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SPECIAL UPDATE

# Defense Asks for Big Overall Increase But Cuts in S&T

After a comprehensive review of defense spending priorities, the Department of Defense (DOD) submitted its long-awaited budget request for fiscal year (FY) 2002. The request includes large increases for many development programs and for the department as a whole, but it asks for cuts to science and technology (S&T) accounts.

The request, which supplants a placeholder request submitted in April with the rest of the Bush Administration's budget, asks for a total increase of $27 billion for DOD, which would raise the department's budget 9 percent, to $328.9 billion. Total research and development (R&D) would also get a huge boost, rising 13.4 percent ($5.7 billion) to $48.5 billion. However, this increase would be entirely concentrated in DOD's development accounts, with basic and applied research combined falling by 0.6 percent to $4.96 billion. (See Table 1 on page 2.)

Congressional reaction to the request was mixed, with many members of Congress applauding the overall increase in DOD spending but criticizing other aspects of the proposed budget. "It's clear that this budget places a huge increase for missile defense ahead of important programs in modernization, basic research and training time for Army units," said Senate Armed Services Committee Chairman Carl Levin (D-MI).

DOD is by far the largest supporter of R&D in the federal government, accounting for nearly half the total. In the 1980s, DOD supported nearly two-thirds of total federal R&D, but because of defense cutbacks following the end of the Cold War, its support for R&D declined during most of the 1990s. DOD R&D has begun to rebound, however, in recent years.

The department divides its R&D funding into seven categories, numbered "6.1" to "6.7". The "6.1," "6.2," and "6.3" categories refer, respectively, to basic research, applied research, and generic technology development. They are often grouped together as "S&T." These programs contribute to a broad knowledge base with potential applications to a wide variety of military as well as civilian uses. S&T is separate from the "6.4" and higher categories, which are focused on the development and testing of specific weapons systems.

DOD is responsible for a little over 10 percent of all federal support of basic and applied research ("6.1" and "6.2"), but is a key sponsor for several science and engineering disciplines. For example, DOD supports 35 percent of all federal research in the computer sciences and nearly a third of all engineering research, as well as significant shares of research in mathematics and oceanography. The department funds research in these disciplines for their contributions to national defense, but this research is also a key source for major innovations in the civilian economy, most evident in DOD's early support for research that led to the now-ubiquitous Internet.

With the Bush Administration new to office this year, DOD did not submit a full FY 2002 budget request until late June, after a review of spending priorities called the Defense Strategy Review conducted by Secretary of Defense Donald Rumsfeld. Initially expected to result in a major reordering of DOD priorities, the review ultimately deferred major strategy decisions until the Quadrennial Defense Review later this year and the FY 2003 budget request next February. The FY 2002 request has been packaged instead as a catch-up budget to address past funding shortfalls.

The big winner in the DOD R&D budget would be the Ballistic Missile Defense Organization (BMDO). BMDO received a substantial boost from $3.5 billion in FY 2000 to $4.2 billion in FY 2001, but the revised request would send its FY 2002 budget soaring to $7.0 billion, a 67.4 percent increase in one year and a doubling of funding over two years (see Table 2 on page 3). The Bush Administration has repeatedly

>>> Continued on page 2

FEATURES



*FY 2002 DOD R&D budget: Detailed tables on pages 2-3.*

## FY 2002 DOD R&D

*Continued from page 1*

affirmed that missile defense is a top priority in U.S. defense strategy. There would be no funds for research and only $133 million for generic technology development in BMDO's FY 2002 budget; nearly all BMDO funds would go to advanced development, testing, manufacturing development, and evaluation of missile defense systems. In the FY 2002 budget, separate programs for national missile defense and theater missile defense would be merged into one integrated program. The administration's goal is to deploy a small-scale national missile defense system as early as 2004.

In sharp contrast to the substantial increases in most areas of the DOD budget, DOD support of basic and applied research would decline in FY 2002. Basic research funding ("6.1") would fall 1.0 percent to $1.3 billion after a nearly 16 percent increase last year. This decline is due to a proposed $52 million cut in University Research Initiatives in the Office of the Secretary of Defense; although much of this cut is due to the deletion of FY 2001 congressionally designated projects, there would be cuts to core funding for many research areas. Defense Research Sciences, the basic research program of the Defense Advanced Research Projects Agency (DARPA), would increase by 11.2 percent to $121 million.

Applied research funding ("6.2") would decline by 0.5 percent or $17 million to $3.7 billion in FY 2002 after an eight percent increase last year. There would be cuts to most "6.2" programs in the Army, Navy, BMDO, and OSD, partially offset by a boost in Air Force funding for aerospace-related research and increases for DARPA research in information technology, materials, and electronics.

DOD funding of S&T ("6.1" through "6.3") would stall at $8.8 billion, down 2.6 percent from FY 2001. Adding in medical research outside the R&D accounts, which would be cut by 84.1 percent, S&T would decline 6.1 percent. Advocates of DOD S&T investments pushed last year for $9.0 billion in FY 2001 S&T funds, a goal Congress granted, and are pushing for an investment of $10.0 billion in FY 2002. The requested decline will make this goal much harder to reach, although Congress has tended to be more supportive of S&T funding than the Pentagon.

Advocates of DOD S&T in the science and engineering community argue that DOD S&T funding is essential for building the knowledge and technology base for future DOD needs, and have successfully argued that post-Cold War cutbacks over the past decade eroded this base. In the past year, there has been growing support inside and outside the Pentagon for setting 3 percent of the DOD budget as a goal for the proper level of S&T investment, which led to hopes that the amended FY 2002 budget would propose a large boost for S&T. The revised

**Table 1. R&D in the Department of Defense**
(Budget authority in millions of dollars)

| | FY 2000 Actual | FY 2001 Estimate | **FY 2002 Budget** | Change FY 01-02 Amount | Change FY 01-02 Percent |
|---|---|---|---|---|---|
| **Research, Development, Test, and Evaluation (RDT&E)** | | | | | |
| Basic Research ("6.1") | 1,139 | 1,317 | **1,304** | -13 | -1.0% |
| Applied Research ("6.2") | 3,409 | 3,676 | **3,659** | -17 | -0.5% |
| Total Research | 4,548 | 4,993 | **4,963** | -30 | -0.6% |
| Adv. Tech. Development ("6.3") | 3,789 | 4,015 | **3,815** | -200 | -5.0% |
| Total Science & Technology | 8,337 | 9,008 | **8,778** | -230 | -2.6% |
| Demons. and Valid. ("6.4") | 6,514 | 7,993 | **11,381** | 3,388 | 42.4% |
| Eng. & Manufacturing Dev. ("6.5") | 8,879 | 8,893 | **10,249** | 1,356 | 15.3% |
| Management Support ("6.6") | 3,076 | 2,639 | **2,786** | 146 | 5.5% |
| Operational Sys. Dev. ("6.7") | 11,947 | 12,961 | **14,235** | 1,274 | 9.8% |
| BA Adjustment | -46 | -180 | **0** | 180 | -100.0% |
| Total RDT&E | 38,706 | 41,315 | **47,429** | 6,115 | 14.8% |
| Medical Research [1] | 295 | 412 | **65** | -347 | -84.1% |
| Other Appropriations [2] | 959 | 1,017 | **959** | -57 | -5.6% |
| **Total DOD R&D** | 39,959 | 42,743 | **48,454** | 5,711 | 13.4% |
| Total Conduct of R&D | 39,865 | 42,565 | **48,274** | 5,709 | 13.4% |
| Total R&D Facilities & Equip. | 95 | 178 | **180** | 2 | 1.1% |

Source: OMB data for R&D for FY 2002, *Budget of the United States Government FY 2002*, DOD "RDT&E Programs" (R-1), FY 2002 DOD budget amendment.
**Note: FY 2002 DOD figures reflect amended FY 2002 budget request. FY 2001 figures adjusted to reflect FY 2001 supplemental appropriations.**
[1] Medical research appropriated in Defense Health Programs, not RDT&E.
[2] R&D support in military personnel, O&M, and other appropriations.
Character of work ("6.x" categories) are expressed in total obligational authority (TOA); BA Adjustment converts TOA into budget authority. All figures rounded to the nearest million. Changes calculated from unrounded figures. Updated July 2001.

## AAAS NOTES

- Watch for full coverage of **stem cells** and **cloning** in the next issue of *Science and Technology in Congress.*
- AAAS STEM CELL REPORT *Stem Cell Research and Applications: Scientific, Ethical, and Policy Issues* www.aaas.org/spp/dspp/sfrl/projects/stem/main.htm

FY 2002 budget allocates 2.7 percent of the DOD budget for S&T, and affirms 3 percent as a worthwhile goal.

Although Congress has finally received the DOD budget, its fate on Capitol Hill is still on hold because of its staggering price tag. When Congress established its spending plan for FY 2002 in May, it worked with a placeholder request for DOD of $310 billion, already a large increase over FY 2001. Because the revised request would add an additional $18 billion to that amount, there is serious disagreement as to where the extra funds might come from, with a number of options including offsetting cuts in DOD, offsetting cuts in domestic programs, or drawing down budget surpluses being considered. Adding to the political difficulty are complaints from some defense observers that even the $329 billion revised request may be too small: procurement funding would actually decline in the budget despite near-universal agreement in the Pentagon and Congress that it needs to be boosted substantially. The budget also relies on some cost-cutting measures, such as removing B-1 fighter planes in three states and initiating a new round of military base closings, that have already received scathing criticism from Congress.

There is increasing fear that approving the DOD request might increase federal spending enough to force the government to dip into the politically sacred Social Security surplus, especially in the outyears. This dilemma could force Congress to make a difficult choice between holding back DOD spending or tapping Social Security funds. To delay the unpleasant choice as long as possible, Congress has put off initial consideration of the Defense appropriations bill until at least September, and it may be November or later before a final FY 2002 DOD budget is approved. In such an environment, the fate of the DOD budget is by no means assured, and especially vulnerable are the basic and applied research programs; already slated for a cut, they will face tremendous fiscal pressure from other programs in a competition for scarce resources, especially if higher defense priorities such as procurement or higher budget priorities such as keeping the budget in balance begin to crowd out the funds available for defense R&D.

On the other hand, there is bi-partisan support in Congress for DOD S&T, as demonstrated by a June 1 Dear Colleague letter requesting an appropriation of at least $10 billion. The letter was signed by seven prominent senators including Senate Minority Leader Trent Lott (R-MS), and Sens. Edward M. Kennedy (D-MA), Joseph I. Lieberman (D-CT), and Rick Santorum (R-PA). •••

*Kei Koizumi, Director,*
*AAAS R&D Budget and Policy Program*

**Table 2. DOD R&D by Military Departments and Agencies**
(Budget authority in millions of dollars)

| | FY 2000 Actual | FY 2001 Estimate | **FY 2002 Budget** | Change FY 01-02 Amount | Change FY 01-02 Percent |
|---|---|---|---|---|---|
| **Research, Development, Test, and Evaluation (RDT&E)** | | | | | |
| Army | 5,330 | 6,247 | **6,694** | 447 | 7.2% |
| Navy | 9,044 | 9,555 | **11,123** | 1,568 | 16.4% |
| Air Force | 14,511 | 14,190 | **14,344** | 154 | 1.1% |
| Defense Agencies | 9,525 | 11,098 | **15,051** | 3,953 | 35.6% |
| *Ballistic Missile Defense Org.* | *3,457* | *4,204* | **7,036** | *2,832* | *67.4%* |
| *Def. Adv. Res. Projects Agency* | *1,850* | *2,010* | **2,281** | *271* | *13.5%* |
| *Secretary of Defense* | *1,177* | *1,506* | **1,595** | *89* | *5.9%* |
| *Classified Agencies* | *1,737* | *1,965* | **2,492** | *527* | *26.8%* |
| *Other* | *1,304* | *1,412* | **1,646** | *233* | *16.5%* |
| Director of Test and Evaluation | 265 | 0 | **0** | 0 | - - |
| Director of Operational Test & Eval. | 31 | 223 | **217** | -6 | -2.5% |
| Total RDT&E | 38,706 | 41,315 | **47,429** | 6,115 | 14.8% |
| Medical Research [1] | 295 | 412 | **65** | -347 | -84.1% |
| Other Appropriations [2] | 959 | 1,017 | **959** | -57 | -5.6% |
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**FOR MORE INFORMATION:**
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*www.aaas.org/spp/R&D*

INFO/DETAILS

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# Heard off the Hill

**Singing Phone, Singing Bird** • While some may consider the electronic ring of a cell phone to be an annoyance, the lyrebird seems to have a different take. This Australian "mimic bird" is so enamored with the new sound, it has added it to its own repertoire. According to Greg Czechura of the Queensland Museum, a male will often do it as part of his mating display to show he is "up-to-date, on the ball, and has the latest sounds." The cell phone's song is not the only manmade sound these birds make. They have also been heard to imitate electronic alarm clocks, reversing-vehicle warning beeps, and automatic cameras, to name a few.
---> *Science, July 6, 2001*

**Pills and Abe** • Abraham Lincoln may have been an inspiring speaker and a legendary debater, but for years, researchers say, he was also poisoning himself. The culprit was a drug often prescribed for depression called "blue mass," which Lincoln began taking at the age of 32. Scientists recreated this medicine from an old recipe which called for mercury, liquorice root, rose water, honey, sugar, and dead rose petals, and they concluded that he was probably ingesting about 9000 times the safe level of mercury. Early in his presidency, Lincoln observed that the pills "made him cross," and stopped taking them. The ensuing change in his behavior could well have changed the course of history.
---> *Science, July 27, 2001*

**Old Brains** • While some may bemoan their aging gray cells, they've got nothing to complain about in comparison to three very unusual brains currently being studied in Japan: these brains are about 2,000 years old. The brain tissue was found by Takao Inoue, a scientist studying three ancient skulls uncovered last year on the Japanese coast. He was spooning mud out of skulls when he discovered white tissue with the consistency of tofu. He speculates that the tissue was preserved by cold temperatures and the heavy, moist clay in which the skulls were buried. The find could yield DNA from the cell nucleus that cannot be recovered from old bones.
---> *Science, April 27, 2001*

**Sucked-in Shower Curtains** • It may not explain the beginning of the universe or unlock the mysteries of black holes, but David Schmidt of the University of Massachusetts at Amherst has solved a vexing problem: he figured out why the curtain gets sucked in when you take a shower. There have long been competing theories on the phenomenon, with some likening the problem to air rushing over an airplane wing, and others saying it has more to do with the temperature of the air inside the shower. But now, Dr. Schmidt has applied to shower heads a powerful software program he helped develop to model sprays like those found in a diesel engine. He found that the sucking is actually caused by aerodynamic drag, by which the water droplets transfer energy to the shower's air, which begins to swirl around like a small hurricane. As in the eye of a hurricane, the pressure inside this swirl is low, sucking in the curtain.
---> *New York Times, July 15, 2001*