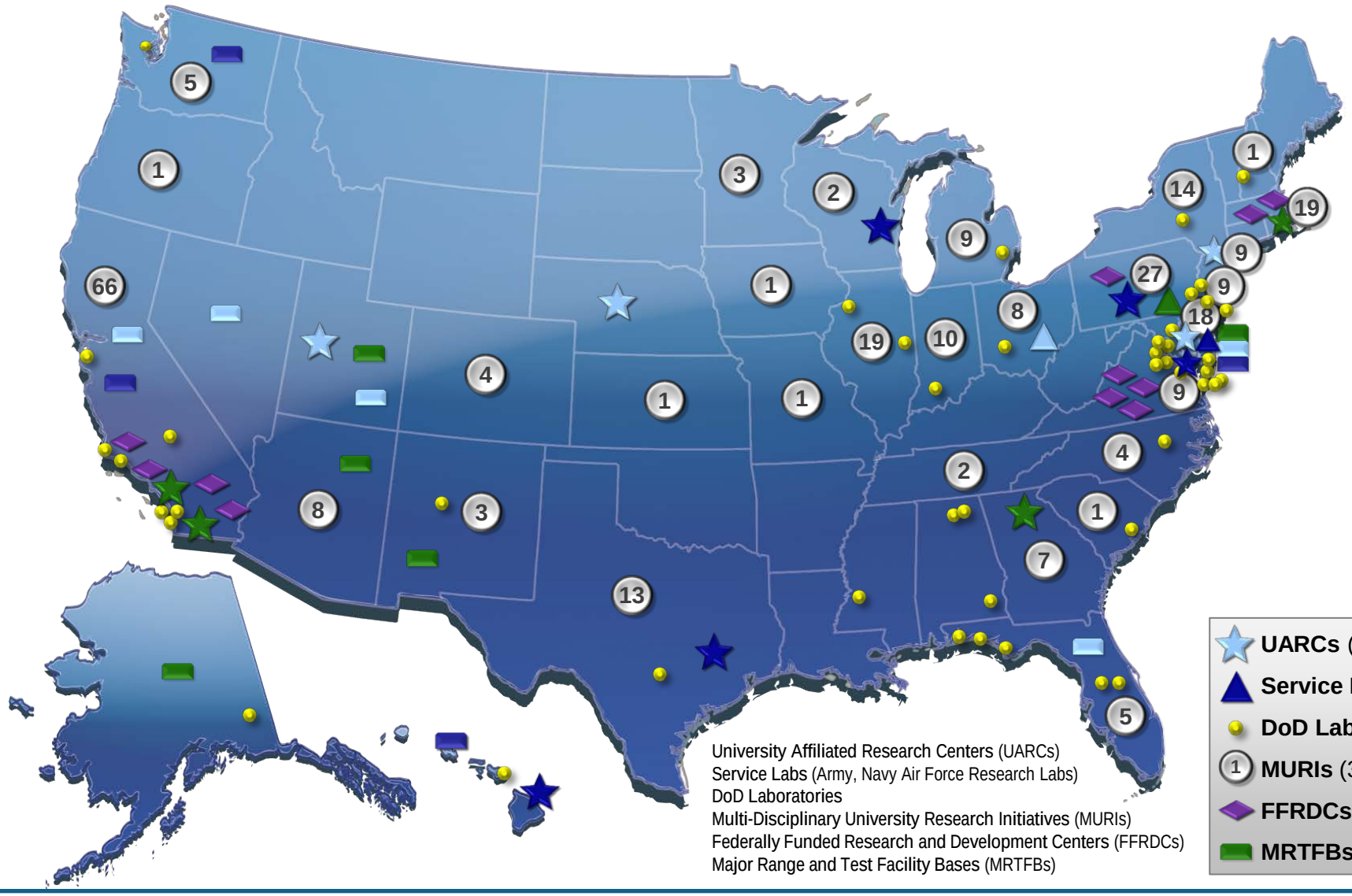
Traditional and non-traditional Industry and academia

And international allies and partners

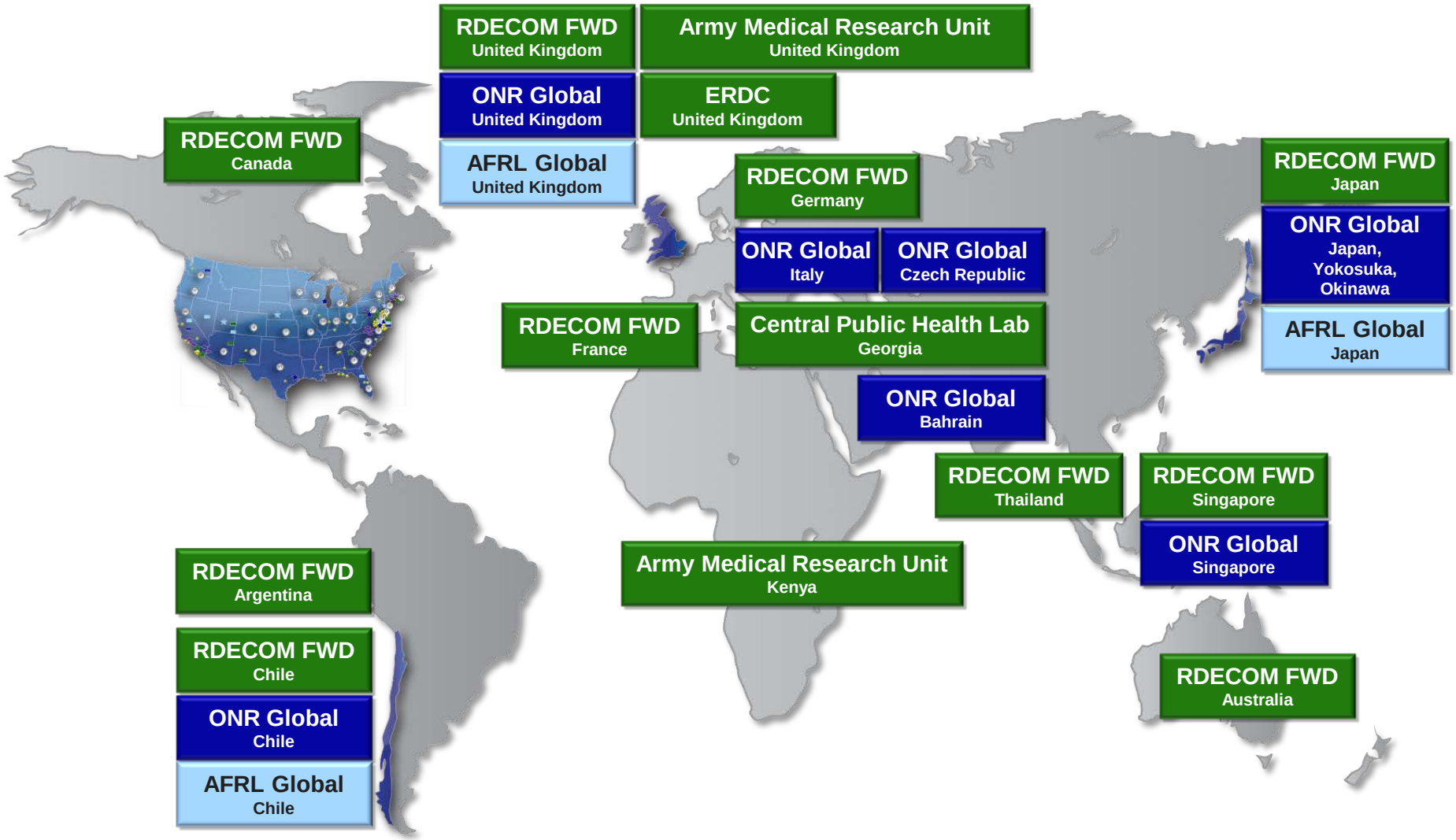
** Source: FedScope.opm, as of 31 March 2015*

DoD R&E Enterprise

(UARCs, Service Labs, DoD Labs, MURIs, FFRDCs, MRTFB)



DoD Research and Engineering World Class Capabilities



Innovation Opportunities
Prototyping and Experimentation

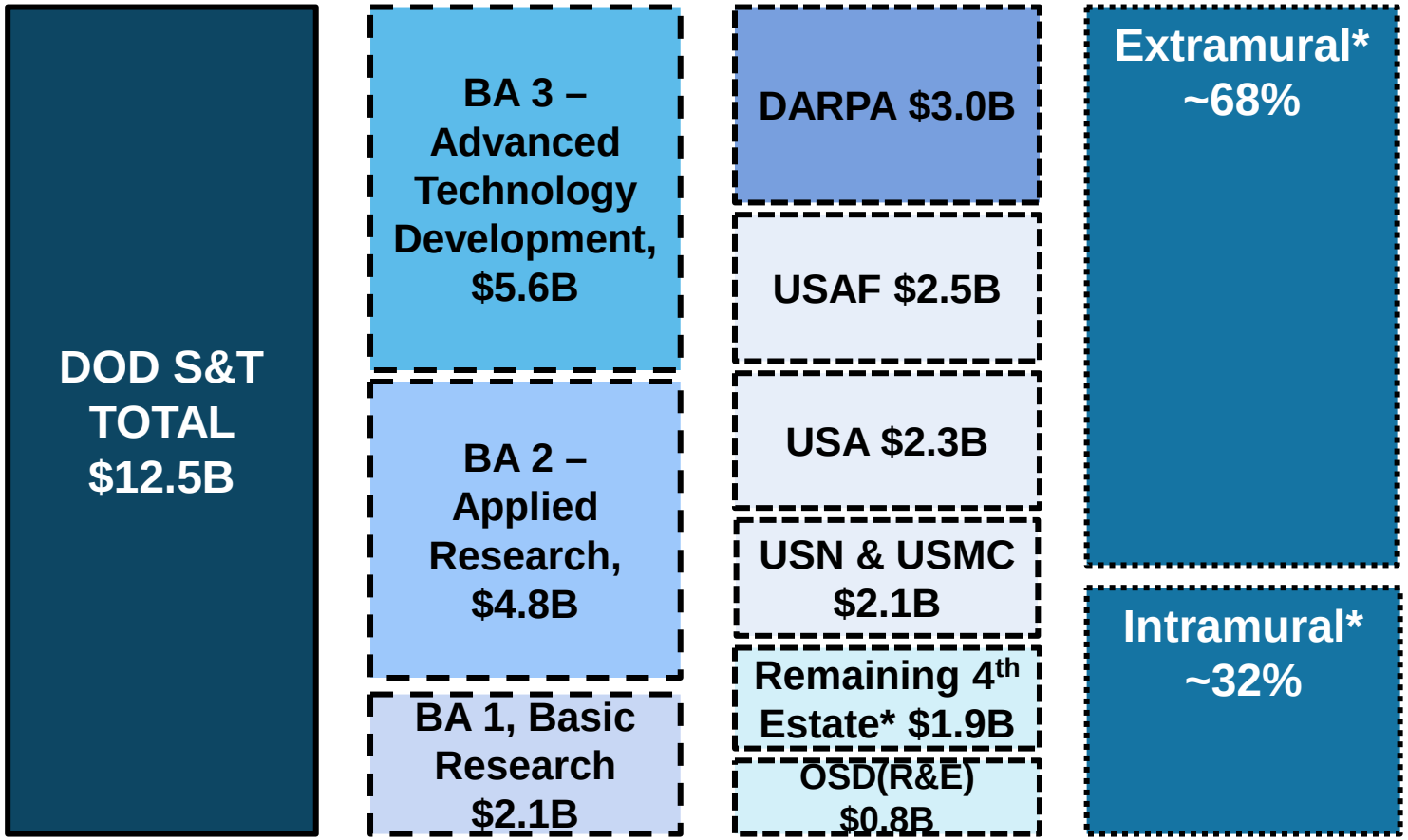
- Autonomy & Robotics
- Biomedical
- Electronic Warfare / Cyber
- Future of Computing/Micro-electronics
- Hypersonics
- Directed Energy
- Manufacturing








DOD PB 2017 S&T Request



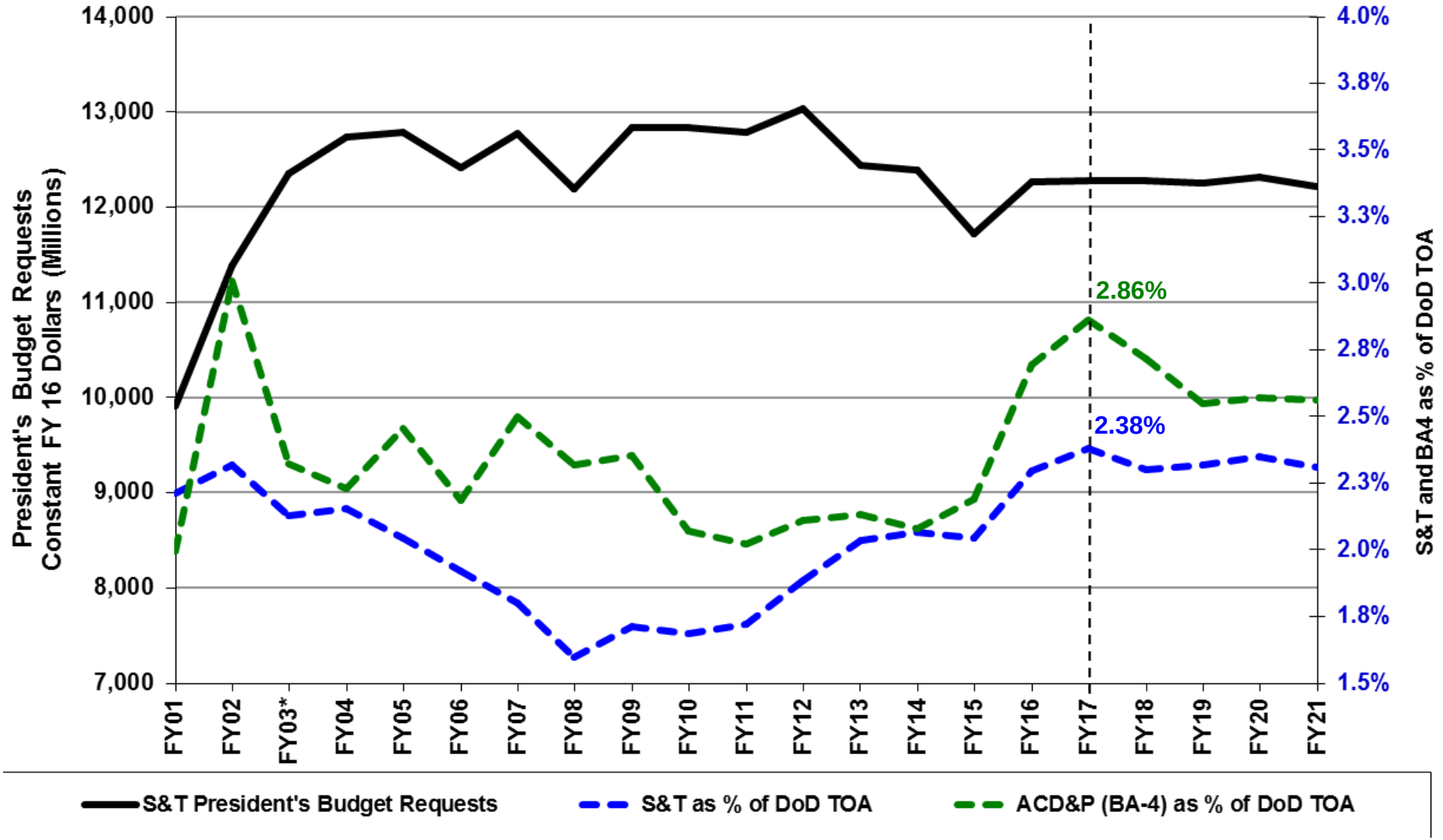
***NOTES:**

4th Estate includes OSD (NCB, EI&E, DLA, MDA, MIBP, TRMC, Policy, Special Programs), USSOCOM

Intramural/Extramural percentage based on FY 2014 NSF Federal Funds Survey for R&D.
Extramural includes: Industry, FFRDC, Academia, Non-Profits, State and Local Governments, Foreign Organizations

DoD S&T - Macro Scale

S&T & BA4 Investment as % of DoD Total Obligational Authority (TOA)



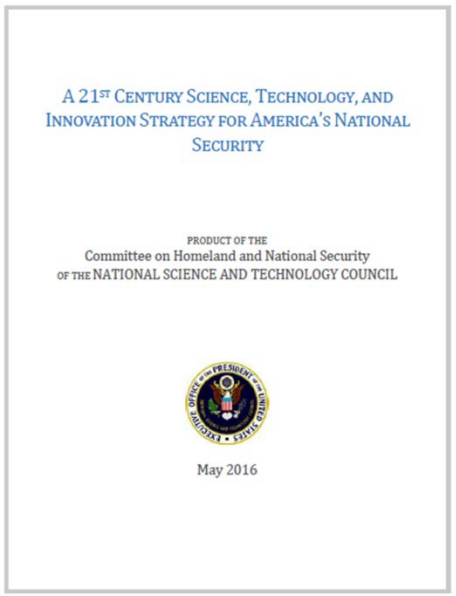
** **Note:** FY03 includes DERF & Nuclear Posture Review funding

An Enterprise-Wide Focus on Innovation

Grow and sustain our S&T capability…

Better Buying Power

Speed to Market


A 21ST CENTURY SCIENCE, TECHNOLOGY, AND INNOVATION STRATEGY FOR AMERICA'S NATIONAL SECURITY

PRODUCT OF THE
Committee on Homeland and National Security
OF THE NATIONAL SCIENCE AND TECHNOLOGY COUNCIL

May 2016

Prototyping, demonstrations, and experimentation

Competition for Talent

Science, Technology, Engineering and Math (STEM)

Better Buying Power (BBP)
Continuous Improvement Process

BBP 3.0 Highlights

Strengthen *Cybersecurity* throughout the Product Lifecycle

Improve *Speed to Market*

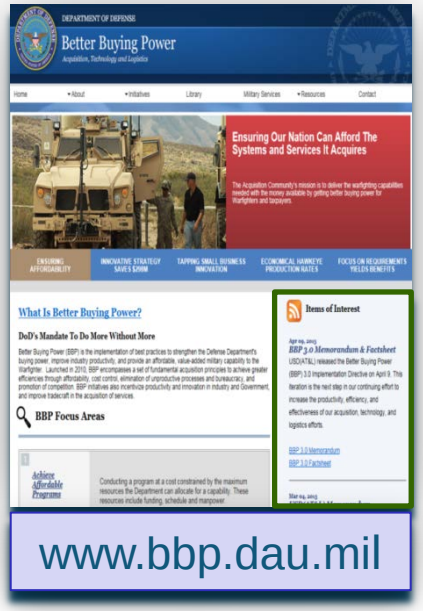
Remove barriers to *Commercial Technology*

Increase the use of *Prototyping and Experimentation*

Use Modular *Open Systems* Architectures

Improve DoD *outreach* to *Global Markets*

Building strong partnerships – internal and external

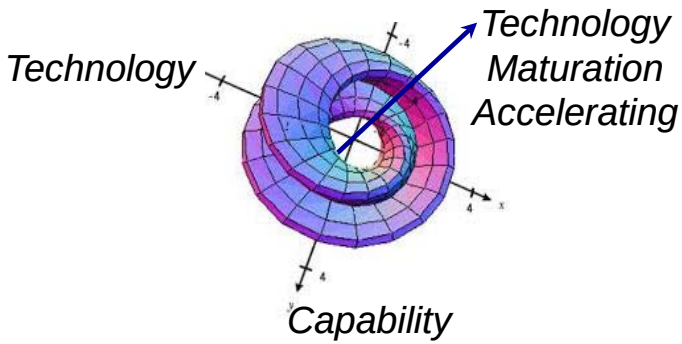


Speed to Market

Rapidly adopt / refresh technology

Remove barriers: improve ***commercial and international*** science and technology awareness

High-payoff ***technology prototyping*** and demonstrations



Pilot ***accelerated contracting vehicles***

Leverage new accelerated, streamlined procurement authorities - venture capital-like

Focus on Prototyping

Strategic Use of Prototyping

Evaluate new concepts, guide development, demonstrate capability

Sustain and support unique capabilities

Stimulate design teams

Contribute to new methods and manufacturing

Promote open standards and competition

New applications

Accelerate technologies, products, and concepts

With tested Tactics, Techniques and Procedures

Strategic emphasis on prototyping to address future threats

ASW Continuous Trail Unmanned Vessel (ACTUV)

Competition for Talent

Work is challenging, topical, and rewarding – cutting edge

Invest in recruiting the best and brightest

Encourage career opportunities and experiences

DoD
Services
Research
Laboratories

Traditional and
Non-Traditional
Commercial
and Academe

DoD Science, Technology, Engineering and Mathematics (STEM) Efforts

***Communicate*: Opportunities to work cutting edge, leap-ahead technologies**

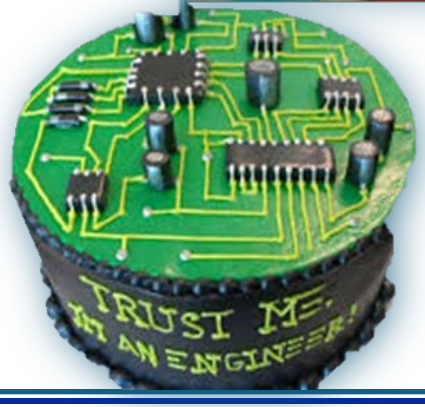
***Inspire*: Young scientists and engineers**

***Cultivate*: Culture of Innovation**

***Promote*: Diversity and agility of thought**

***Enhance*: Professional experiences**

DoD photo by EJ Hersom



Scholarship-for-Service Program

Undergraduate, masters, and doctoral students – any phase

1 year DoD employment for each academic year of funding

SMART has awarded 1782 scholarships to 1734 people since 2006

13% of awards made to current DoD employees

DoD Innovation Strategies

Shifting culture **Leaning forward**

Growing organically **Looking externally**

Avoid technology surprise **Seeking asymmetric advantage**

Leveraging new technology sources **Servicing / expanding core competencies**

DoD R&E Enterprise:
Pursuing Sustained Technical Advantage










DoD Research and Engineering Enterprise:
http://www.acq.osd.mil/chieftechnologist/

Defense Innovation Marketplace
http://www.defenseinnovationmarketplace.mil

Twitter: @DoDInnovation