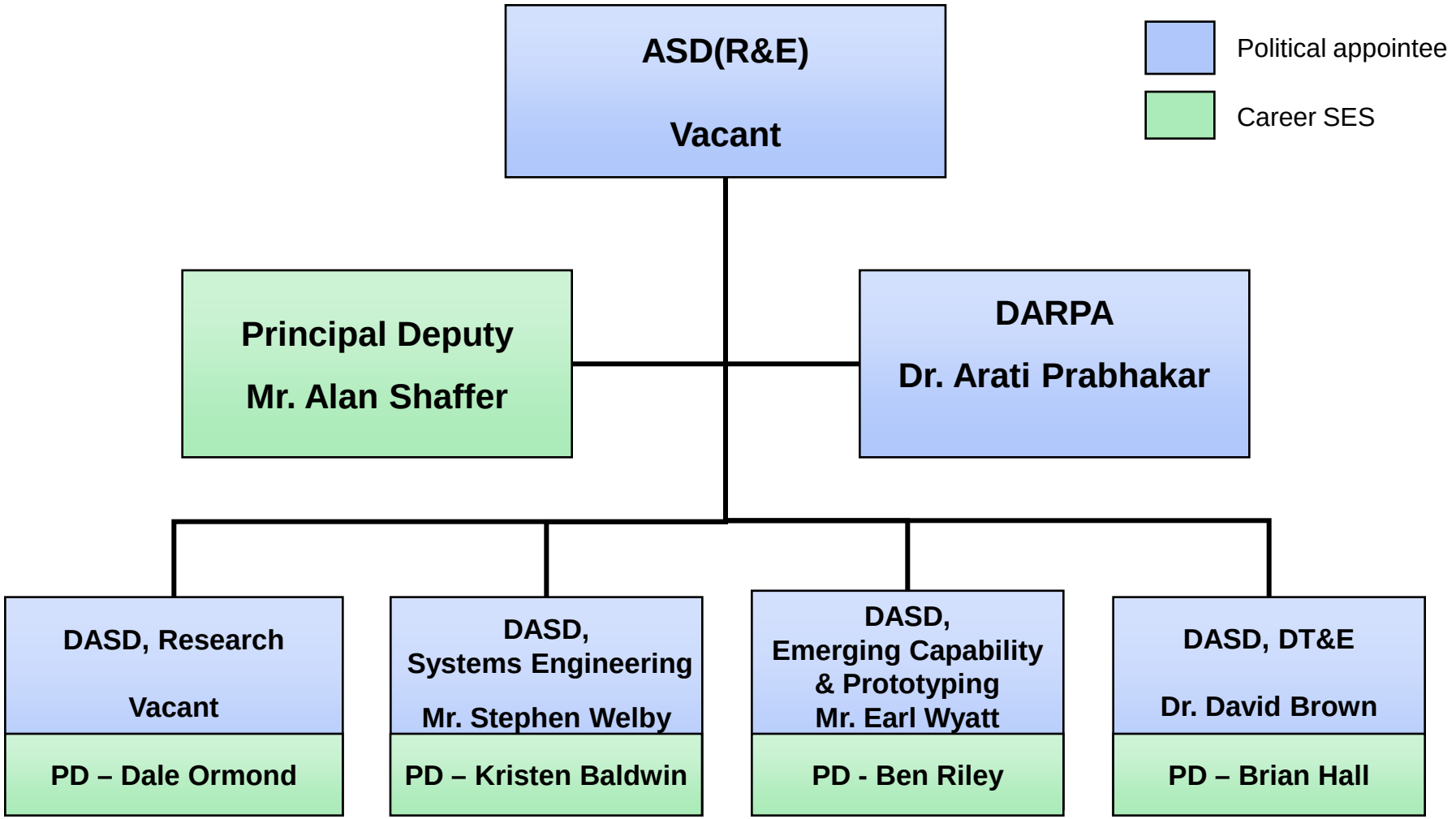
Fiscal Year 2016 President's Budget Request for the DoD Science & Technology Program March 24, 2015

Mr. Bob Baker

Deputy Director, Plans & Programs,

Assistant Secretary of Defense (Research & Engineering)

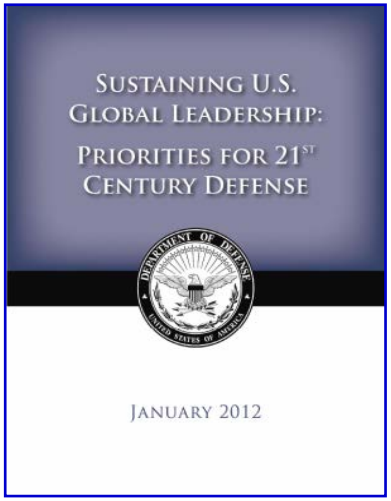
ASD(R&E) – Organization

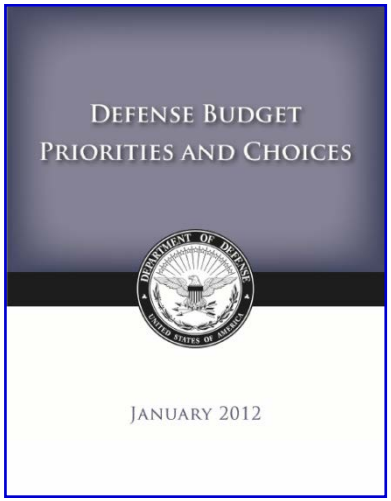


Outline

- ***Guidance and Priorities***
- ***FY2016 S&T President's Budget Request***
- ***Historical Context***
- ***Reliance 21 & Communities of Interest (COIs)***

Key Elements of Defense Strategic Guidance





- 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 the Asia-Pacific region.
- Build 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.

DoD at Strategic Crossroads

Secretary Hagel
Budget Roll-Out Brief
24 Feb 2014

"The development and proliferation of more advanced military technologies by other nations means that we are ***entering an era where American dominance on the land and seas, in the skies, and in space can no longer be taken for granted"***

The strategic question is – will the force of tomorrow be:

- **Larger with diminished capability or,**
- **Smaller with more technologically advanced capabilities**

Need for Technological Superiority

"Advanced military technologies, from rockets and drones to chemical and biological capabilities, have found their way into the arsenals of both non-state actors as well as previously less capable militaries. Russia, China, Iran, and North Korea have been pursuing long-range, comprehensive military modernization programs to close the technology gap that has long existed between them and the United States."

"These modernization programs are developing and fielding advanced aircraft, submarines, and both longer-range and more accurate ballistic and cruise missiles. They're developing new and advanced anti-ship and anti-air missiles, as well as new counter space, electronic warfare, undersea, and air attack capabilities."

Honorable Ashton Carter, Secretary of Defense, SASC Budget Hearing, Mach 3, 2015

FY 2016 OMB/OSTP S&T Priorities

- **S&T:** Basic and applied research and advanced technology development are important to DOD's long-term technological superiority (~$12.3B)
- **DARPA:** High-risk, high-payoff research is critical contribution to DOD S&T (~$2.9B)
- **Advanced Manufacturing:** Support of the President's National Network Manufacturing Initiative to fund six DOD-led manufacturing institutes (~$0.2B)
- **Hypersonics:** Support of national hypersonics requirements and capabilities
- **Prototyping Activities:** Support of efforts to reduces technical risk in acquisition programs and maintain workforce skills in design, systems engineering, and prototyping
- **Modernizing Laboratory Infrastructure:** Recommended DOD work within the MILCON process to secure funding for laboratory projects while also exploring alternative approaches that are consistent with OMB policies and regulations
- **Science, Technology, Engineering and Mathematics (STEM) Education:** OMB supports K-12 STEM activities and the Science, Mathematics, and Research for Transformation (SMART) program.

2014 Quadrennial Defense Review

- **Builds upon/updates the 2012 Defense Strategic Guidance**
  - **Protect the homeland against all strategic threats**
  - **Build security globally by projecting U.S. influence and deterring aggressors**
  - **Project power and win decisively**

- **Embodies key elements of January 2012 Defense Strategy**
  - **Rebalance to Asia-Pacific**
  - **Sustaining commitments to allies in Middle East and Europe**
  - **Aggressively pursue counterterrorism campaign**
  - **Emphasis on key threat areas (e.g., cyber, missile defense, special operations, space, capabilities etc.)**
  - **No longer size forces for large, prolonged stability operations**




Defense R&E Strategy

1. **Mitigate current and anticipated threat capabilities**
   - Cyber
   - Electronic Warfare
   - Counter Space
   - Counter-WMD
   - Missile Defense

2. **Affordably enable new or extended capabilities in existing military systems**
   - Systems Engineering
   - Modeling and Simulation
   - Capability Prototyping
   - Developmental Test & Eval.
   - Interoperability
   - Power & Energy

3. **Create technology surprise through science and engineering**
   - Autonomy
   - Data Analytics
   - Human Systems
   - Hypersonics
   - Quantum Systems
   - Basic Sciences

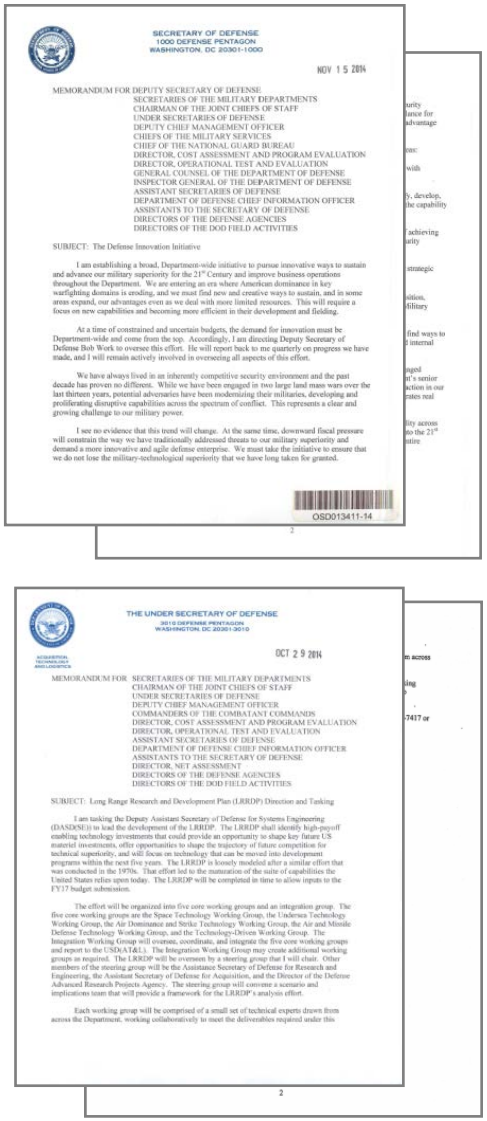
Technology Needs

- Cyber / Electronic Warfare
- Engineering / M & S
- Capability Prototyping
- Protection & Sustainment
- Advanced Machine Intelligence
- Anti-Access/Area Denial (A2/AD)

FY 2016 Investments Aligned to Defense R&E Strategy

- **Mitigate**
  - Project Power Despite Anti-access/Area-denial Challenges (~$2.0B+)
  - Counter Weapons of Mass Destruction (~$0.9B)
  - Cyberspace and Space (~$1.0B)
  - Electronic Warfare (~$0.5B)
- **Affordability**
  - Advanced Manufacturing (~$0.2B)
  - Prototyping Efforts (~$0.6B)
- **Surprise**
  - High-speed Kinetic Strike (~$0.3B)

Defense Innovation Initiative and the Long-Range Research and Development Program Plan



SECRETARY OF DEFENSE
1000 DEFENSE PENTAGON
WASHINGTON, DC 20301-1000

NOV 15 2014

MEMORANDUM FOR DEPUTY SECRETARY OF DEFENSE
SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARIES OF DEFENSE
DEPUTY CHIEF MANAGEMENT OFFICER
CHIEFS OF THE MILITARY SERVICES
CHIEF OF THE NATIONAL GUARD BUREAU
DIRECTOR, COST ASSESSMENT AND PROGRAM EVALUATION
DIRECTOR, OPERATIONAL TEST AND EVALUATION
GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE
INSPECTOR GENERAL OF THE DEPARTMENT OF DEFENSE
ASSISTANT SECRETARIES OF DEFENSE
DEPARTMENT OF DEFENSE CHIEF INFORMATION OFFICER
ASSISTANTS TO THE SECRETARY OF DEFENSE
DIRECTORS OF THE DEFENSE AGENCIES
DIRECTORS OF THE DOD FIELD ACTIVITIES

SUBJECT: The Defense Innovation Initiative

I am establishing a broad, Department-wide initiative to pursue innovative ways to sustain and advance our military superiority for the 21st Century and improve business operations throughout the Department. We are entering an era where American dominance in key warfighting domains is eroding, and we must find new and creative ways to sustain, and in some areas expand, our advantages even as we deal with more limited resources. This will require a focus on new capabilities and becoming more efficient in their development and fielding.

At a time of constrained and uncertain budgets, the demand for innovation must be Department-wide and come from the top. Accordingly, I am directing Deputy Secretary of Defense Bob Work to oversee this effort. He will report back to me quarterly on progress we have made, and I will remain actively involved in overseeing all aspects of this effort.

We have always lived in an inherently competitive security environment and the past decade has proven no different. While we have been engaged in two large land mass wars over the last thirteen years, potential adversaries have been modernizing their militaries, developing and proliferating disruptive capabilities across the spectrum of conflict. This represents a clear and growing challenge to our military power.

I see no evidence that this trend will change. At the same time, downward fiscal pressure will constrain the way we have traditionally addressed threats to our military superiority and demand a more innovative and agile defense enterprise. We must take the initiative to ensure that we do not lose the military-technological superiority that we have long taken for granted.

OSD013411-14

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THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

OCT 29 2014

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARIES OF DEFENSE
DEPUTY CHIEF MANAGEMENT OFFICER
COMMANDERS OF THE COMBATANT COMMANDS
DIRECTOR, COST ASSESSMENT AND PROGRAM EVALUATION
DIRECTOR, OPERATIONAL TEST AND EVALUATION
ASSISTANT SECRETARIES OF DEFENSE
DEPARTMENT OF DEFENSE CHIEF INFORMATION OFFICER
ASSISTANTS TO THE SECRETARY OF DEFENSE
DIRECTOR, NET ASSESSMENT
DIRECTORS OF THE DEFENSE AGENCIES
DIRECTORS OF THE DOD FIELD ACTIVITIES

SUBJECT: Long Range Research and Development Plan (LRRDP) Direction and Tasking

I am tasking the Deputy Assistant Secretary of Defense for Systems Engineering (DASD(SE)) to lead the development of the LRRDP. The LRRDP shall identify high-payoff enabling technology investments that could provide an opportunity to shape key future US materiel investments, offer opportunities to shape the trajectory of future competition for technical superiority, and will focus on technology that can be moved into development programs within the next five years. The LRRDP is loosely modeled after a similar effort that was conducted in the 1970s. That effort led to the maturation of the suite of capabilities the United States relies upon today. The LRRDP will be completed in time to allow inputs to the FY17 budget submission.

The effort will be organized into five core working groups and an integration group. The five core working groups are the Space Technology Working Group, the Undersea Technology Working Group, the Air Dominance and Strike Technology Working Group, the Air and Missile Defense Technology Working Group, and the Technology-Driven Working Group. The Integration Working Group will oversee, coordinate, and integrate the five core working groups and report to the USD(AT&L). The Integration Working Group may create additional working groups as required. The LRRDP will be overseen by a steering group that I will chair. Other members of the steering group will be the Assistance Secretary of Defense for Research and Engineering, the Assistant Secretary of Defense for Acquisition, and the Director of the Defense Advanced Research Projects Agency. The steering group will convene a scenario and implications team that will provide a framework for the LRRDP's analysis effort.

Each working group will be comprised of a small set of technical experts drawn from across the Department, working collaboratively to meet the deliverables required under this

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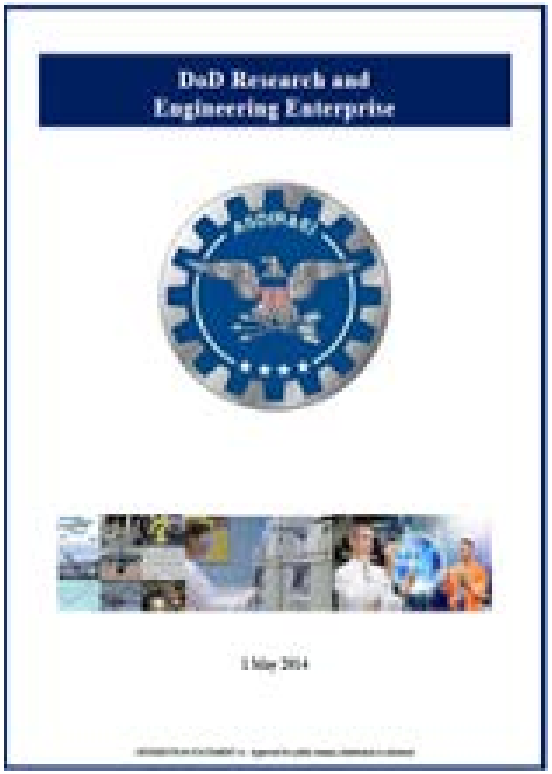
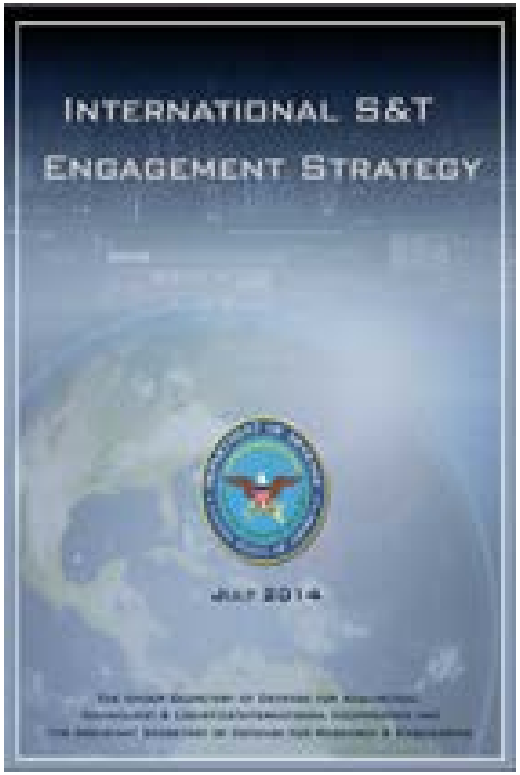
- The ***Defense Innovation Initiative (DII)*** is a DoD-wide effort to identify and invest in innovative ways to sustain and advance our national security into the 21st century. The DII also involves the development of innovative operational concepts that would help the U.S. use our current capabilities in new and creative ways.

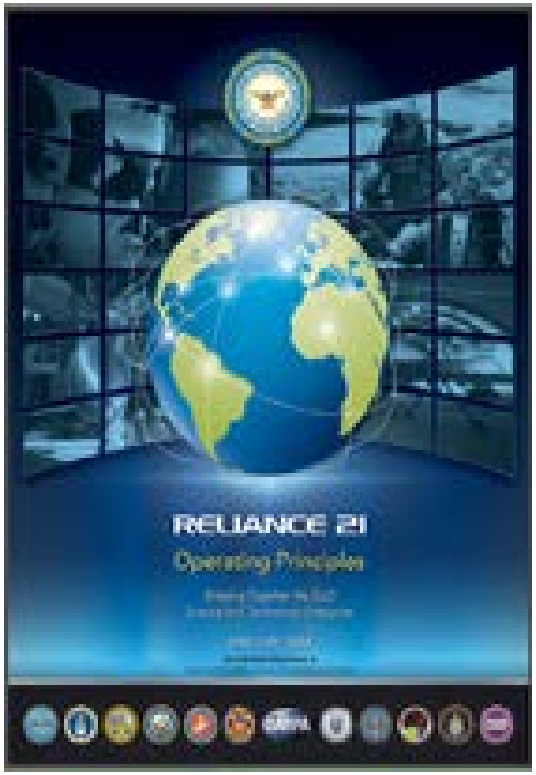
- The ***Long-Range Research and Development Program Plan (LRRDPP)*** is a part of the DII effort that will identify, develop, and field breakthrough technologies and systems. PBR 16 supports this effort through specific investments in promising new technologies and capabilities such as high-speed strike weapons, advanced aeronautics, rail guns, and high energy lasers.

DoD R&E Path Forward Strategic Guidance

"Our technological superiority is not assured, and in fact it is being challenged very effectively right now." ***-Frank Kendall, USD(AT&L) 19 Sep 2014***







Available at www.DefenseInnovationMarketplace.mil

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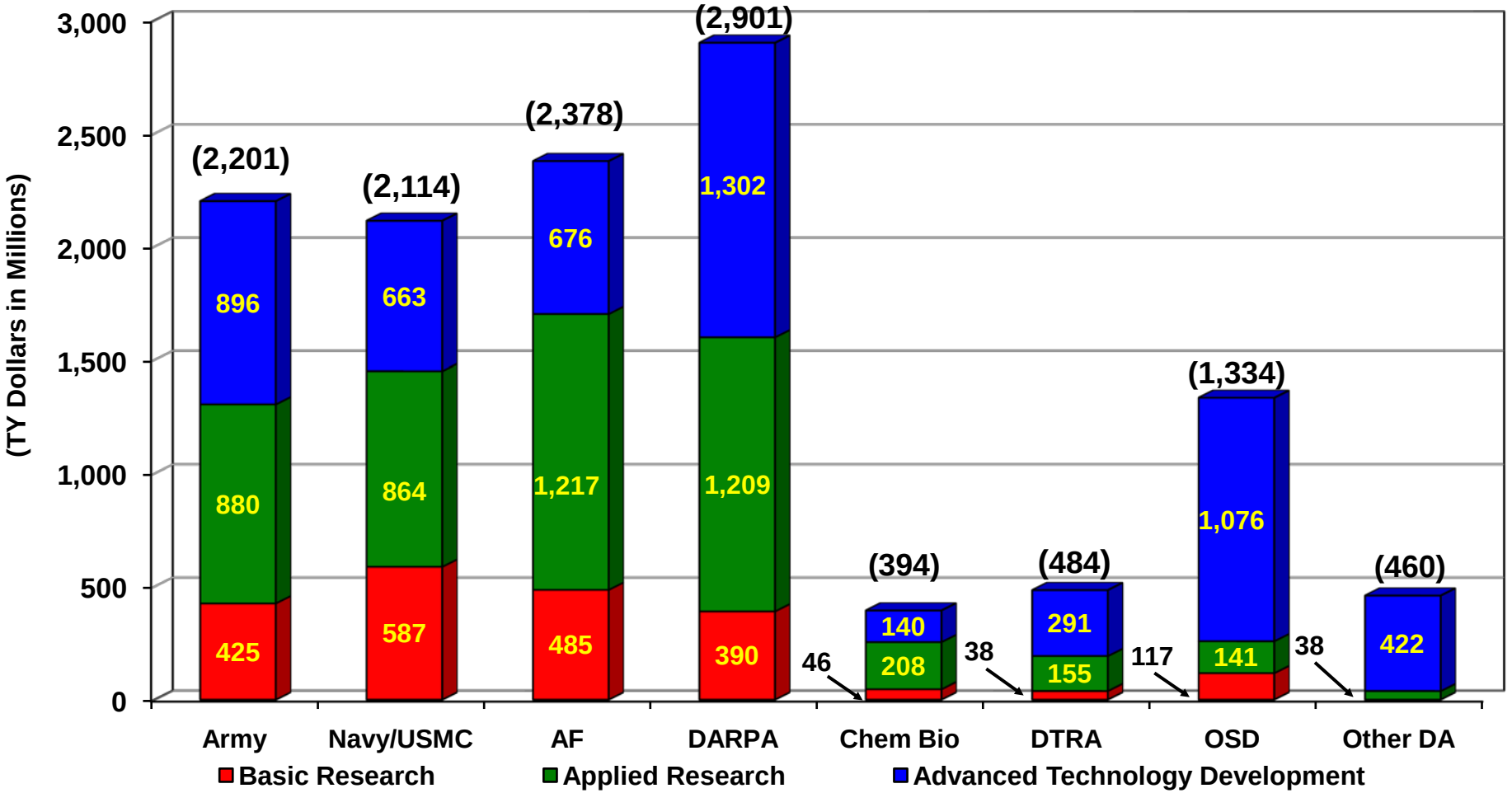
PB 16 DoD S&T Budget Request

Total PB 16 S&T request = $12.27B

Total FY 15 S&T Request = $11.51B

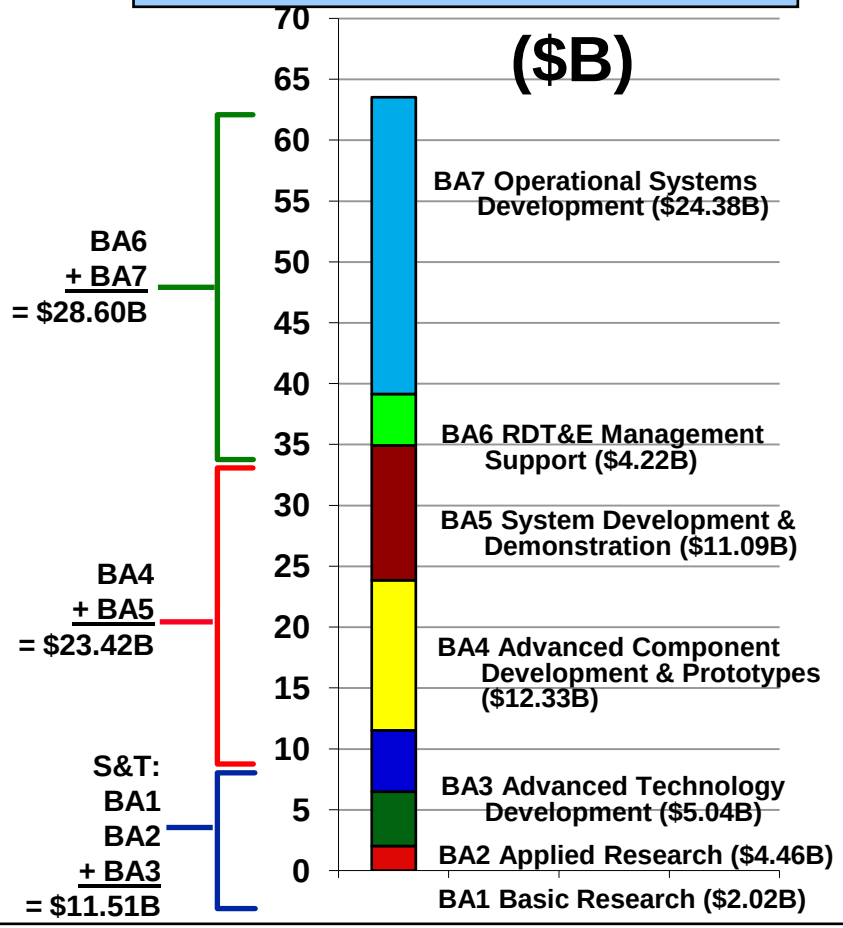
Army = 2,205 Navy = 1,992 AF = 2,129 DARPA = 2,843 ChemBio = 407 DTRA = 473 OSD = 1,059 Other DA = 406



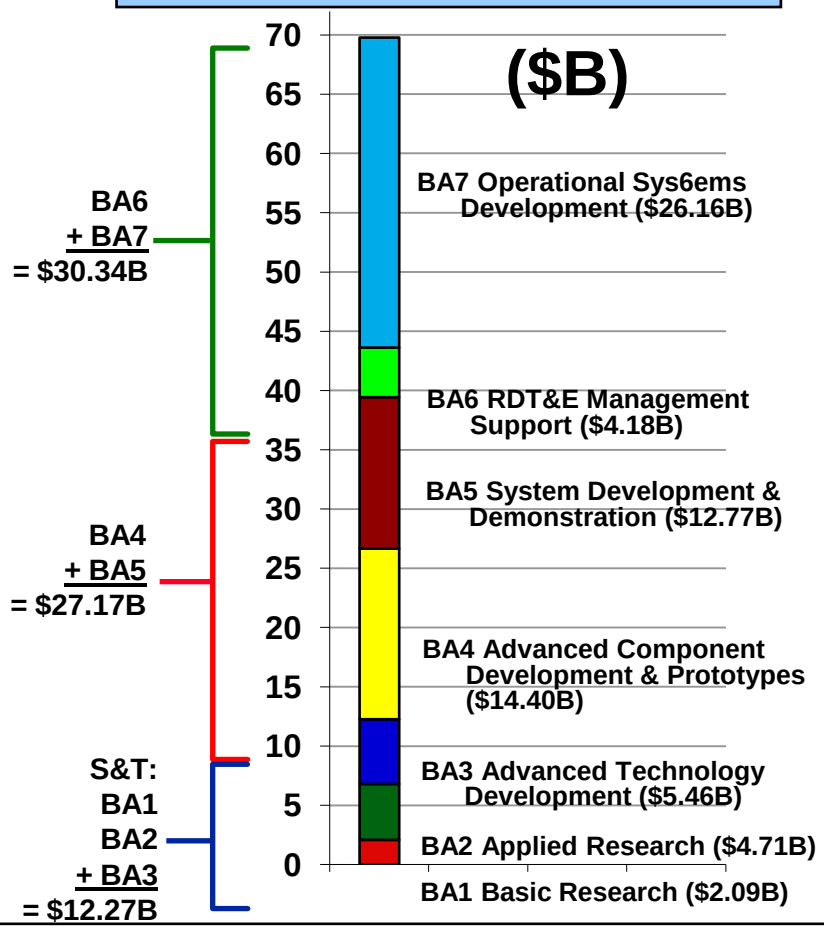
DoD PB-15 & PB-16 RDT&E Budget Request Comparison

- in Then Year Dollars -

FY 15 RDT&E request = $63.53B (Budget Activities 1-7)



PB 16 RDT&E request = $ 69.78B (Budget Activities 1-7)



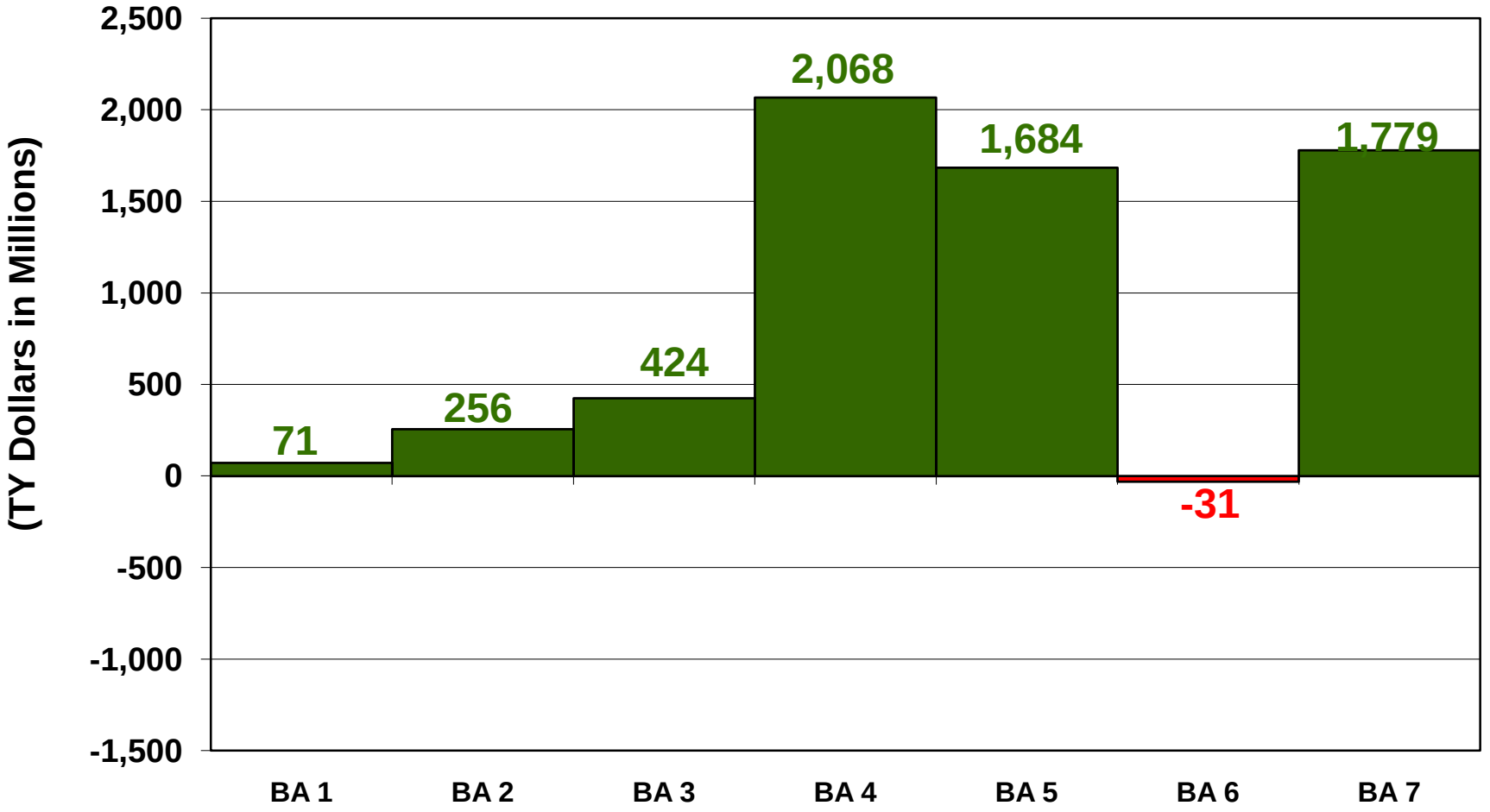
Technology Base (BA1 + BA2) = $6.47B

PB15 S&T is 18.1% of RDT&E;
RDT&E is 12.8% of DOD Topline (Base only)

Technology Base (BA1 + BA2) = $6.80B

PB 16 S&T is 17.6% of RDT&E;
RDT&E is 13.1% of DOD Topline (Base only)

RDT&E Budget Request Overview
- FY 2015 to FY 2016 Adjustments -

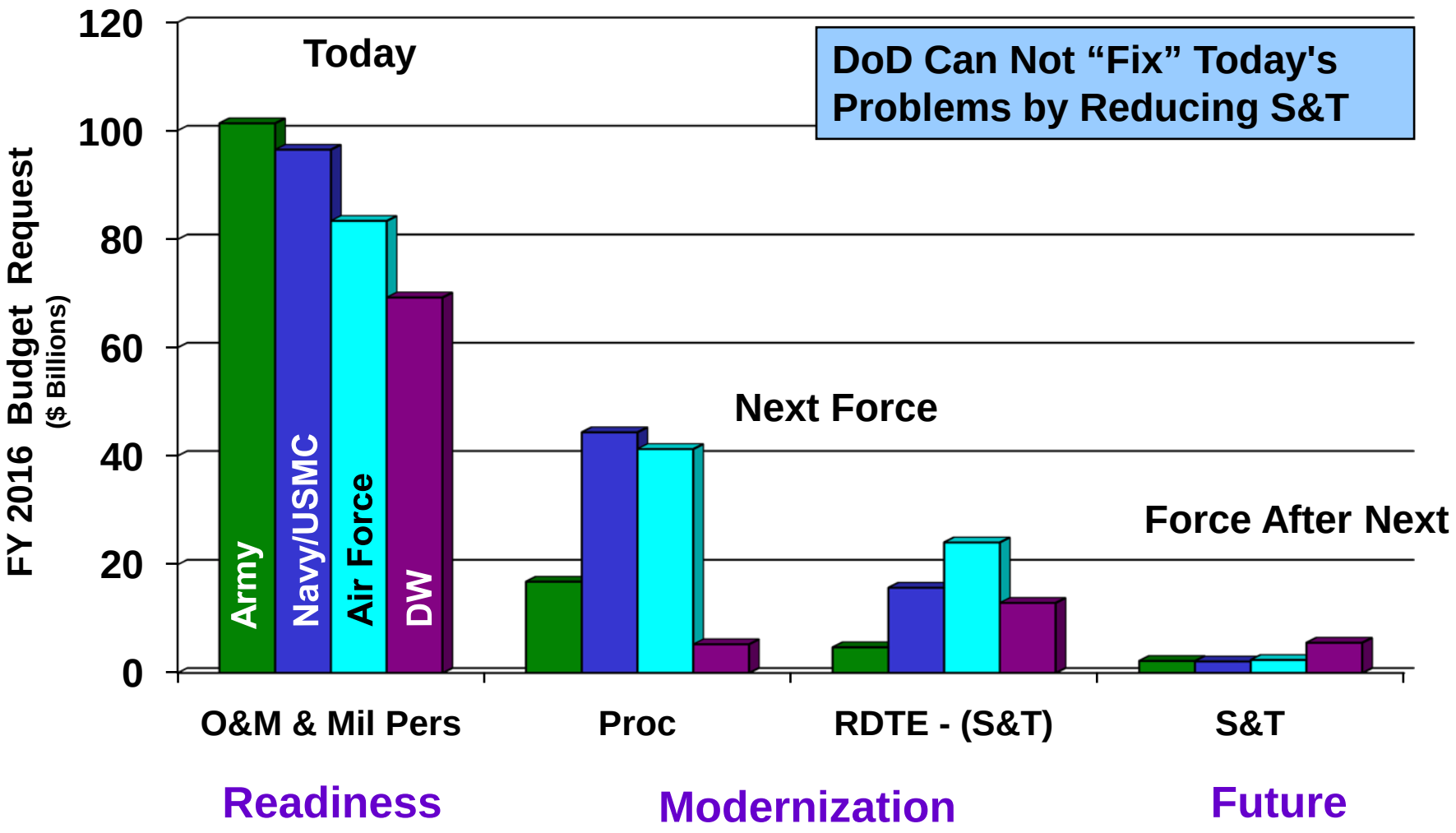


President's Budget 2016
DoD R&E Budget Request Comparison

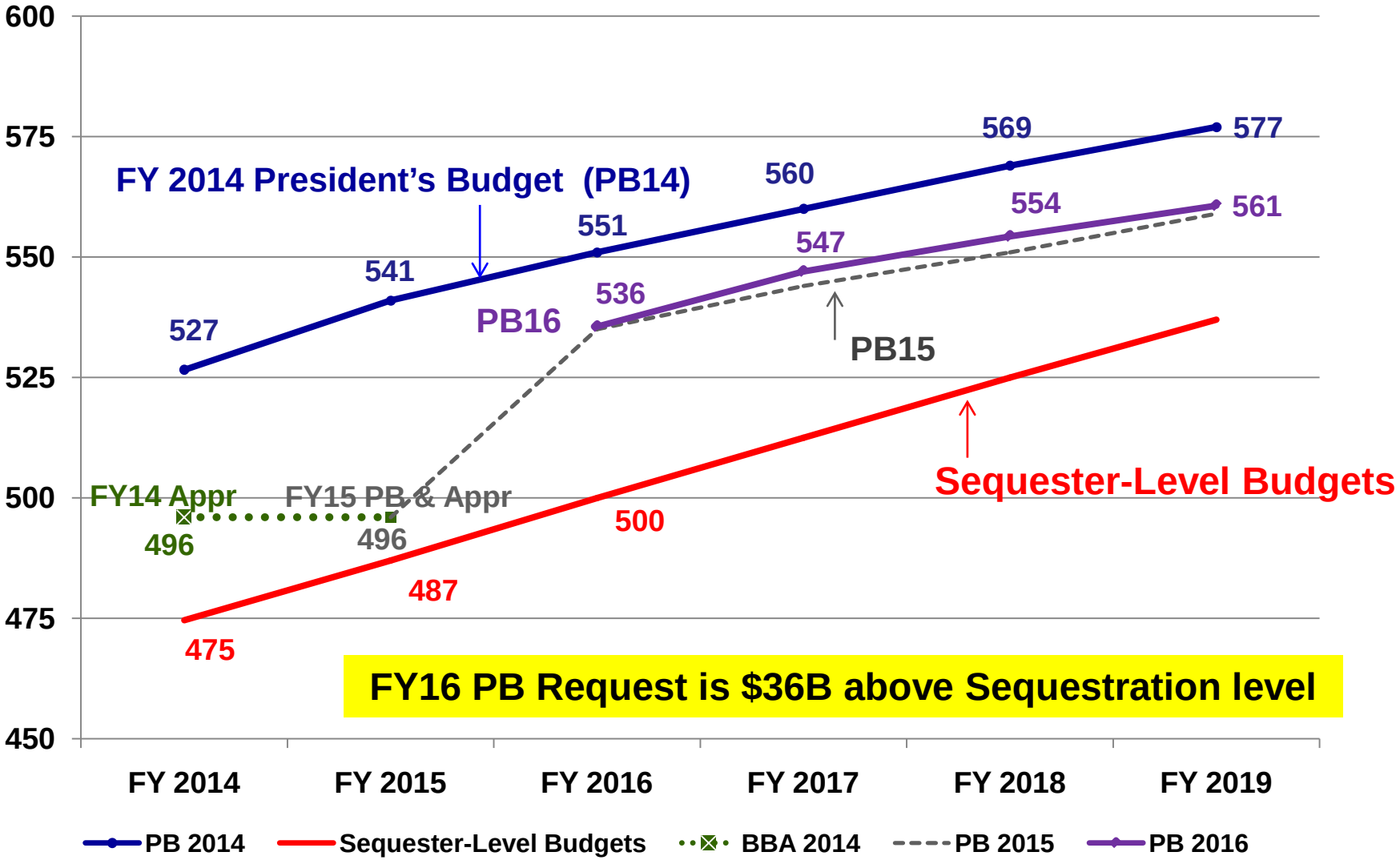
(TY Dollars in Millions)

	PBR 2015	PBR 2016 (FY 2015 CY $)	% Real Change from PBR 2015
Basic Research (BA 1)	2,018	2,089 (2,049)	1.56%
Applied Research (BA 2)	4,457	4,713 (4,622)	3.70%
Advanced Technology Development (BA 3)	5,040	5,464 (5,359)	6.33%
DoD S&T	11,514	12,266 (12,030)	4.48%
Advanced Component Development and Prototypes (BA 4)	12,334	14,402 (14,125)	14.52%
DoD R&E (BAs 1 - 4)	23,848	26,668 (26,155)	9.67%
DoD Topline	496,600	534,313 (524,042)	5.53%

FY 2016 Technology Investment Compared to Other DoD Categories



Defense Budget
- The Big Picture -



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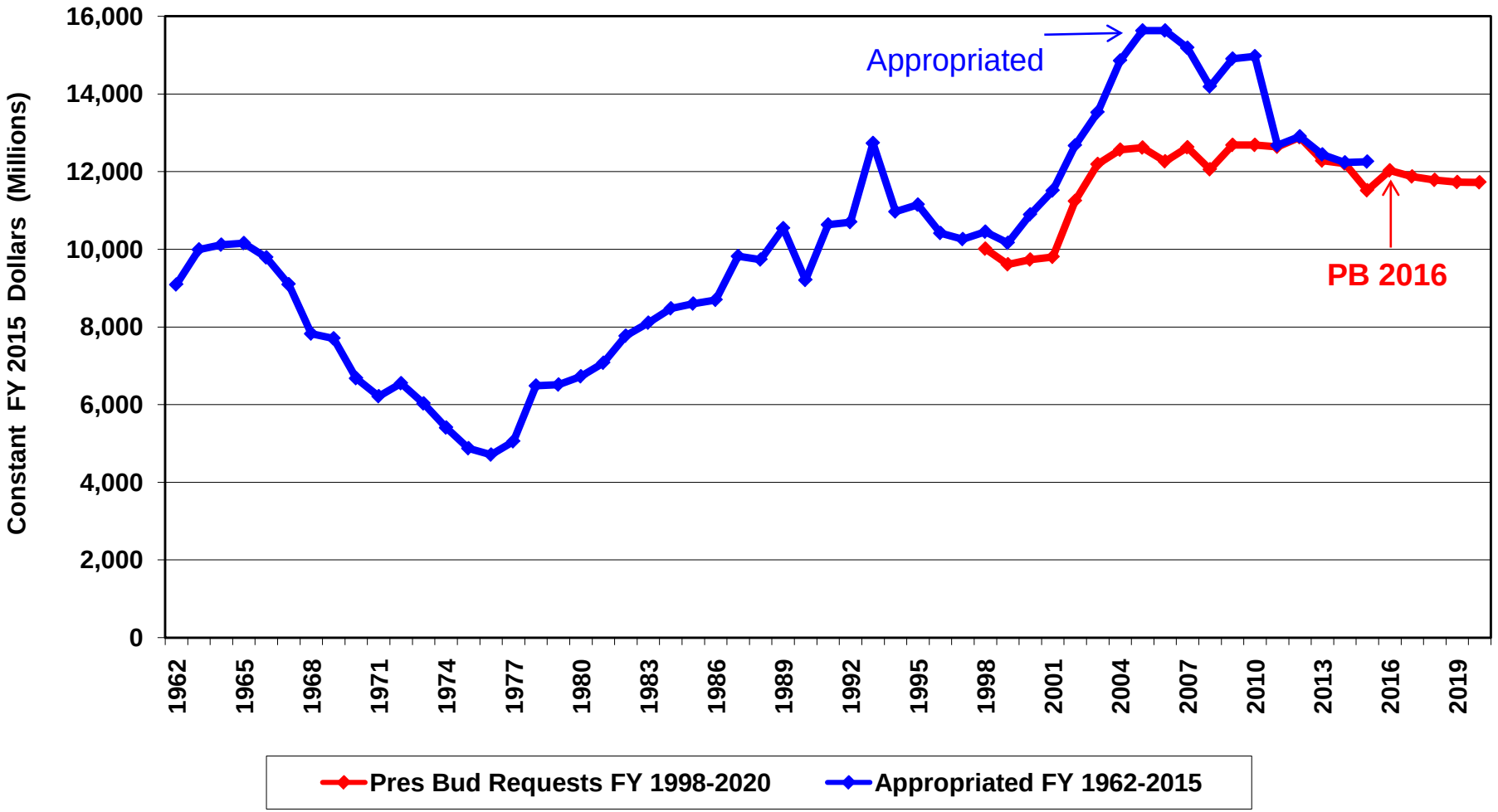
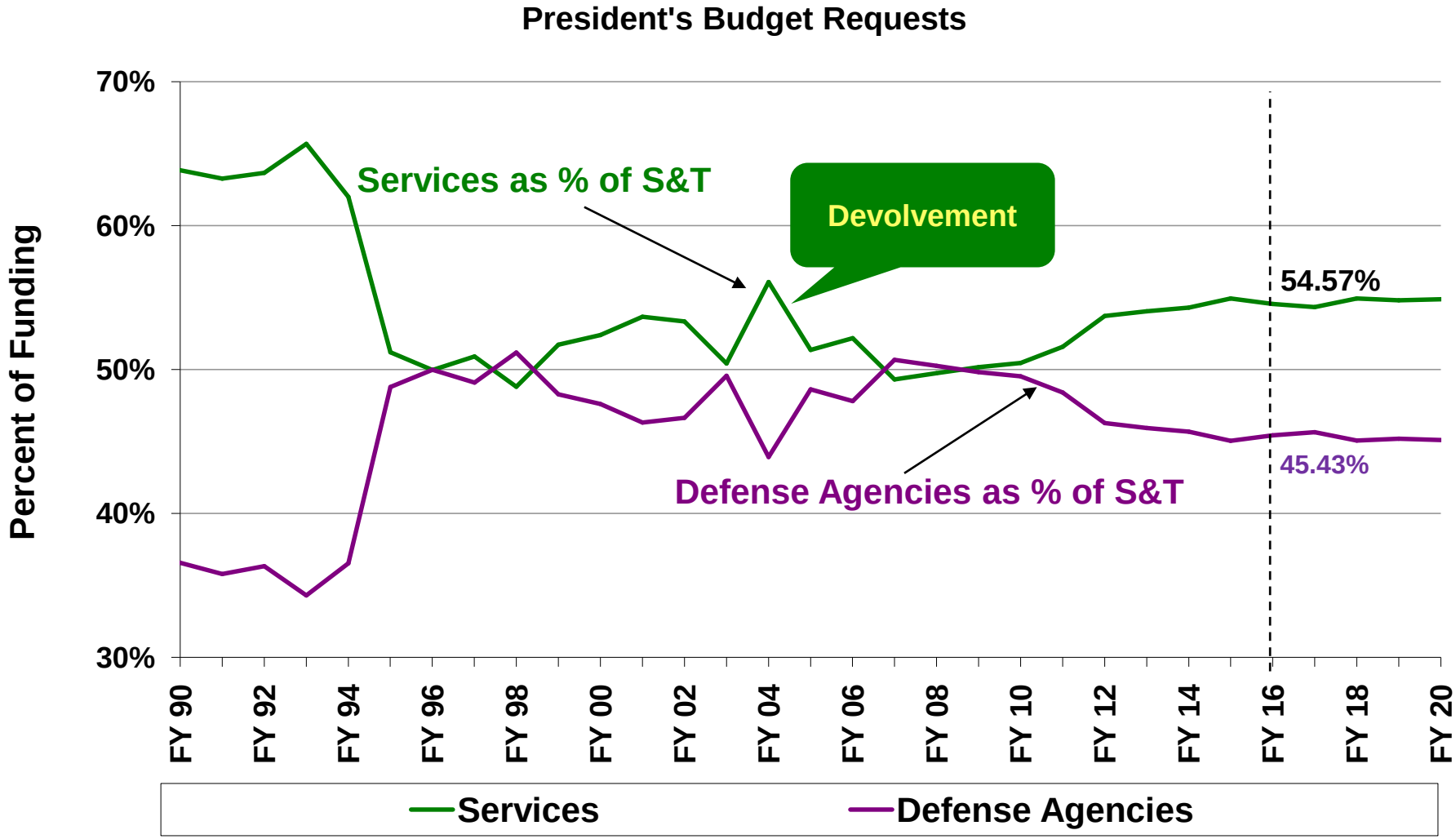
DoD S&T FUNDING: FY 1962-2020

(FY 1962-2015 Appropriated, FY 1998-2020 President's Budget Request)



DoD S&T Breakout

- Services and Defense Agencies as % of Total S&T -



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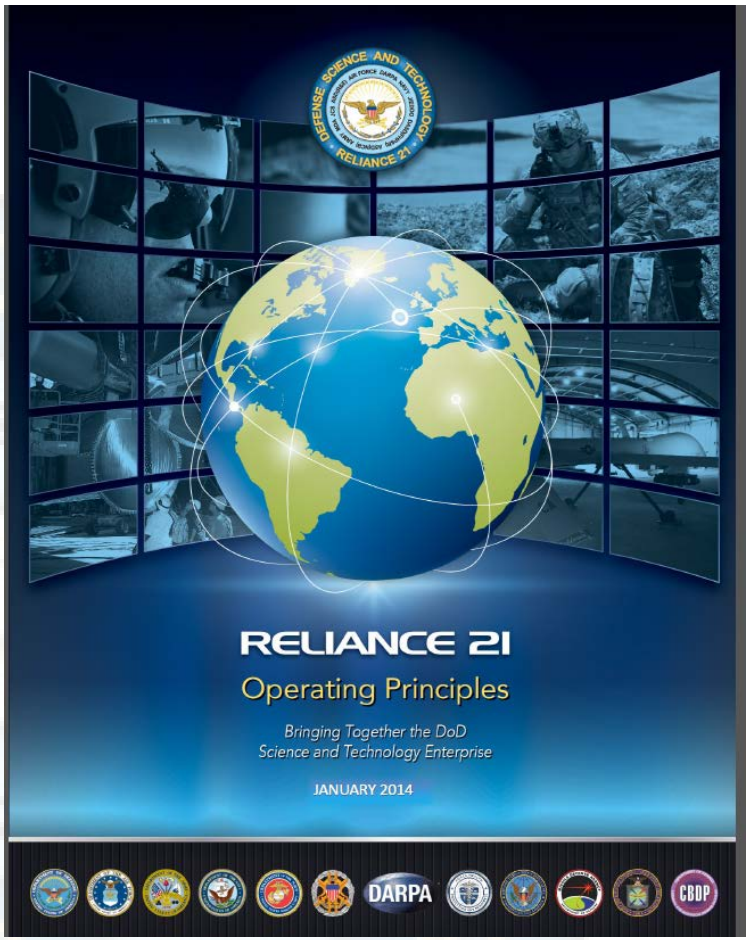
Reliance 21 and COIs

- **Reliance 21 is the overarching framework of the DoD's S&T joint planning and coordination process**
  - **Reliance 21 has roots that go back several decades, and has been continually renewed and refreshed**

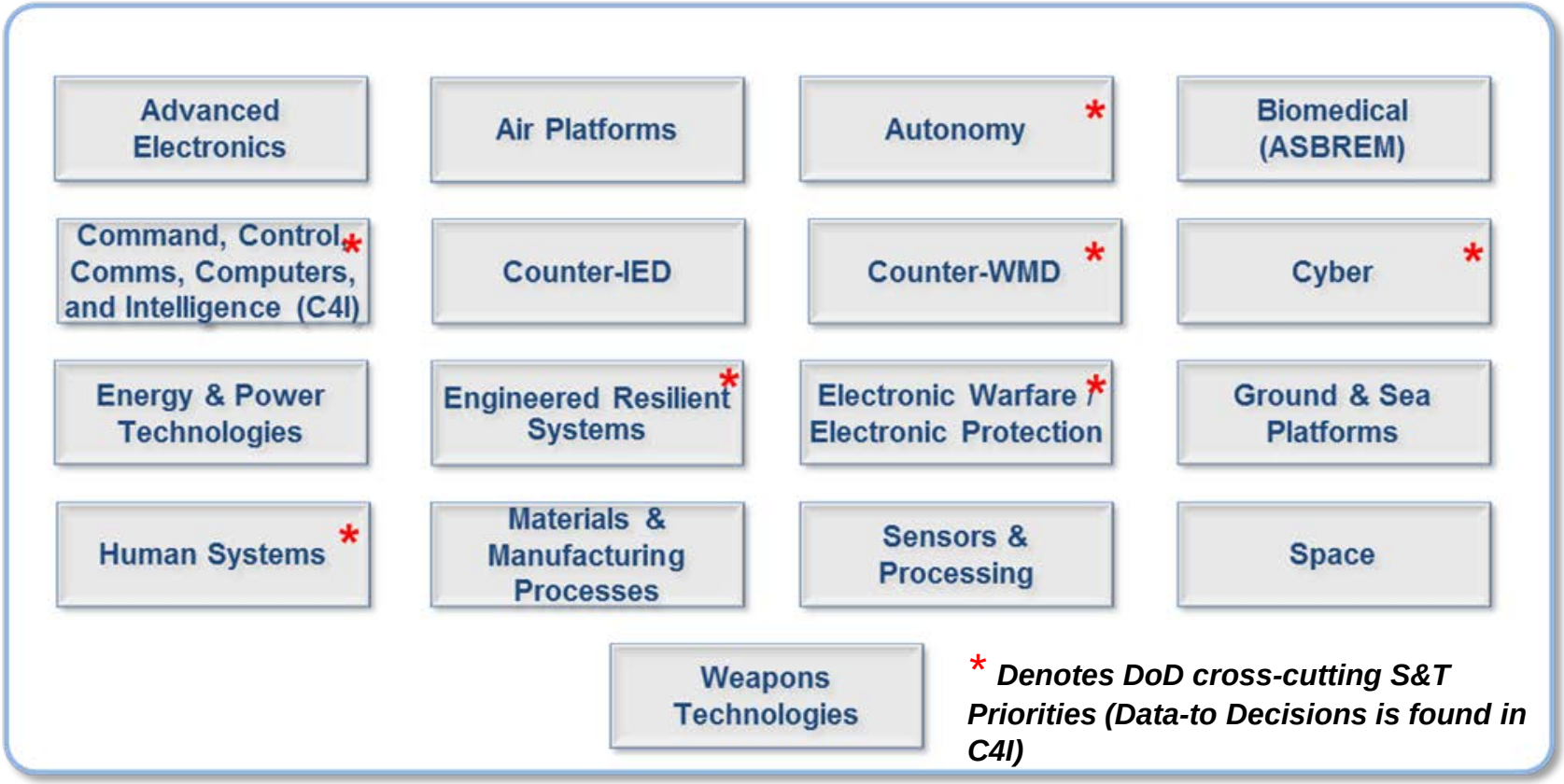
- **COIs (Communities of Interest) are groups of scientists and engineers who are subject matter experts in specific cross-cutting technology areas where there is substantial investment across multiple Components**

- **COIs were established in 2009 as a mechanism to encourage multi-agency coordination and collaboration.**



Found at www.DefenseInnovationMarketplace.mil and www.acq.osd.mil/chieftechnologist/index.html

Reliance 21 Communities of Interest

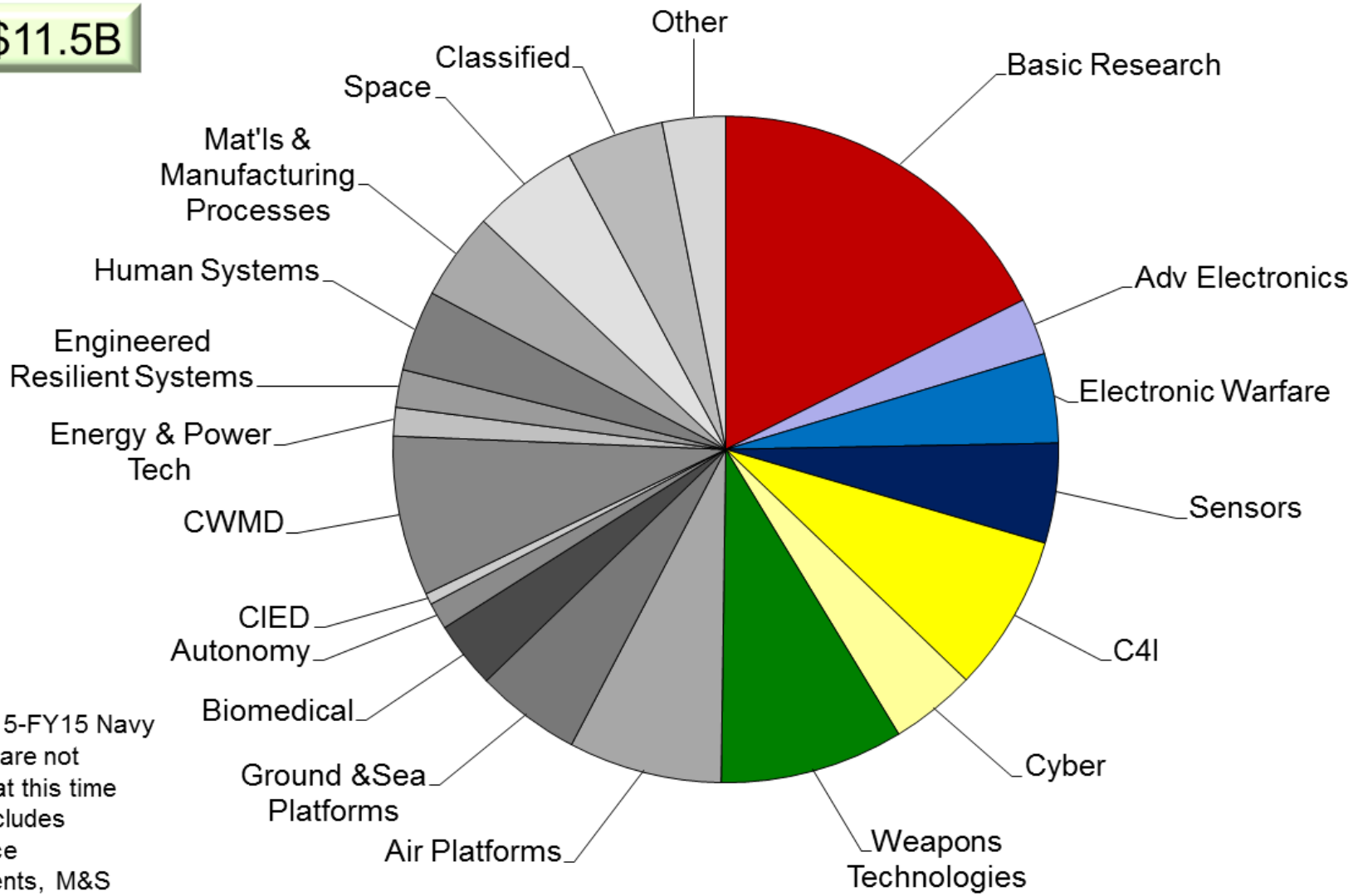


17 cross-cutting technical areas, each with a Steering Group Lead and multiple technical 'challenge areas' staffed with Subject Matter Experts (SMEs) from Services & Defense Agencies

PB 2015 FY 15 S&T

Basic Research BA1 & BA2/BA3 by Community of Interest

S&T = $11.5B



Note:
- $42M PB15-FY15 Navy programs are not specified at this time
- "Other" includes Battlespace Environments, M&S Technology, other

Summary
--*Where We Are Today*--

- **FY 2016 S&T President Budget Request (PBR) is $12.27 billion, which is a $750 million increase (6.5%) as compared to FY 2015 PBR and a 4.5% increase in buying power**
  - **S&T is 2.3% of DoD Topline**
- **Basic Research is funded at approximately $2.09 billion, a 3.5% increase compared to FY 2015 PBR**
- **Defense Advanced Research Projects Agency is funded at $2.9 billion RDT&E to develop technologies for revolutionary, high-payoff, military capabilities**
- **S&T funding for each Military Department is maintained at approximately $2.1 - $2.4 billion**
- **Funds aligned to support strategic guidance and S&T priorities**

BACK-UPS

Current COI Leaders

• Advanced Electronics	Ms. Ruth Moser (Air Force)
• Air Platforms	Mr. C. Douglas Ebersole (Air Force)
• ASBREM	RADM Bruce Doll (Navy)
• Autonomy	Dr. Jonathan Bornstein (Army)
• C4I	Mr. John Willison (Army)
• Counter-IED	Dr. Karl Dahlhauser (ASD(R&E))
• Counter-WMD	Dr. Steven Wax (DTRA)
• Cyber	Dr. Richard Linderman (Air Force)
• Electronic Warfare/Electronic Protection	Dr. Peter Craig (Navy)
• Energy and Power Technology	Dr. Richard Carlin (Navy)
• Engineered Resilient Systems	Dr. Jeffery Holland (Army)
• Ground and Sea Platforms	Dr. John Pazik (Navy)
• Human Systems	Dr. Michelle Sams (Army)
• Materials & Manufacturing Processes	Dr. Julie Christodoulou (Navy)
• Sensors	Dr. Don Reago (Army)
• Space	Dr. John Stubstad (ASD(R&E))
• Weapons Technologies	Mr. Mike Zoltoski (Army)