

R&D in the FY 2008 Department of Defense Budget

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HIGHLIGHTS

- **The Department of Defense (DOD) R&D investment continues to grow, with a proposed 1.0 percent or \$765 million increase to a record \$79.0 billion in the FY 2008 budget** (see Table II-2). DOD weapons development would increase dramatically by 5.5 percent or \$3.5 billion to an all-time high of \$68.1 billion, including \$2.9 billion in development funds requested as part of a 2008 war supplemental.
- But as in past years, the big increases for development are matched by steep cuts to DOD's future-oriented investments. DOD would slash "Science and Technology" (S&T) spending by 20.1 percent or \$2.8 billion down to \$10.9 billion, erasing seven years of gains (see Table II-5). S&T, which includes basic research, applied research, medical research, and technology development, would fall to just 2.27 percent of the regular DOD budget.
- **Despite being a major sponsor of physical sciences research, a top Administration priority on the nondefense side of the budget, DOD's support of basic and applied research would fall in FY 2008.** Basic research ("6.1") would fall 8.7 percent to \$1.4 billion, primarily from the removal of congressional earmarks (see Table II-4). Applied research ("6.2") would fall 18.2 percent to \$4.4 billion, again mostly but not entirely from the proposed elimination of FY 2007 earmarks. The Defense Advanced Research Projects Agency (DARPA) would see its budget fall 1.0 percent to \$3.1 billion (see Table II-3).
- **The Air Force would be the big winner in the 2008 budget.** Air Force R&D would climb 14.4 percent to an unprecedented \$28.1 billion because of increases to various space and classified weapons development programs, including war-related supplemental requests (see Table II-3). Funding for the other services would fall, and among the

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Defense Agencies only the Chemical and Biological Defense Program (CBDP) would increase, by 4.1 percent to \$1.0 billion.

DOD R&D IN THE FY 2008 BUDGET

The Department of Defense (DOD), still engaged in a long and expensive war in Iraq, continues to spend record amounts and could have a budget exceeding \$623 billion next year. DOD is also investing record amounts in the next generation of weapons: the FY 2008 Pentagon budget would provide \$79.0 billion for R&D next year, an increase of \$765 million or 1.0 percent (see Table II-2). In real terms, the request would fall short of the expected inflation rate (2.4 percent next year) for the first time in a decade (see Figure 1), but the 2007 baseline includes not only enacted 2007 appropriations but also a war-related supplemental request for \$1.4 billion presented as part of the 2008 budget but intended for FY 2007.

Although physical sciences research is a top priority for the Bush Administration on the nondefense side of the budget through continued support of the American Competitiveness Initiative (ACI), DOD support of research would fall dramatically in 2008 even though DOD is the fifth largest federal supporter of the physical sciences. **DOD basic research funding (the “6.1” category) would fall 8.7 percent to \$1.4 billion**, mostly but not entirely from the proposed elimination of congressional earmarks (see Table II-4). Basic research in the three services and the Defense Agencies would all fall steeply. Funding for the three-service University Research Initiatives, which awards basic research grants competitively to university performers, would receive a combined \$246 million, down 14.5 percent. The Defense Research Sciences program, funded in the three services and in DARPA, would receive a combined \$923 million, down 5.9 percent. The largest increase among basic research programs would go to the fledgling National Defense Education program (NDEP), more than doubling from \$19 million this year to \$44 million in 2008.

Applied research funding (the “6.2” category) is in for even deeper cuts of 18.2 percent down to \$4.4 billion. Again, applied research in the three services and the Defense Agencies would all fall sharply. Nearly all applied research programs would see their budgets cut, with the exception of several aerospace-related research projects, research on

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directed energy, and an 18 percent increase in applied research in the Chemical and Biological Defense Program to \$305 million.

In a repeat of the usual pattern, the Pentagon would dramatically cut **medical research** programs (see Table II-2) in the Defense Health Program, by 61 percent down to \$134 million. These programs just received \$348 million in the 2007 joint funding resolution signed by President Bush on February 15, including \$218 million for breast, ovarian, and prostate cancer research through peer-reviewed, competitively awarded grants. Over the years, the DOD peer-reviewed program has become a major force in cancer research; by comparison, NIH spending on these three cancers totals \$1.2 billion this year. But it is DOD policy not to request continuing funds for most of these congressionally initiated programs, so the 2008 budget sees a sharp cut in this account and a zeroing out of the cancer research programs.

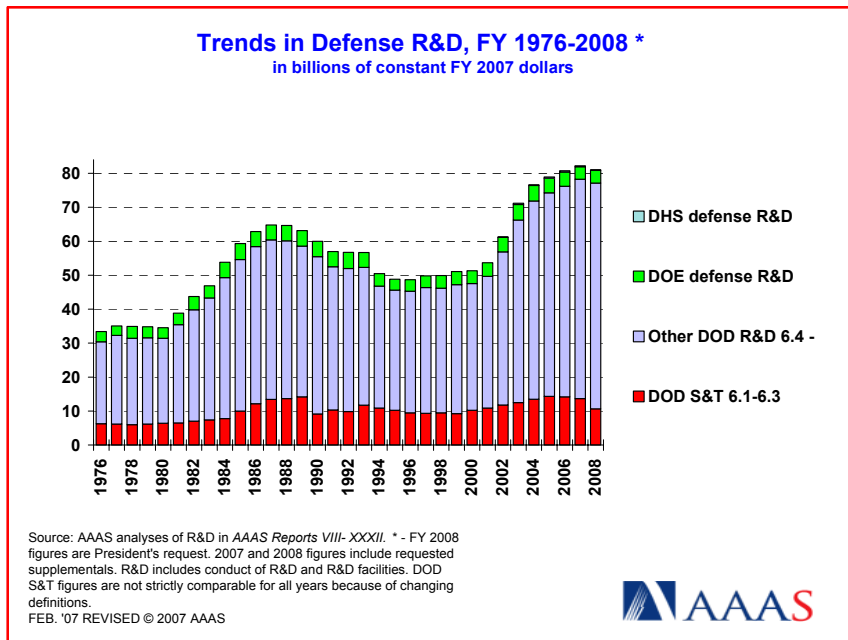


Figure 1.

DOD funding of “S&T” (the “6.1” through “6.3” categories plus medical research) would plummet to \$10.9 billion in FY 2008, a dramatic drop of \$2.8 billion or 20.1 percent (see Table II-5 and Figure 2), with steep cuts in all categories. For every year this decade,

Congress has been far more supportive of S&T funding than the Pentagon. In what has now become an annual ritual, the Pentagon proposes sharp cuts each year and Congress adds billions of dollars in the appropriations process. Last year, the Pentagon requested a 19 percent cut in S&T, but Congress ended up appropriating just a 1 percent cut, primarily but not entirely through the addition of earmarks. Advocates of DOD S&T in the science and engineering community argue that S&T funding is essential for building the knowledge and technology base for future DOD needs. Over the past decade, 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. But the Pentagon has never fully endorsed this goal: although the 2001 Quadrennial Defense Review, DOD's military strategy document, included the 3 percent goal, the 2005 QDR does not contain it, and the annual DOD budget request has never met the 3 percent figure. It has been up to Congress to boost S&T funding so that the last six budgets have met that goal (after taking out Iraq and Afghanistan war spending). In the 2007 final budget, DOD S&T equals 3.15 percent of the regular DOD budget (excluding emergency war funding), but the 2008 request would bring that ratio down to an unprecedented low of 2.27 percent.

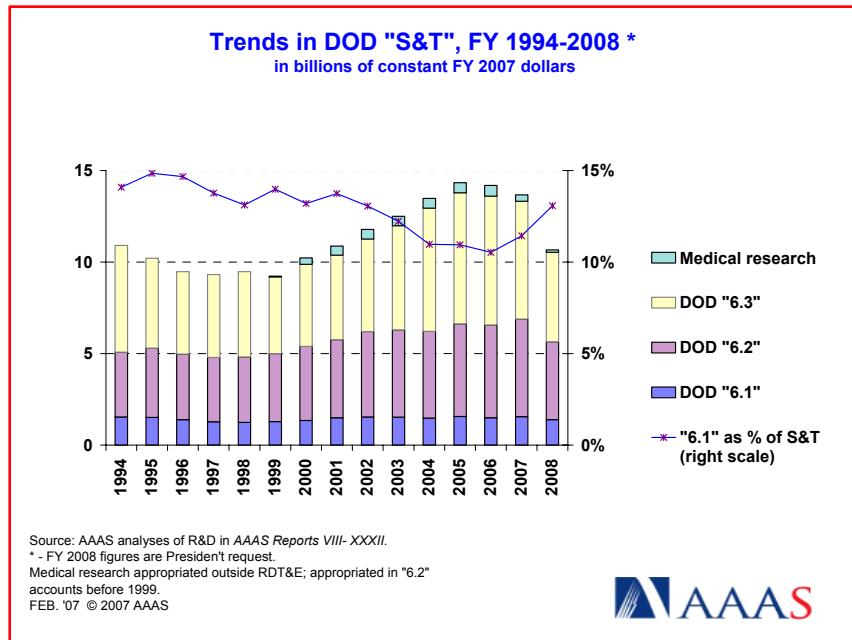


Figure 2.

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The final 2007 appropriation keeps DOD S&T near its record-high 2005 funding level in real terms, but the 2008 request would undo seven years of gains (see Figure 2). DOD S&T has increased in recent years after hitting post-Cold War lows in the late 1990s. While this is a relief for DOD S&T advocates, Figure 2 shows that the composition of the DOD S&T portfolio has been changing. DOD support of basic research has increased relatively little, and is a shrinking proportion of the DOD S&T portfolio. While “6.2” funding has increased a little more, recent growth in DOD S&T has come predominantly from growth in “6.3” funding of advanced technology development rather than from research. In recent years, advocates have called for at least 20 percent of S&T funding to be devoted to basic research. As Figure 2 shows, basic research turned a corner in 2007 to make up an increasing 11 percent of S&T funding, and would keep increasing to 13 percent in 2008 (primarily because “6.3” programs would suffer greater cuts than “6.1” programs) but would remain well short of 20 percent.

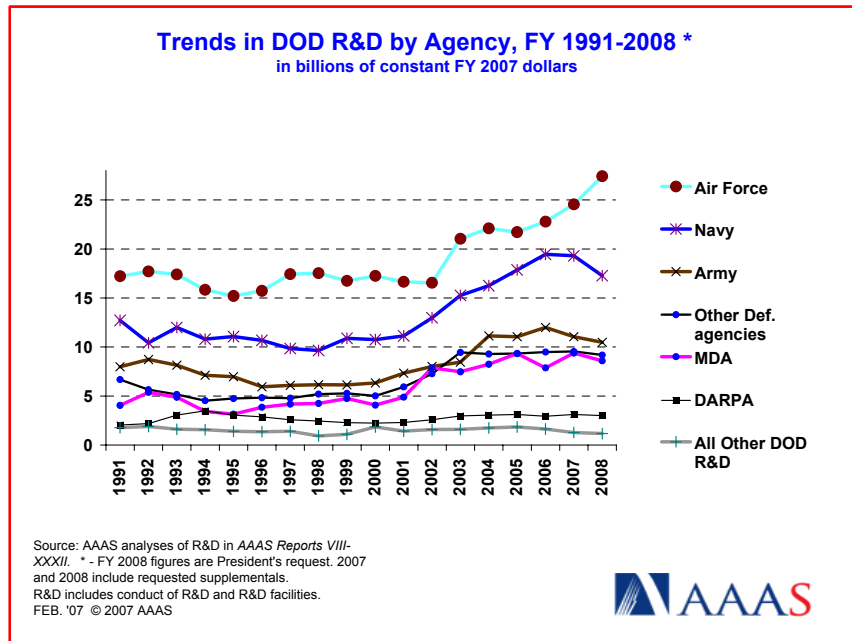


Figure 3.

Air Force weapons development programs would be the biggest winners in the 2008 budget. DOD weapons development (the non-S&T portion of DOD R&D) would jump \$3.5 billion or 5.5 percent to \$68.1

billion in the request, entirely due to an enormous increase in Air Force R&D to an unprecedented \$28.1 billion (see Table II-3 and Figure 3). The Air Force increase would go to programs in the “6.4” and higher categories for engineering, development, and testing work on specific weapons systems. Although the request details enormous increases for advanced development of space and satellite communications and other new weapons systems, much of the increase is for classified development programs, including several classified projects in the emergency supplemental war request. By contrast, R&D in the Army and Air Force would decline in 2008, although funding would remain near historic highs (see Figure 3).

R&D in the Defense Agencies would fall \$750 million or 3.4 percent to \$21.3 billion (see Table II-3). Funding for all the major agencies except the Chemical and Biological Defense Program (CBDP) would fall, including the Missile Defense Agency (MDA; down 6.2 percent) and the research-oriented **Defense Advanced Research Projects Agency (DARPA; down 1.0 percent)**. Slightly more than half of DARPA’s budget goes to “6.1” and “6.2” activities, with the remainder devoted to “6.3” technology development. Its broad research portfolio is aimed at expanding the frontiers of knowledge and military technology to provide future solutions to DOD’s technology needs. DARPA’s basic research funding would increase in 2008, but its applied research programs are a mix of increases and decreases combining for a net cut. CBDP is another relatively research-oriented agency, devoting nearly 40 percent of its resources to research. CBDP applied research would increase 18 percent to \$305 million, but its “6.1” basic program would fall 31 percent to \$70 million, primarily due to the transition of several projects from the basic to the applied phase.

IMPACTS OF DOD R&D

The Department of Defense (DOD) is by far the largest supporter of R&D in the federal government, accounting for more than half the total federal R&D portfolio. Defense-related R&D is also funded by the Department of Energy (DOE), which is responsible for maintaining the U.S. nuclear weapons stockpile, and the new Department of Homeland Security (DHS), whose primary mission is homeland defense but also performs biodefense R&D related to military security (see Figure 1). The 2008 budget request would keep DOD R&D and total defense R&D near 2007’s record funding level at the second-highest level in history.

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DOD is responsible for a shrinking 11 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 (S&E) disciplines, especially in the physical sciences broadly defined. DOD supports 31 percent of all federal research in the computer sciences and a similar proportion of all engineering research, as well as 29 percent of federal oceanography research and 14 percent of mathematics. DOD’s impact is even greater in several engineering sub-disciplines such as electrical engineering, mechanical engineering, and materials. DOD funds research in these disciplines for their contributions to national defense, but this research also supports graduate education in these fields and seeds major innovations in the civilian economy, most evident in DOD’s early support for research that led to the now-ubiquitous Internet.

A majority of DOD’s R&D (and nearly all the work in categories “6.4” and higher) is performed by industrial firms such as the large defense contractors Lockheed Martin and Boeing. FFRDCs (federally funded research and development centers), defense laboratories, and colleges and universities also perform R&D. If one excludes DOD development, which is nearly exclusively performed by industry, DOD basic and applied research (“6.1” and “6.2”) is performed by a diverse group of institutions. 32 percent of DOD research is performed by DOD laboratories, while 40 percent is performed by industry. 21 percent of DOD basic and applied research is performed by universities and colleges, making DOD the third-largest federal sponsor of academic research behind only the National Institutes of Health (NIH) and the National Science Foundation (NSF).

DOD R&D spending is heavily concentrated, with just five states receiving half of DOD’s billions. Because development funding in particular is awarded in multibillion dollar contracts, DOD R&D tends to go states with large military contractors such as California, Maryland, Virginia, Texas, and Massachusetts. Virginia benefits from being the location of the Pentagon as well as numerous DOD laboratories and FFRDCs, while the District of Columbia and Maryland also benefit from DOD facilities located close to the Pentagon. DOD research spending is less concentrated, especially DOD investments in university research.

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OUTLOOK FOR DEFENSE R&D

DOD is presiding over a 2007 budget that will soon hit a record \$599 billion if Congress approves a \$94 billion war supplemental in spring 2007 on top of a \$70 billion war supplemental approved in late 2006. With military occupation costs in Iraq and Afghanistan running well over \$2 billion a week over and above the regular DOD budget, DOD spending is expected to keep hitting new highs. DOD's 2008 request is a record-shattering \$623 billion, including \$142 billion in supplemental war funding. Within these record totals, DOD R&D has also set new records, in part driven by development costs of new weapons related to current and near-term combat needs; in the last few years, these development funds have been further boosted by war supplementals.

Despite these large requested increases, it has been up to Congress to sustain DOD's more longer-term investments in S&T. As the 2008 budget goes to Congress, Congress once again faces the task of finding money to add to proposed cuts in basic and applied research programs. But in a fiscal environment in which, despite budget deficits, defense spending appears immune from fiscal restraint, Congress is likely to have relatively little trouble boosting DOD R&D across the board.