



**Fiscal Year 2011
President's Budget Request
for the
DoD Science & Technology Program
April 13, 2010**

***Mr. Bob Baker
Deputy Director, Plans & Programs,
Defense Research and Engineering***

Outline



- • ***Guidance from the Chain of Command***
- ***FY2011 S&T President's Budget Request***
- ***Budget Changes & Historical Context***
- ***Strategic Planning***

Connecting Researchers to the Warfighter



**President Obama, Hudson Valley Community College,
September 21, 2009**



*“Our strategy begins where innovation so often does: in the classroom and in the laboratory -- and in the networks that connect them to the broader economy. These are the building blocks of innovation: education, infrastructure, **research**.*”

***We also have to strengthen our commitment to research, including basic research,** which has been badly neglected for decades. That's always been one of the secrets of America's success -- putting more and more money into research to create the next great inventions, the great technologies that will then spur further economic growth.*

*When we fail to invest in research, we fail to invest in the future. Yet, since the peak of the space race in the 1960s, our national commitment to research and development has steadily fallen as a share of our national income. That's why I set a **goal of putting a full 3 percent of our Gross Domestic Product, our national income, into research and development,** surpassing the commitment we made when President Kennedy challenged this nation to send a man to the moon. ”*

Investment in Basic and Applied Research is a commitment to the future warfighter

The Next Phases of Development

--Thoughts from the Secretary of Defense on S&T--



But, while the world of terrorists and other violent extremists – of insurgents and IEDs – is with us for the long haul, we also recognize that another world has emerged. Growing numbers of countries and groups are employing the latest and increasingly accessible technologies to put the United States at risk in disruptive and unpredictable ways.

Secretary of Defense Gates, Speech to Industry Leaders 16 Jul 09



Continuing the Reform Agenda

*From Under Secretary Robert Hale 1 Feb 2010 Budget Rollout Brief
and Secretary Gates 2010 Budget Rollout Brief*

- **Taking Care of People**
- **Rebalancing Military Capabilities**
- **Reforming What and How We Buy**
- **Supporting our Troops in the Field**





New DDR&E - Zachary J. Lemnios

- **Education**

- BSEE, University of Michigan
- MSEE, Washington University in St. Louis
- Harvard Kennedy School of Government - Program for Senior Executives in National and International Security

- **MIT Lincoln Laboratory**

- Chief Technology Officer
- Assistant Division Head, Solid State Division
- Senior Staff, Solid State Division

- **DARPA**

- Director, Microsystems Technology Office
- Deputy Director of the Information Processing Technology Office
- Program Manager and Assistant Director of the Electronics Technology Office

- **Industry**

- Hughes Aircraft Company
- Westinghouse Electric Corporation
- Ford Microelectronics, Inc.



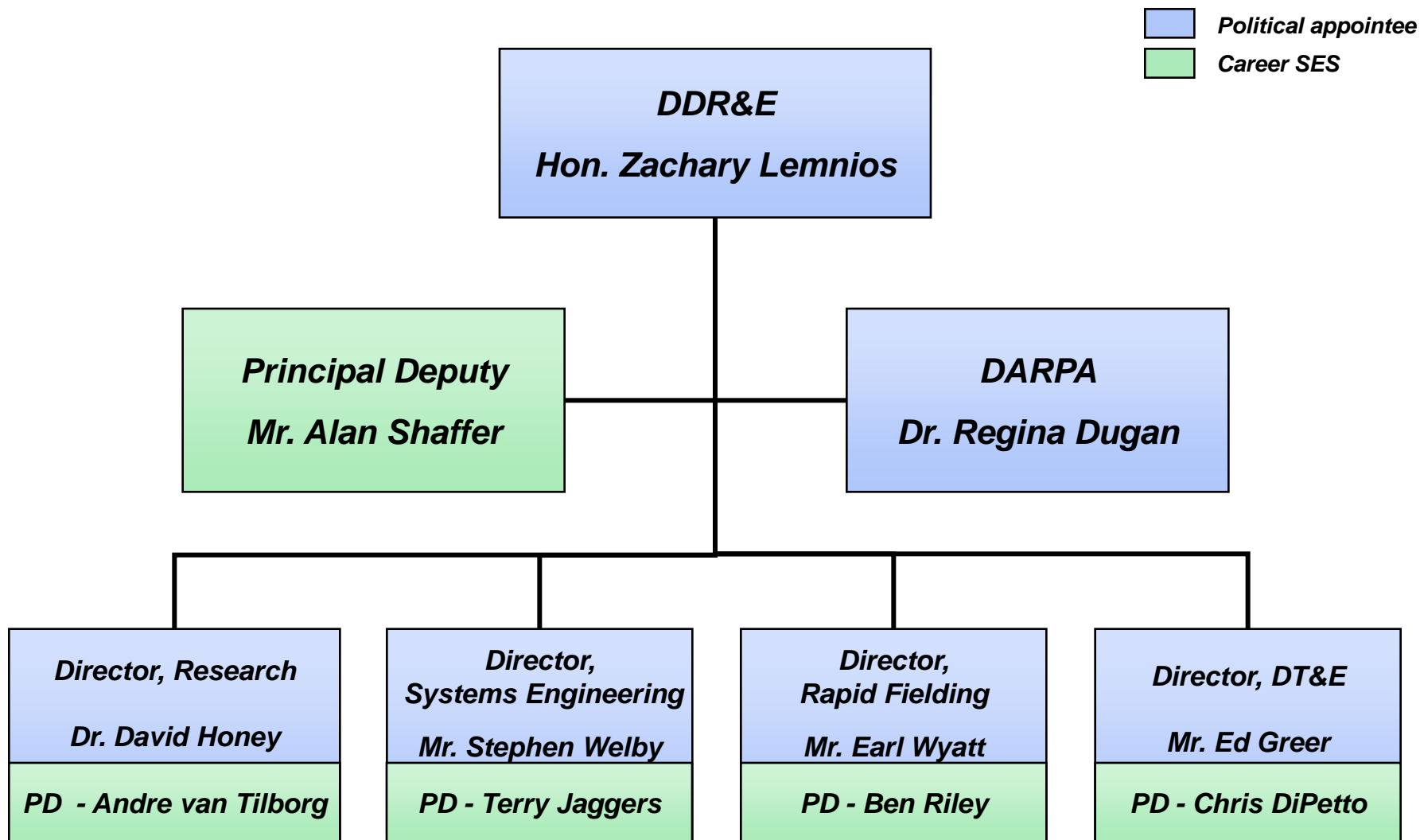


DDR&E Imperatives

- **Accelerate delivery of technical capabilities to win the current fight.**
 - Solve the most difficult near term problems and transition compelling concepts to the warfighter.
- **Prepare for an uncertain future.**
 - Shape the Department's science and technology investments to open options that counter (and create) strategic surprise.
- **Reduce the cost, acquisition time and risk of our major defense acquisition programs.**
 - Provide systems engineering leadership, deep system analysis, and technical assessments across the Department.
- **Develop world class science, technology, engineering, and mathematics capabilities for the DoD and the Nation.**



DDR&E – Organization



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OMB Passback Language for S&T

PB 11 S&T OMB Guidance

- "In order to support the Administration's goal of encouraging research, *DoD should increase funding for basic and applied research* (so-called 6.1 and 6.2 categories from the RDT&E accounts) *by a total of \$249 million in FY11 and \$29M in FY2012 relative to the FY2011 budget estimate submission provided in September. (This results in a 7 percent increase in FY2011 and no decline in FY2012)....."*
- *FY2011 PBR request increases the combination of basic and applied research by \$430M from FY 2010 President's Budget baseline, to include increased emphasis and leveraging small business participation and expertise in executing basic and applied research.*

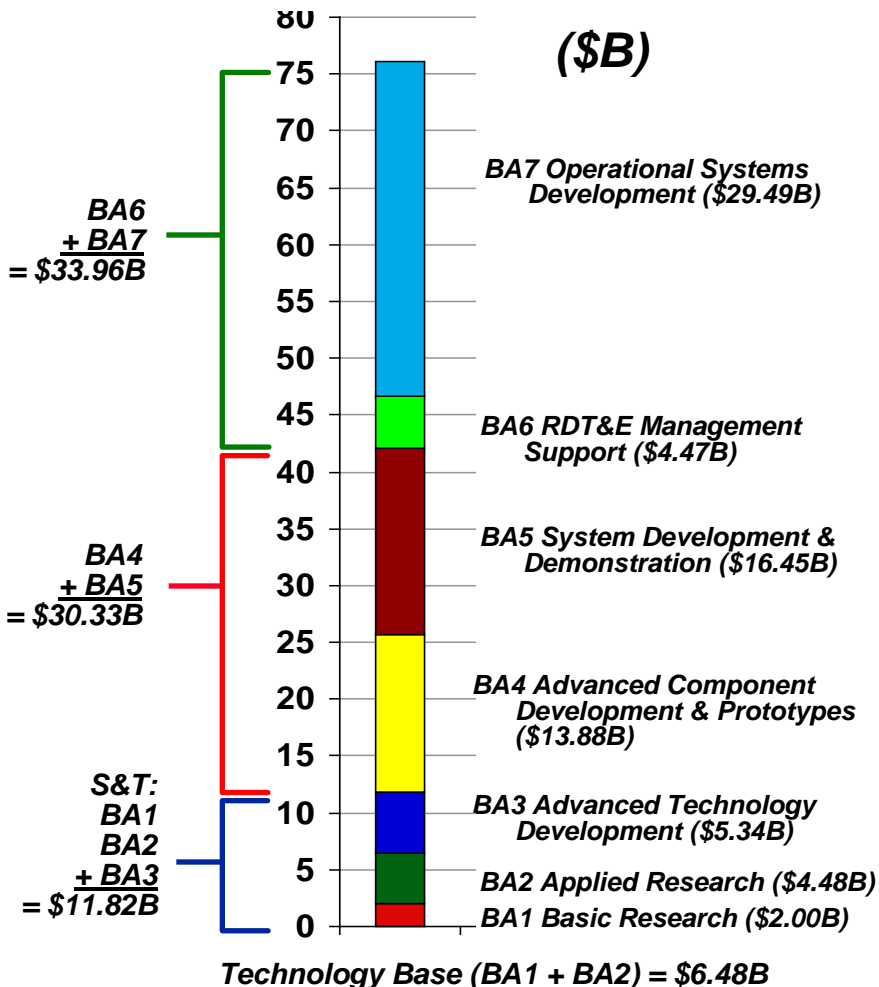
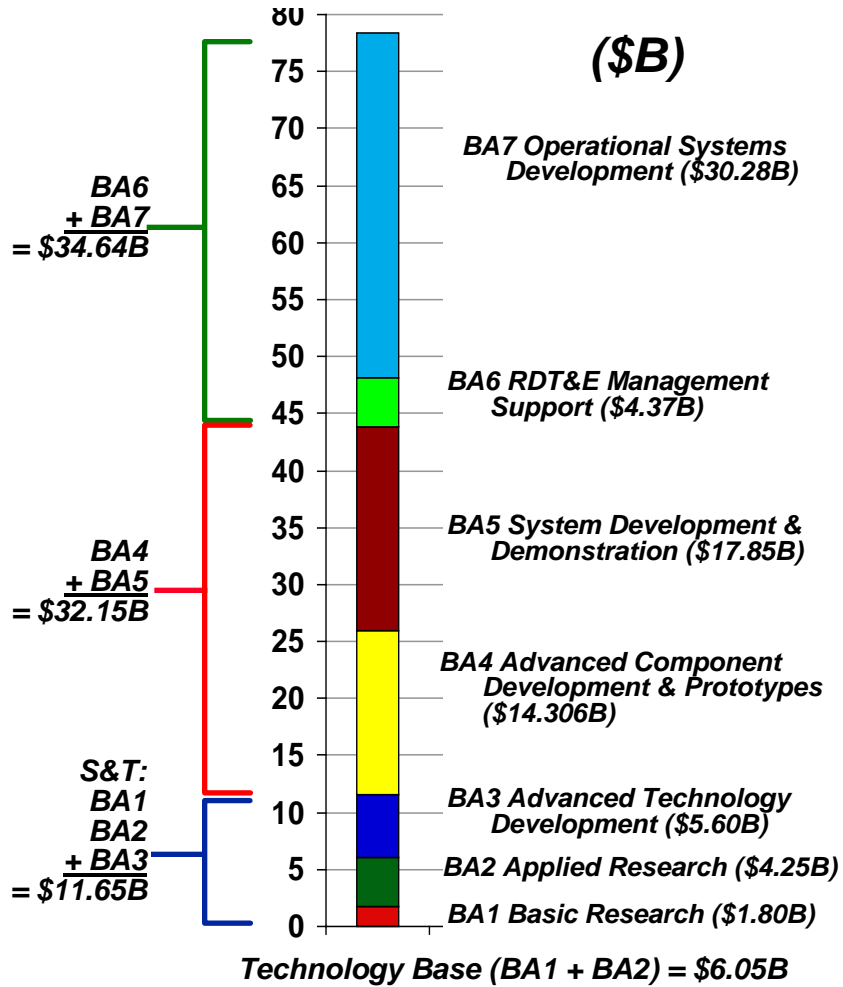
FY10 and FY11 RDT&E Budget Request Comparison

- in Then Year Dollars -



FY10 RDT&E request = \$78.44B
(Budget Activities 1-7)

FY11 RDT&E request = \$76.11B
(Budget Activities 1-7)

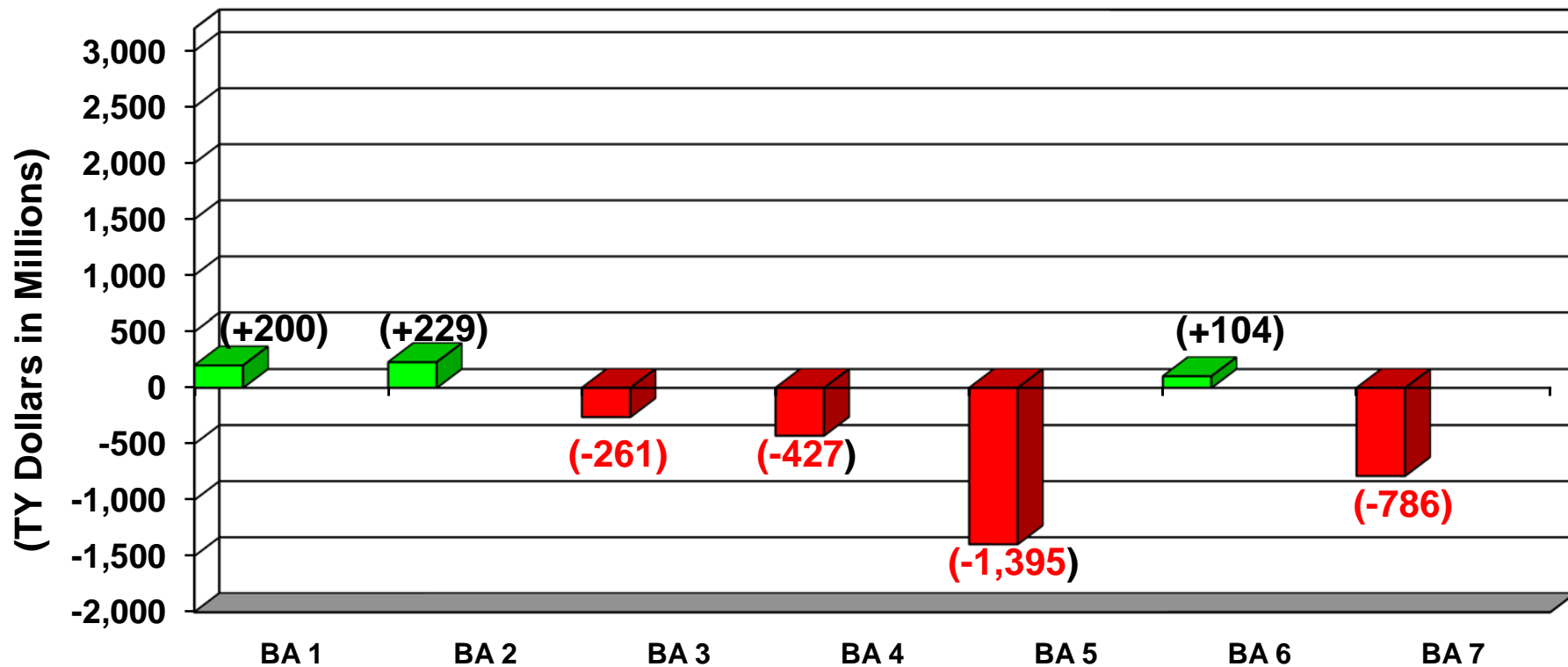


PBR10 S&T is 14.9% of RDT&E

PBR11 S&T is 15.5% of RDT&E

RDT&E Budget Request Overview

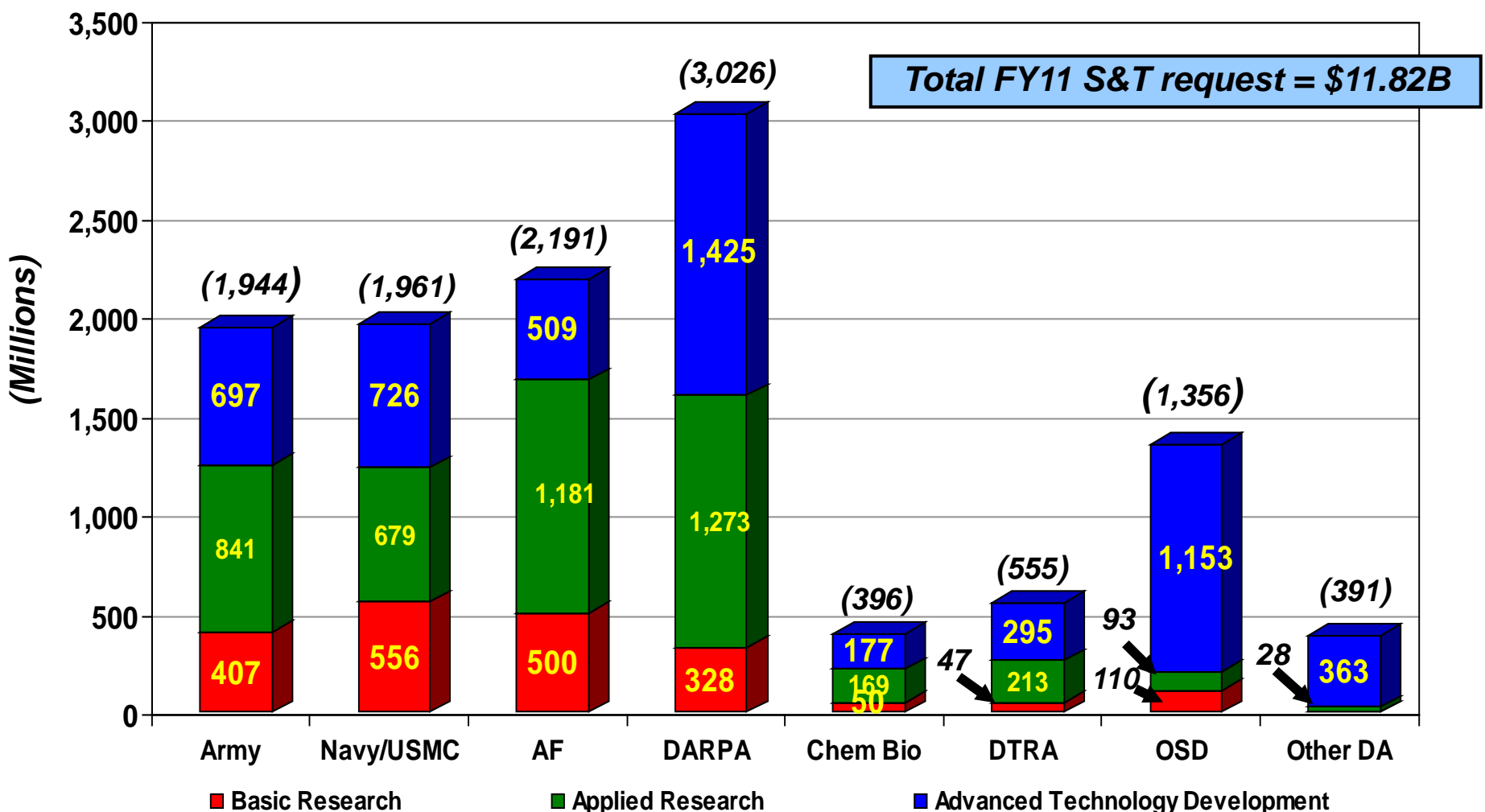
- FY10 and FY11 Comparison -



FY11 DoD S&T Budget Request



Total FY10 S&T Request = 11.65B
 Army = 1,854 Navy = 1,846 AF = 2,179 DARPA = 3,102 ChemBio = 554 DTRA = 501 OSD = 1,352 Other DA = 261



FY11 President's Budget Request



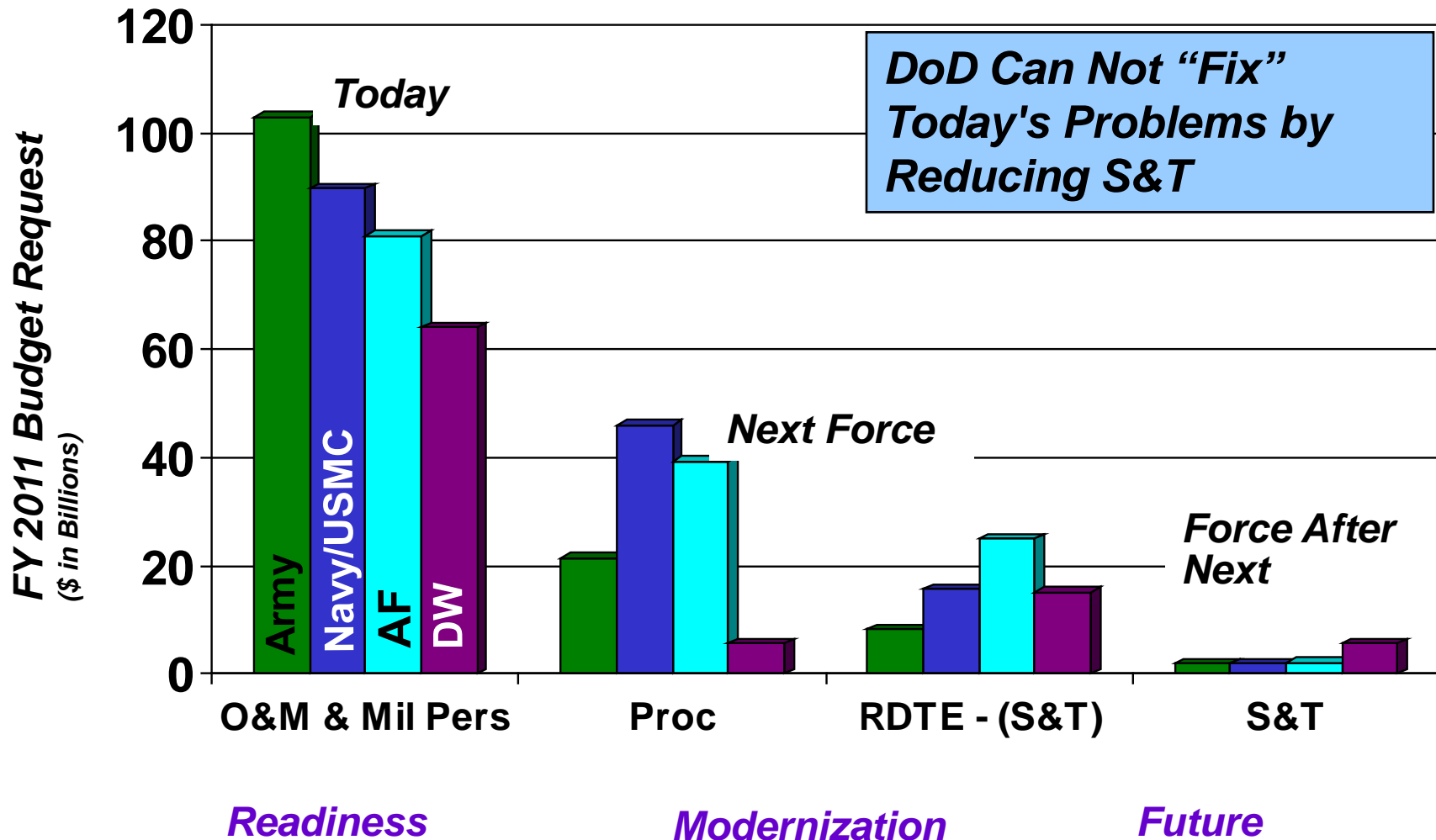
PB2011	Budget Activity	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015
\$ in Millions		ENACTED	PB2011 PRCP	PB2011 PRCP	PB2011 PRCP	PB2011 PRCP	PB2011 PRCP
DoD	BA 1	2,165,243	1,998,797	1,962,831	2,053,714	2,114,943	2,192,600
DoD	BA 2	5,038,295	4,475,822	4,617,641	4,693,762	4,776,157	4,901,514
DoD	BA 3	6,544,231	5,344,430	5,528,759	5,642,716	5,772,354	6,031,326
	DoD S&T	13,747,769	11,819,049	12,109,231	12,390,192	12,663,454	13,125,440
Army	BA 1	431,777	406,873	402,797	447,296	466,520	488,459
Army	BA 2	1,337,114	841,364	841,839	865,738	893,900	935,683
Army	BA 3	1,373,609	696,592	726,611	743,890	801,718	907,410
	Army S&T	3,142,500	1,944,829	1,971,247	2,056,924	2,162,138	2,331,552
Navy	BA 1	549,354	556,425	575,329	606,737	620,470	646,405
Navy	BA 2	718,810	678,680	725,137	758,190	773,561	810,430
Navy	BA 3	831,923	725,599	662,554	630,973	642,680	633,610
	Navy S&T	2,100,087	1,960,704	1,963,020	1,995,900	2,036,711	2,090,445
Air Force	BA 1	774,491	500,473	493,538	498,171	517,696	537,939
Air Force	BA 2	1,221,221	1,181,420	1,195,271	1,204,264	1,215,228	1,234,550
Air Force	BA 3	758,667	509,305	527,007	545,575	567,802	582,795
	Air Force S&T	2,754,379	2,191,198	2,215,816	2,248,010	2,300,726	2,355,284
Def Agencies	BA 1	409,621	535,026	491,167	501,510	510,257	519,797
Def Agencies	BA 2	1,761,150	1,774,358	1,855,394	1,865,570	1,893,468	1,920,851
Def Agencies	BA 3	3,580,032	3,412,934	3,612,587	3,722,278	3,760,154	3,907,511
	Defense Agencies S&T	5,750,803	5,722,318	5,959,148	6,089,358	6,163,879	6,348,159

FY11 DoD R&E Budget Request Comparison



	FY10 PBR	FY10 Approp	FY11 PB (Constant Year FY10)	Real Change from PBR (In CY \$)
Basic Research (BA 1)	1,798	2,165	1,999 (1,966)	+9.5%
Applied Research (BA 2)	4,247	5,038	4,476 (4,402)	+3.8%
Advanced Technology Development (BA 3)	5,605	6,544	5,344 (5,257)	-6.4%
DoD S&T	11,649	13,748	11,819 (11,625)	- 0.1%
Advanced Component Development and Prototypes (BA 4)	14,306	14,485	13,877 (13,649)	-4.6%
DoD R&E (BAs 1 – 4)	25,956	28,232	25,696 (25,274)	-2.6%
DoD Topline	533,813	660,394	548,919 (528,621)	+2.8%

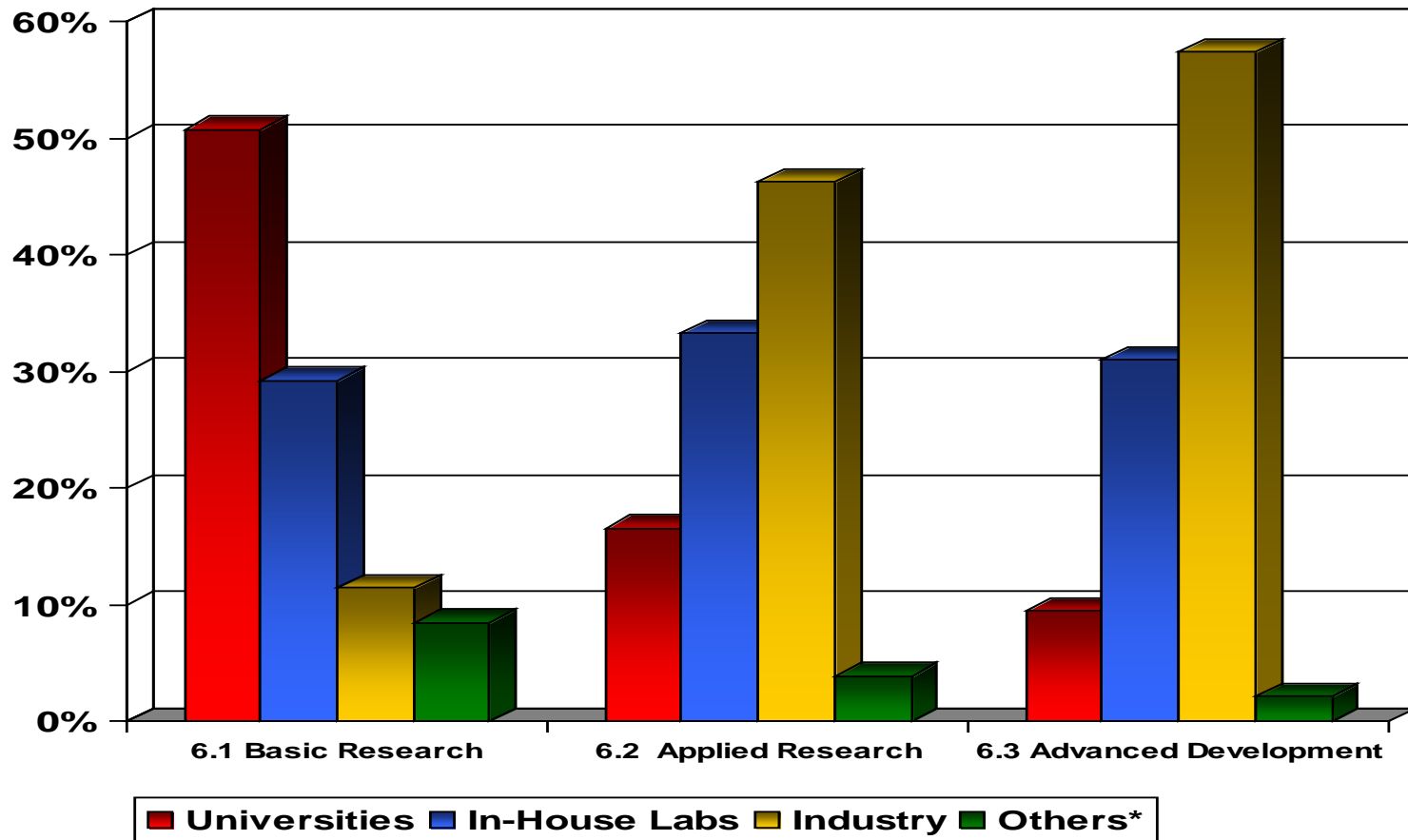
FY11 Technology Investment Compared to Other DoD Categories



Recipients of DoD S&T Funds



DoD S&T Funding Recipients by Percentage (PBR08)



*Includes non-profit institutions, State & local govt., & foreign institutions
Source: National Science Foundation Report (PBR08)

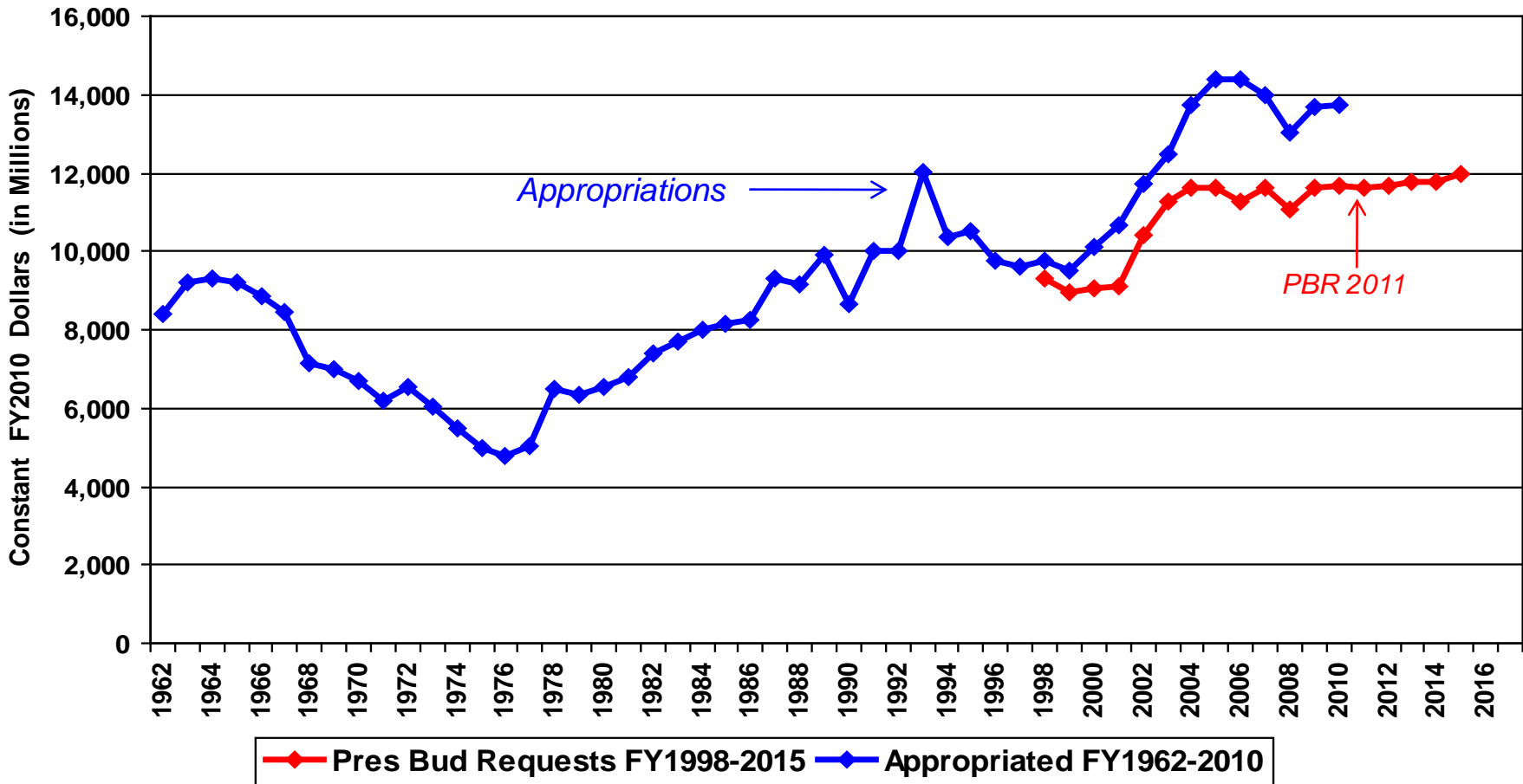
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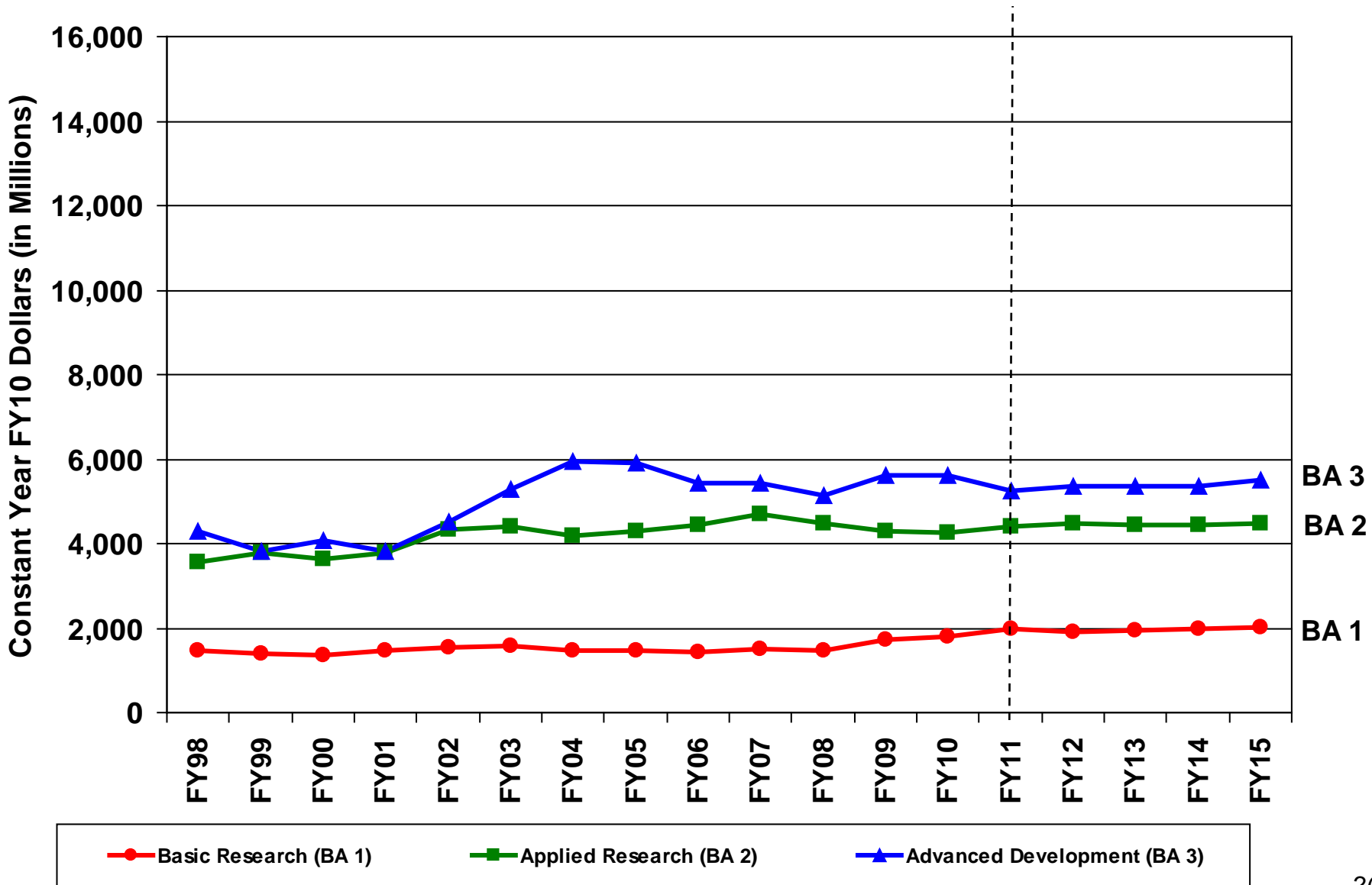
DoD S&T FUNDING: FY1962-2015

(FY1962-2010 Appropriated, FY1998-2015 President's Budget Request)
 (Constant FY2010 Dollars)

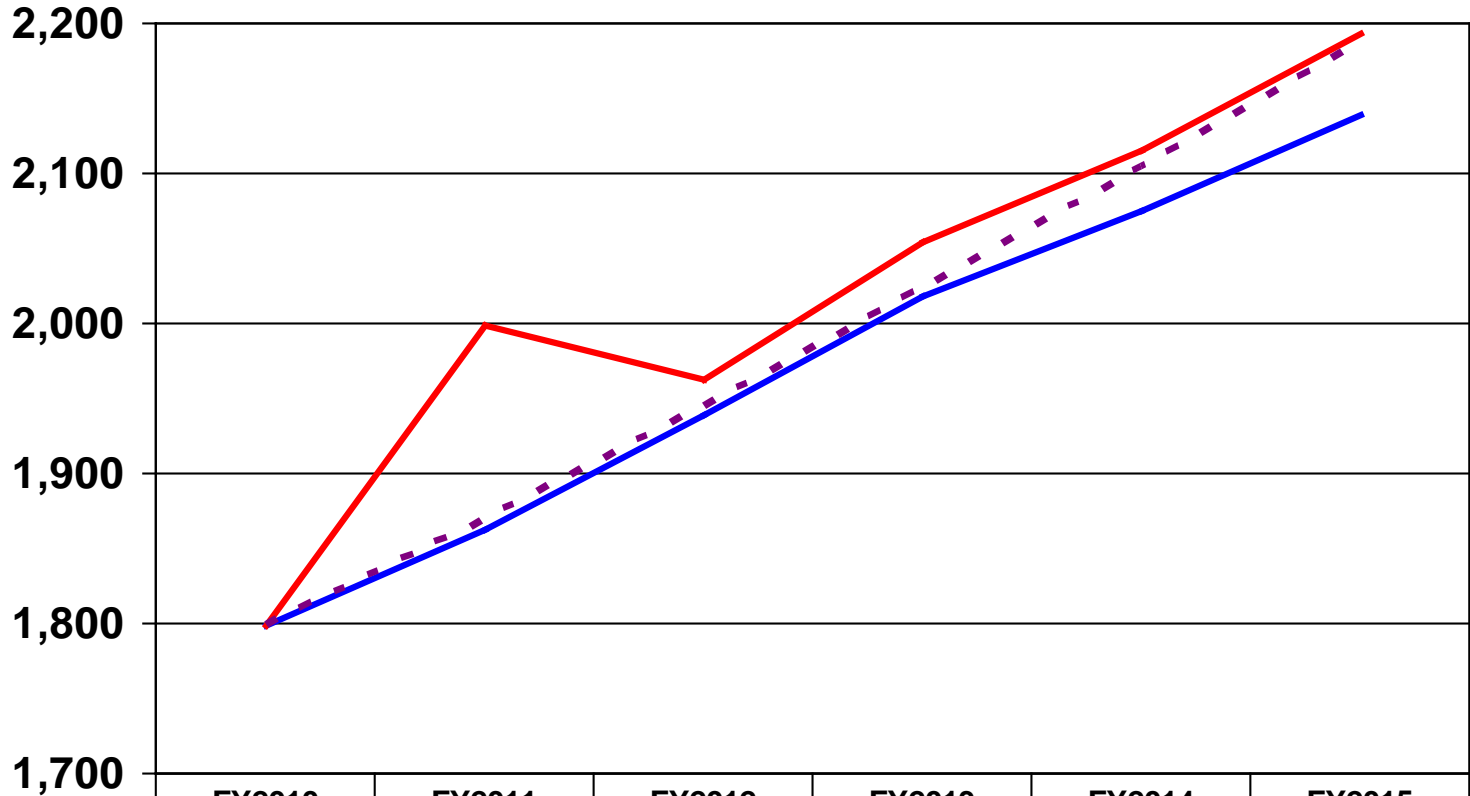


DoD S&T Funding By Budget Activity

- President's Budget Requests - in FY10 Constant Dollars -



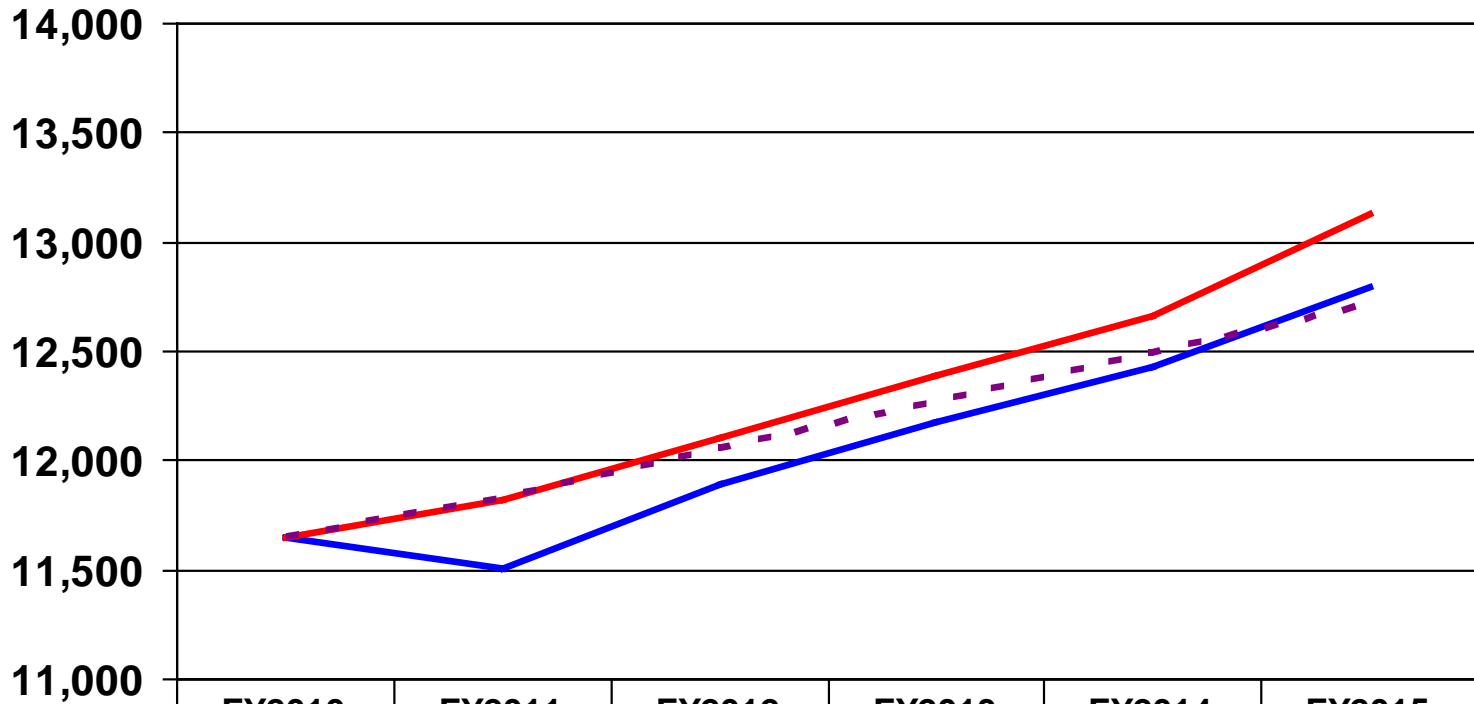
DoD Basic Research (TY Dollars in Millions)



	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015
— PBR-10	1,798	1,863	1,939	2,018	2,075	2,139
— PBR-11	1,798	1,999	1,963	2,054	2,115	2,193
- - - 2% RPG	1798	1870	1945	2023	2104	2188
Δ - PBR10 versus PBR11		136	24	36	40	54

DoD Science & Technology

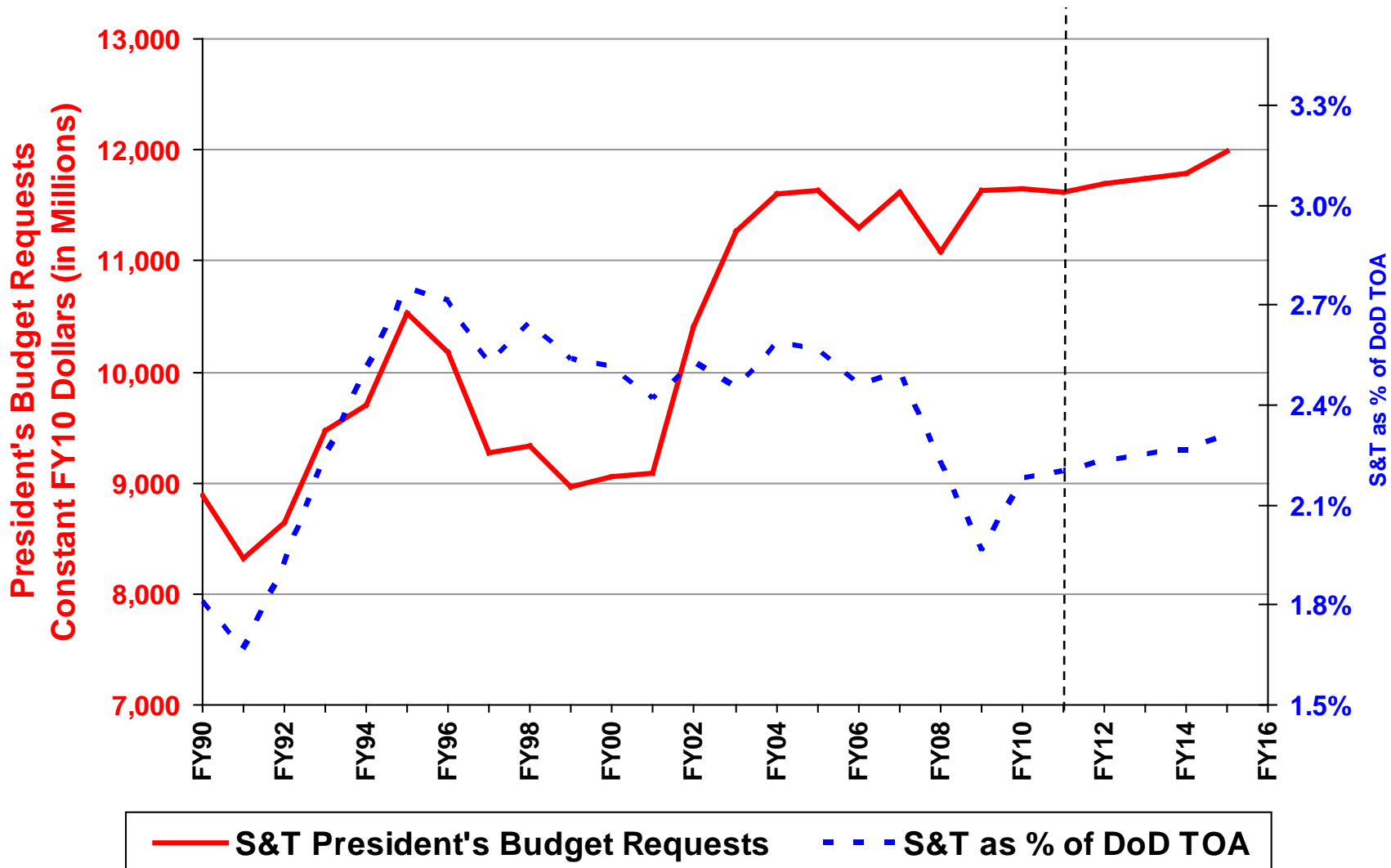
(TY Dollars in Millions)



	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015
— PBR-10	11,649	11,509	11,888	12,180	12,431	12,791
— PBR-11	11,649	11,819	12,109	12,390	12,663	13,125
- - 0% RPG	11,649	11,836	12,049	12,266	12,487	12,711
Δ - PBR10 versus PBR11		310	221	210	232	334

DoD S&T - Macro Scale

- S&T Investment and % of DoD Total Obligational Authority (TOA) -



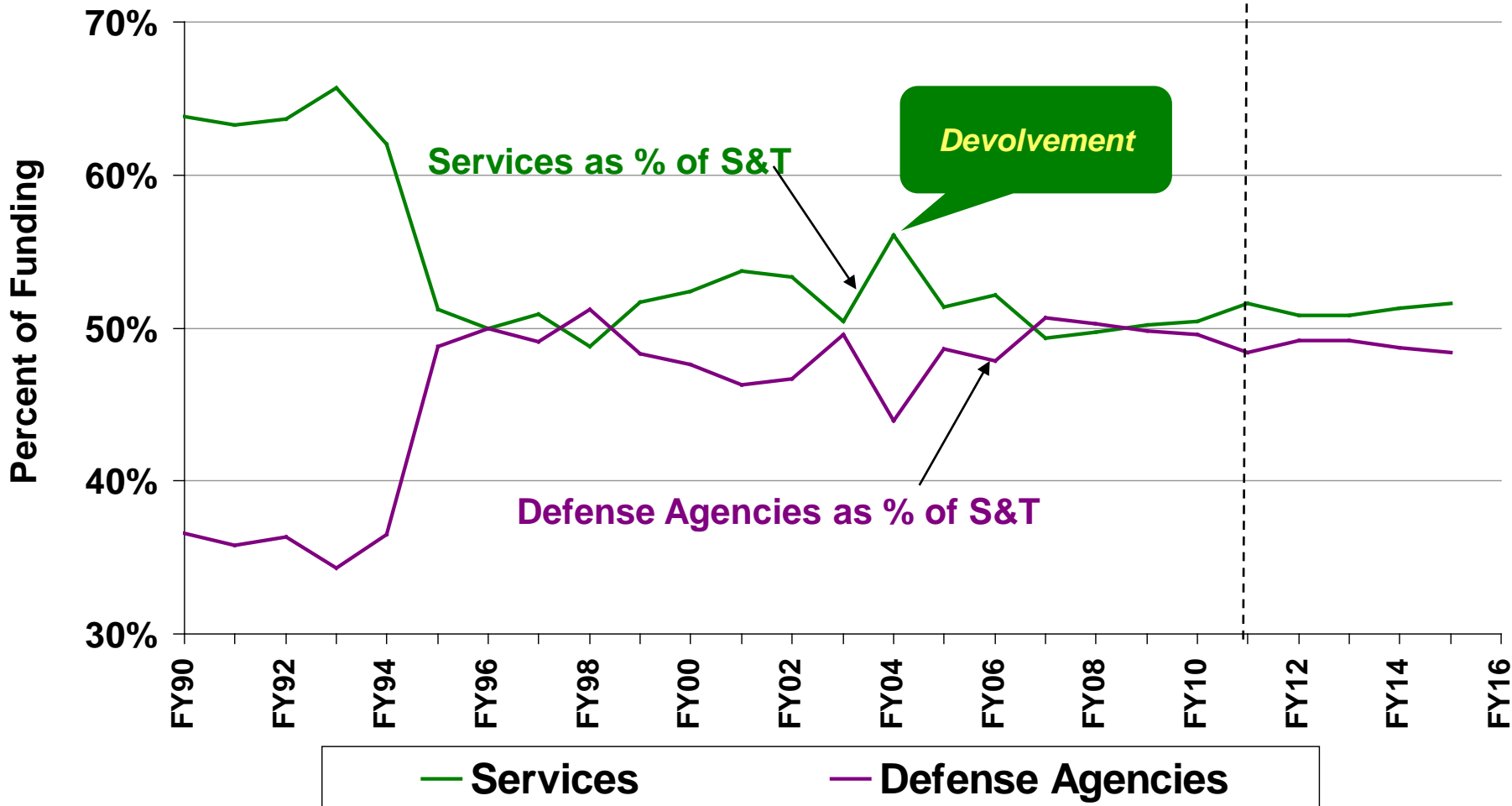
** Note: FY03 includes DERF & Nuclear Posture Review funding



S&T Breakout

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

President's Budget Requests



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Core DoD Budget Supports QDR Key Mission Areas

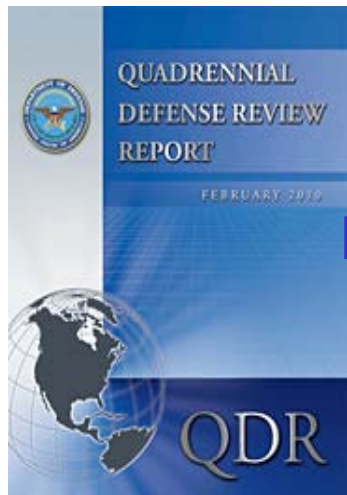


QDR Key Mission Areas

1. *Defend the United States and Support Civil Authorities at Home*
2. *Succeed in Counterinsurgency, Stability, and Counterterrorism Operations*
3. *Build the Security Capacity of Partner States*
4. *Deter and Defeat Aggression in Anti-Access Environments*
5. *Prevent Proliferation and Counter Weapons of Mass Destruction*
6. *Operate Effectively in Cyberspace*

PBR-11 S&T Enhancements

- *Defense research and in-house sciences (\$114M)*
- *University and industry research (\$16M)*
- *Innovative energy technologies (\$17M)*
- *Deployable force protection (\$69M)*
- *Advanced distance learning (\$10M)*
- *Cultural and social modeling (\$6M)*
- *Nanotechnology manufacturing (\$36M)*
- *Information and Communications Technology (\$15M)*
- *Cyber Security (\$200M)*



Science and Technology Priorities for FY11 Budget



Prioritizing key science and technology activities

Challenges include :

- *Increasing the productivity of our research institutions, including our research universities and major public and private laboratories and research centers (Research Institutions)*
- *Strengthening science, technology, engineering, and mathematics education at every level, from pre-college to post-graduate to lifelong learning (STEM)*
- *Improving and protecting our information, communication, and transportation infrastructure, which is essential to our commerce, science, and security alike (Cyber Security)*
- *Enhancing our capabilities in space, which are essential for communications, geopositioning, intelligence gathering, Earth observation, and national defense, as well for increasing our understanding of the universe and our place in it (Space Capabilities)*

**- Office of Management and Budget
- Office of Science and Technology Policy
(04 Aug 09 Memorandum)**



Big Moves Last Three Budgets

FY2009 (~\$2B across the FYDP)

- Basic Research (~\$1.5B)
- Increased Protection Demonstrations for Dismounted Troops (~\$200M)
- Novel LO/CLO Technologies (~\$150M)
- Cyber Protection (~\$100M)
- Anti-tamper Technology (~\$10M)

FY2010 (~\$1.8B across the FYDP)

- Medical S&T (Wounded Warrior) (~\$2.5B total; ~\$1B in S&T, the rest in DHP)
- Large Data Handling (ISR Capability) (~\$100M)
- Cyber Protection (~\$100M)
- Anti-Tamper (~\$35M)
- High Temperature Materials (~\$70M)
- Stand-off Detection of Fissile Materials (~\$300M)
- High Performance Computing (~\$100M)
- Minerva (Sociology Research) (~\$100M)

FY2011 (~\$1.6B across the FYDP)

7% increase in FY11 Basic (6.1) and Applied Research (6.2) from FY10 baseline (~\$544M)

- Deployable Force Protection (~\$238M)
- Cyber Security Research (~\$200M)
- Night Vision Technology-Advanced Focal Plane Array (\$94M)
- High Energy Laser Advanced Technology (\$512M)

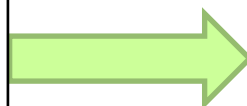
Key	
Joint Programs	
Multiple Executors	
Army	
Navy	
Air Force	



QDR 2006 vs. QDR 2010

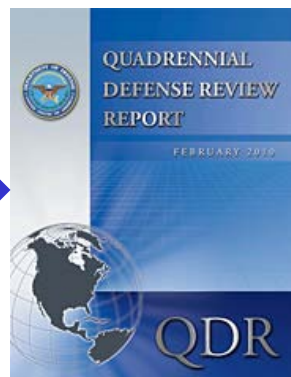
QDR 2006 Strategic Outcomes

1. *Defend the Homeland in Depth*
2. *Defeat Terrorist Networks*
3. *Shape the Choices of Countries at Strategic Crossroads*
4. *Prevent the Acquisition or use of Weapons of Mass Destruction*



QDR 2010 Key Mission Areas

1. *Defend the United States and Support Civil Authorities at Home*
2. *Succeed in Counterinsurgency, Stability, and Counterterrorism Operations*
3. *Build the Security Capacity of Partner States*
4. *Deter and Defeat Aggression in Anti-Access Environments*
5. *Prevent Proliferation and Counter Weapons of Mass Destruction*
6. *Operate Effectively in Cyberspace*



**QDR 2010 Builds on QDR 2006
- Anti-Access and Cyberspace are New -**

S&T Enabling Technology Priorities

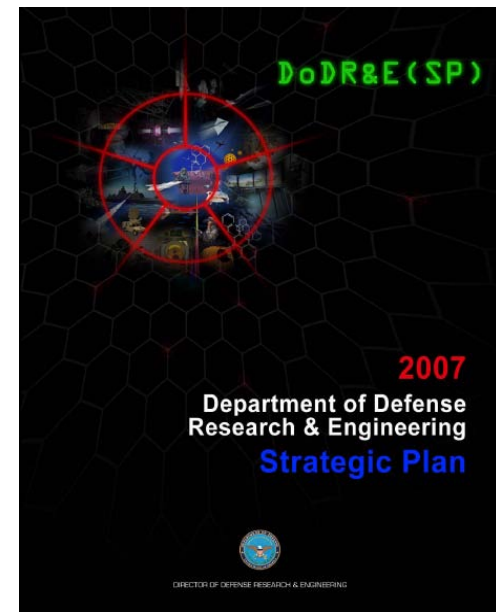
--Supporting the 2006 QDR Strategic Outcomes--



- **Technology focus areas:**

- Biometrics and Biological exploitation
- Information Technology and applications
- Persistent Surveillance Technologies
- Networks and Communication
- Human, Social, Cultural, and Behavioral Modeling
- Language Translation Technologies
- Manufacturing Technologies
- Cognitive Enhancement
- Directed Energy Technologies
- Autonomous Systems Technologies
- Hyperspectral Sensors
- Nanotechnology
- Advanced Materials
- Energy and Power Technologies
- Organization, Fusion, & Mining Data
- Combating Weapons of Mass Destruction Technologies
- Energetic Materials

In Blue—Areas with Substantial Increases in FY08/09/10 President's Budget Request





Summary

- **PBR11 S&T investment is driven by:**
 - *2010 Quadrennial Defense Review*
 - President's and SECDEF's desire to increase funding for Basic and Applied Research
- **Basic Research is 9.5% higher than PBR10 request in real terms**
- **Applied Research is 3.8% higher than PBR10 request in real terms**
- **PBR11 is among the highest in the last 20 years, in real terms**