Mr. Bob Baker
Deputy Director, Plans & Programs,
Assistant Secretary of Defense (Research & Engineering)
Outline

- Guidance from the Chain of Command
- FY2012 S&T President’s Budget Request
- Historical Context
- Strategic Planning & Budget Changes
“The first step in winning the future is encouraging American innovation. Our free enterprise system is what drives innovation. But because it’s not always profitable for companies to invest in basic research, throughout our history, our government has provided cutting-edge scientists and inventors with the support they need.

Two years ago, I said that we needed to reach a level of research and development, we haven’t seen since the Space Race. And in a few weeks I’ll be sending a budget to Congress that helps us meet that goal. We’ll invest in biomedical research, information technology, and especially clean energy technology -- an investment that will strengthen our security, protect our planet, and create countless new jobs for our people.

Maintaining our leadership in research and technology is crucial to America’s success. But if we want to win the future - - if we want innovation to produce jobs in America and not overseas – then we also have to win the race to educate our kids.

Over the next 10 years, with so many baby boomers retiring from our classrooms, we want to prepare 100,000 new teachers in the fields of science and technology and engineering and math.”
“These budget decisions took place in the context of a nearly two year effort by the DoD to reform the way the Pentagon does business – to change how and what we buy... We have protected programs that support military people, readiness, and modernization... We still live in a very dangerous and often unstable world. Our military must remain strong and agile enough to face a diverse range of threats – from non-state actors attempting to acquire and use weapons of mass destruction and sophisticated missiles, to the more traditional threats of other states...”

“Directed DoD to fund 2% real growth in Basic Research and to maintain stable funding in the rest of S&T for FY12-FY16. In real terms, the FY12 S&T budget request is almost 29% greater than the request in FY 2000.”

OSD/PA News Release, 2/14/11
Continuing the Reform Agenda

“Budget represents a reasonable, responsible, and sustainable level of funding” - Secretary Gates, Budget Rollout Brief (2/14/2011)

- Taking Care of People
- Rebalancing Military Capabilities
- Reforming What and How We Buy
- Supporting our Troops in the Field
ASD(R&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.
ASD(R&E) – Organization

ASD(R&E)
Hon. Zachary Lemnios

Principal Deputy
Mr. Alan Shaffer

DARPA
Dr. Regina Dugan

DASD
Research
Dr. David Honey
PD - Andre van Tilborg

DASD
Systems Engineering
Mr. Stephen Welby
PD - Kristen Baldwin

DASD
Rapid Fielding
Mr. Earl Wyatt
PD - Ben Riley

DASD
Developmental T&E
Mr. Ed Greer
PD - Vacant

Political appointee
Career SES
Outline

- Guidance from the Chain of Command
- FY2012 S&T President’s Budget Request
- Historical Context
- Strategic Planning & Budget Changes
FY12 DoD S&T Budget Request

Total FY12 S&T request = $12.25B

Total FY11 S&T Request = $11.82B
Army = 1,945  Navy = 1,961  AF = 2,191  DARPA = 3,026  ChemBio = 396  DTRA = 555  OSD = 1,356  Other DA = 389
## FY12 President’s Budget Request

<table>
<thead>
<tr>
<th>BP12</th>
<th>BA</th>
<th>FY11</th>
<th>FY12</th>
<th>FY13</th>
<th>FY14</th>
<th>FY15</th>
<th>FY16</th>
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<tbody>
<tr>
<td></td>
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<td>PBR 11</td>
<td>PB12 CIS</td>
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<td>PB12 CIS</td>
<td>PB12 CIS</td>
<td>PB12 CIS</td>
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<tr>
<td>DoD</td>
<td>BA 1</td>
<td>1,998,797</td>
<td>2,078,470</td>
<td>2,137,917</td>
<td>2,221,206</td>
<td>2,305,688</td>
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<tr>
<td>DoD</td>
<td>BA 2</td>
<td>4,475,822</td>
<td>4,687,273</td>
<td>4,680,455</td>
<td>4,712,527</td>
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<td>DoD</td>
<td>BA 3</td>
<td>5,344,430</td>
<td>5,481,225</td>
<td>5,765,877</td>
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<td>6,028,726</td>
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<td>DoD S&amp;T</td>
<td>11,819,049</td>
<td>12,246,968</td>
<td>12,584,249</td>
<td>12,808,491</td>
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<td>Army</td>
<td>BA 1</td>
<td>406,873</td>
<td>436,920</td>
<td>440,492</td>
<td>456,268</td>
<td>470,582</td>
<td>487,449</td>
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<td>Army</td>
<td>BA 2</td>
<td>841,364</td>
<td>869,332</td>
<td>860,648</td>
<td>856,203</td>
<td>840,534</td>
<td>832,660</td>
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<td>Army</td>
<td>BA 3</td>
<td>696,592</td>
<td>976,812</td>
<td>949,153</td>
<td>983,936</td>
<td>966,542</td>
<td>983,685</td>
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<td>Army S&amp;T</td>
<td>1,944,829</td>
<td>2,283,064</td>
<td>2,250,293</td>
<td>2,296,407</td>
<td>2,277,658</td>
<td>2,303,794</td>
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<tr>
<td>Navy</td>
<td>BA 1</td>
<td>556,425</td>
<td>577,372</td>
<td>599,398</td>
<td>622,310</td>
<td>646,079</td>
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<tr>
<td>Navy</td>
<td>BA 2</td>
<td>678,680</td>
<td>783,794</td>
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<td>772,408</td>
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<td>Navy</td>
<td>BA 3</td>
<td>725,599</td>
<td>648,217</td>
<td>606,260</td>
<td>641,203</td>
<td>629,779</td>
<td>641,636</td>
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<td>Navy S&amp;T</td>
<td>1,960,704</td>
<td>2,009,383</td>
<td>1,988,631</td>
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<td>2,085,689</td>
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<tr>
<td>AIR FORCE</td>
<td>BA 1</td>
<td>500,473</td>
<td>518,859</td>
<td>538,233</td>
<td>558,331</td>
<td>579,179</td>
<td>600,805</td>
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<td>AIR FORCE</td>
<td>BA 2</td>
<td>1,181,420</td>
<td>1,181,874</td>
<td>1,187,232</td>
<td>1,203,560</td>
<td>1,227,057</td>
<td>1,250,541</td>
</tr>
<tr>
<td>AIR FORCE</td>
<td>BA 3</td>
<td>509,305</td>
<td>585,404</td>
<td>562,607</td>
<td>579,470</td>
<td>590,288</td>
<td>600,329</td>
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<td>Air Force S&amp;T</td>
<td>2,191,198</td>
<td>2,286,137</td>
<td>2,288,072</td>
<td>2,341,361</td>
<td>2,396,524</td>
<td>2,451,675</td>
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<tr>
<td>Def-Agencies</td>
<td>BA 1</td>
<td>535,026</td>
<td>545,319</td>
<td>559,794</td>
<td>584,297</td>
<td>609,848</td>
<td>645,202</td>
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<tr>
<td>Def-Agencies</td>
<td>BA 2</td>
<td>1,774,358</td>
<td>1,852,273</td>
<td>1,849,602</td>
<td>1,880,356</td>
<td>1,880,715</td>
<td>1,949,184</td>
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<tr>
<td>Def-Agencies</td>
<td>BA 3</td>
<td>3,412,934</td>
<td>3,270,792</td>
<td>3,647,857</td>
<td>3,670,149</td>
<td>3,842,117</td>
<td>3,900,533</td>
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<td>Def-Agencies S&amp;T</td>
<td>5,722,318</td>
<td>5,668,384</td>
<td>6,057,253</td>
<td>6,134,802</td>
<td>6,332,680</td>
<td>6,494,919</td>
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</tbody>
</table>
FY11 and FY12 RDT&E Budget Request Comparison
- in Then Year Dollars -

FY11 RDT&E request = $76.13B (Budget Activities 1-7)

FY12 RDT&E request = $75.33B (Budget Activities 1-7)

RDT&E Declined: S&T Did Not

BA6 RDT&E Management Support ($4.48B)
BA5 System Development & Demonstration ($16.45B)
BA4 Advanced Component Development & Prototypes ($13.88B)
BA3 Advanced Technology Development ($5.34B)
BA2 Applied Research ($4.48B)
BA1 Basic Research ($1.99B)
BA7 Operational Systems Development (29.49B)

BA6 + BA7 = $33.98B
BA4 + BA5 = $30.33B
S&T: BA1 + BA2 + BA3 = $11.82B

Technology Base (BA1 + BA2) = $6.47B

PBR11 S&T is 15.5% of RDT&E

BA6 RDT&E Management Support ($3.98B)
BA5 System Development & Demonstration ($15.66B)
BA4 Advanced Component Development & Prototypes ($13.73B)
BA3 Advanced Technology Development ($5.48B)
BA2 Applied Research ($4.69B)
BA1 Basic Research ($2.08B)
BA7 Operational Systems Development ($29.51B)

BA6 + BA7 = $33.69B
BA4 + BA5 = $29.39B
S&T: BA1 + BA2 + BA3 = $12.25B

Technology Base (BA1 + BA2) = $6.77B

PBR12 S&T is 16.2% of RDT&E
## FY12 DoD R&E Budget Request Comparison

<table>
<thead>
<tr>
<th>Category</th>
<th>PBR 2010</th>
<th>PBR 2011 (CY FY11 $)</th>
<th>PBR 2012 (CY FY11 $)</th>
<th>Real Change from PBR11 to PBR12 (CY FY11 $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Research (BA 1)</td>
<td>1,798</td>
<td>1,999</td>
<td>2,078 (2,043)</td>
<td>+2.2%</td>
</tr>
<tr>
<td>Applied Research (BA 2)</td>
<td>4,247</td>
<td>4,476</td>
<td>4,687 (4,608)</td>
<td>+2.9%</td>
</tr>
<tr>
<td>Advanced Technology Development (BA 3)</td>
<td>5,605</td>
<td>5,344</td>
<td>5,481 (5,388)</td>
<td>0.8%</td>
</tr>
<tr>
<td>DoD S&amp;T</td>
<td>11,649</td>
<td>11,819</td>
<td>12,247 (12,039)</td>
<td>1.9%</td>
</tr>
<tr>
<td>Advanced Component Development and Prototypes (BA 4)</td>
<td>14,306</td>
<td>13,877</td>
<td>13,733 (13,401)</td>
<td>-3.4%</td>
</tr>
<tr>
<td>DoD R&amp;E (BAs 1 – 4)</td>
<td>25,956</td>
<td>25,696</td>
<td>25,880 (25,440)</td>
<td>-1.0%</td>
</tr>
<tr>
<td>DoD Topline</td>
<td>533,813</td>
<td>549,093</td>
<td>566,341 (556,710)</td>
<td>+1.4%</td>
</tr>
</tbody>
</table>
FY 2012 Technology Investment Compared to Other DoD Categories

DoD Can Not “Fix” Today's Problems by Reducing S&T

FY 2012 Budget Request

($ in Billions)

O&M & Mil Pers
Proc
RDTE - (S&T)
S&T

Today
Army
Navy/USMC
Air Force
DW
Next Force

Force After Next

Readiness Modernization Future
Recipients of DoD S&T Funds

*Includes non-profit institutions, State & local govt., & foreign institutions

Source: National Science Foundation Report (PBR08)
Outline

- Guidance from the Chain of Command
- FY2012 S&T President’s Budget Request
- Historical Context
- Strategic Planning & Budget Changes
DoD S&T FUNDING: FY1962-2016
(Constant FY12 Dollars)
DoD Basic Research  
*(TY Dollars in Millions)*

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td>PBR-12</td>
<td>2,078</td>
<td>2,138</td>
<td>2,221</td>
<td>2,306</td>
<td>2,404</td>
<td></td>
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<tr>
<td>PBR-11</td>
<td>1,999</td>
<td>1,963</td>
<td>2,054</td>
<td>2,115</td>
<td>2,193</td>
<td></td>
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<tr>
<td>2% RPG</td>
<td>1,999</td>
<td>2,069</td>
<td>2,145</td>
<td>2,225</td>
<td>2,307</td>
<td>2,392</td>
</tr>
</tbody>
</table>

\[ \Delta - \text{PBR11 versus PBR12} \]

116 84 106 113
S&T Breakout
- Services and Defense Agencies (Wide) as % of Total S&T -

President's Budget Requests

Percent of Funding

- Services as % of S&T
- Defense Agencies (Wide) as % of S&T

Services
Defense Agencies (Wide)

FY90 FY92 FY94 FY96 FY98 FY00 FY02 FY04 FY06 FY08 FY10 FY12 FY14 FY16

Devolvement
Outline

- Guidance from the Chain of Command
- FY2012 S&T President’s Budget Request
- Historical Context
- Strategic Planning & Budget Changes
Quadrennial Defense Review

Key Mission Areas (KMAs)

1. Defend the United States and Support Civil Authorities at Home
2. Succeed in Counterinsurgency, Stability, and Counterterrorist 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 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 -
Priority S&T Investment Areas for FY 2013-2017

• **Data-to-Decisions**
  – Science and applications to reduce the cycle time and manpower requirements for analyses and use of large data sets.

• **Engineered Resilient Systems**
  – Engineering concepts, science, and design tools to protect against malicious compromise of weapon systems, and to develop agile manufacturing for trusted and assured defense systems.

• **Cyber Science and Technology**
  – Science and technology for efficient, effective cyber capabilities across the spectrum of joint operations.

• **Electronic warfare / Electronic protection**
  – New concepts and technology to protect systems and extend capabilities across the electromagnetic spectrum.

• **Counter Weapons of Mass Destruction (WMD)**
  – Advances in DoD’s ability to locate, secure, monitor, tag, track, interdict, eliminate, and attribute WMD weapons and materials.

• **Autonomy**
  – Science and technology to achieve autonomous systems that reliably and safely accomplish complex tasks in all environments.

• **Human Systems**
  – Science and technology to enhance human-machine interfaces to increase productivity and effectiveness across a broad range of missions.
# Big Moves DoD Wide

## FY2012

<table>
<thead>
<tr>
<th>Program</th>
<th>Funding (Increase from FY11PBR-FY12PBR)</th>
<th>Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Taking Care of People</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Defense Health</td>
<td>~ $ 125 M</td>
<td>DHP; Services</td>
</tr>
<tr>
<td><strong>Force Protection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Chemical Bio-Defense Program</td>
<td>~ $ 100 M</td>
<td>NCB</td>
</tr>
<tr>
<td>3 Cyber S&amp;T</td>
<td>~ $ 76 M</td>
<td>DARPA</td>
</tr>
<tr>
<td>4 Force Protection</td>
<td>~ $ 49 M</td>
<td>Navy &amp; Army</td>
</tr>
<tr>
<td>5 RF Systems</td>
<td>~ $ 45 M</td>
<td>Navy</td>
</tr>
<tr>
<td><strong>Prepare for Uncertain Future</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Info &amp; Communications Technology</td>
<td>~ $ 120 M</td>
<td>DARPA; AF</td>
</tr>
<tr>
<td>7 Weapons Technology</td>
<td>~ $ 62 M</td>
<td>Services</td>
</tr>
<tr>
<td>8 Undersea Warfare</td>
<td>~ $ 30 M</td>
<td>Navy</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td>~ $ 607 M</td>
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</table>
## Big S&T Moves, Last Three Budgets

<table>
<thead>
<tr>
<th>FY2010 (~$1.8B across the FYDP)</th>
<th>FY2011 (~$1.6B across the FYDP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical S&amp;T (Wounded Warrior) (~$2.5B total; ~$1B in S&amp;T, remainder DHP)</td>
<td>7% increase in FY11 Basic (6.1) and Applied Research (6.2) from FY10 base (~$544M)</td>
</tr>
<tr>
<td>Large Data Handling (ISR Cap) ~ $100M</td>
<td>Deployable Force Protection (~$238M)</td>
</tr>
<tr>
<td>Cyber Protection (~ $100 M)</td>
<td>Cyber Security Research (~$200M)</td>
</tr>
<tr>
<td>Anti-Tamper (~$33M)</td>
<td>Night Vision Technology-Advanced Focal Plane Array ($94M)</td>
</tr>
<tr>
<td>High Temperature Materials (~$70M)</td>
<td>High Energy Laser Advanced Technology ($512M)</td>
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<tr>
<td>Stand-off Detection of Fissile Materials (~$300)</td>
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</tr>
<tr>
<td>High Performance Computing (~$100M)</td>
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<tr>
<td>Minerva (Sociology Research) (~$100M)</td>
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</tr>
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</table>

<table>
<thead>
<tr>
<th>FY2012 (~$0.6B; $3.0 B across the FYDP)</th>
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</thead>
<tbody>
<tr>
<td>Protection of Defense Health ($125 M)</td>
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<tr>
<td>Information and Communication Technology ($120 M)</td>
</tr>
<tr>
<td>Force Protection Technology ($49 M)</td>
</tr>
<tr>
<td>Chemical and Biological Defense Technology ($100 M)</td>
</tr>
<tr>
<td>Cyber Security ($76 M)</td>
</tr>
<tr>
<td>Advanced Undersea Warfare Applied Research ($30 M)</td>
</tr>
</tbody>
</table>

### Key

- Joint Programs
- Multiple Executors
- Army
- Navy
- Air Force
Summary

- Overall S&T up 1.9% (in real terms) from FY11 PBR
  - Grew at a faster rate than DoD top line (1.4%)
  - All three categories (6.1, 6.2, 6.3) had real growth
  - RDT&E is down, but S&T is up
- Met SECDEF Guidance
- Big Moves Included:
  - Protection of Defense Health Program
  - Information and Communications Technology
  - Cyber S&T
  - Force Protection
  - Chemical and Biological Research
  - Weapons Technology