

R&D in the FY 2009 Department of Defense Budget

Kei Koizumi, AAAS

HIGHLIGHTS

- The **Department of Defense (DOD)** R&D investment continues to grow, with a proposed increase of \$2.9 billion or 3.7 percent to \$80.7 billion in fiscal year (FY) 2009 (see Table II-2), but both the 2008 and 2009 totals will grow by billions later this year when war-related supplementals are added.
- In a surprise move, DOD requests a 4.0 percent increase to \$1.7 billion for its basic research (“6.1”) portfolio, the majority of which is performed in universities (see Table II-4). Taking out \$165 million in 2008 basic research earmarks results in a 16 percent or \$230 million increase for “6.1” between non-earmarked 2008 funding and the 2009 request. “6.1” funding in all three military services and the Defense Agencies would gain, with especially large increases in Navy and Air Force basic research.
- DOD “Science and Technology” (S&T) spending, which includes basic research but also applied research, medical research, and technology development, would fall 11.7 percent or \$1.5 billion to \$11.7 billion (see Table II-5), but entirely because DOD would not renew \$2.2 billion in 2008 S&T earmarks. Excluding earmarks, DOD “S&T” would gain 5.6 percent between 2008 and 2009. S&T funding would be 2.26 percent of the non-emergency 2009 DOD budget.
- The research-oriented Defense Advanced Research Projects Agency (DARPA) would do well with a request of \$3.3 billion in 2009, an 11 percent increase (see Table II-3). DOD weapons development would increase by 6.9 percent or \$4.5 billion to an all-time high of \$69.0 billion.

DOD R&D IN THE FY 2009 BUDGET

The Department of Defense (DOD) continues to spend record amounts in wartime and could have a budget exceeding \$700 billion next year after all war costs are paid for. DOD is also investing record amounts in the next generation of weapons: the FY 2009 Pentagon budget would provide \$80.7 billion for R&D next year, an increase of \$2.9 billion or 3.7 percent (see Table II-2). In real terms, the 2008 budget and the 2009 request appear to fall short of the record-setting 2007 budget (Figure 1), but when development dollars in war-related supplemental appropriations for 2008 and 2009 are eventually added the 2008 and 2009 R&D budgets are likely to be the largest in history.

DOD basic research funding (the “6.1” category) would increase 4.0 percent to \$1.7 billion (see Table II-4), in a surprising reversal of the usual pattern of the Pentagon requesting cuts. The majority of “6.1” research is performed in universities. Taking out \$165 million in 2008 basic research earmarks results in a remarkable 16 percent or \$230 million increase for “6.1” between non-earmarked 2008 funding and the 2009 request. “6.1” funding in all three military services and the Defense Agencies would gain (see Table II-4), with especially large increases in Navy and Air Force basic research. Although DOD is the fifth-largest federal sponsor of physical sciences research, DOD has been left out of the American Competitiveness Initiative (ACI), the Bush Administration’s ongoing effort to double federal basic physical sciences research funding over a decade. But in the 2009 request, DOD shares in requested increases for the nondefense physical sciences agencies in the ACI. Funding for the three-service University Research Initiatives program, which awards basic research grants competitively to university performers, would receive a combined \$307 million, up 2.1 percent or \$6 million from a 2008 appropriation loaded with earmarks, but up \$51 million from what DOD requested for 2008. The Defense Research Sciences program, funded in the three services and in DARPA, would receive a combined \$1.1 billion, up 7.7 percent. The largest percentage increase among basic research programs would go to the National Defense Education program (NDEP), from \$44 million this year to \$69 million next year (up 57 percent). From 2001 to 2007, basic research remained stable at just over \$1.5 billion in today’s dollars (see Figure 2), but congressional 2008 increases and now the 2009 requested increase could signal a new era of growth.

R&D IN THE FY 2009 DEPT. OF DEFENSE BUDGET

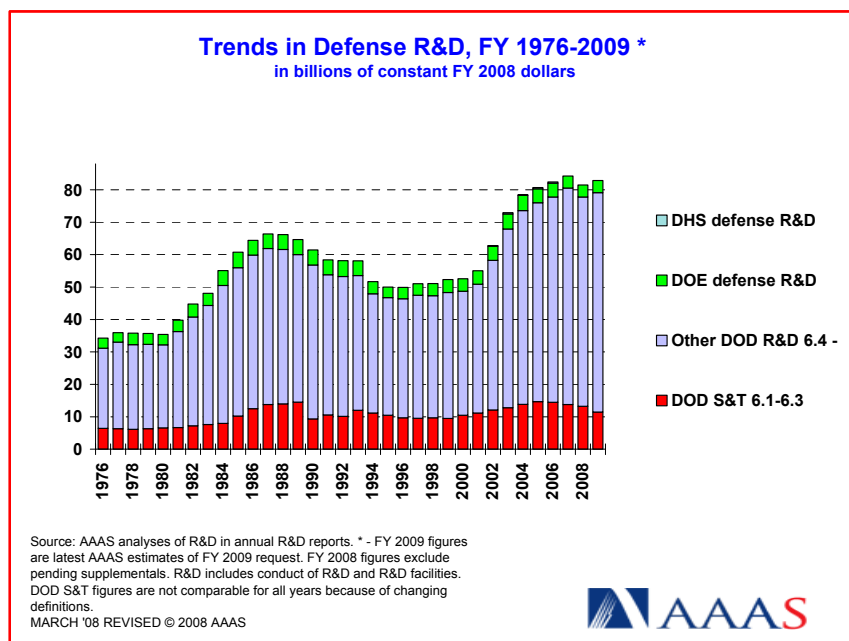


Figure 1.

The 2008 Defense appropriations bill contains a provision that would limit indirect cost reimbursements on basic research grants to 35 percent. University and other external research performers are reimbursed for indirect costs associated with the performance of research at rates negotiated through a government-wide process overseen by the Office of Management and Budget (OMB). Leading research universities usually receive indirect cost reimbursements exceeding 50 percent of direct costs, so the provision could dramatically reduce “6.1” research awards in 2008, but the 2009 DOD request does not extend this congressional provision into 2009.

Applied research (the “6.2” category) would fall 16.1 percent or \$813 million to \$4.2 billion (see Table II-2), primarily because DOD would cut \$840 million in congressional earmarks from the 2008 appropriation. Nearly all applied research programs would see their budgets cut, with the exception of several applied research DARPA programs.

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 64 percent down to \$194 million (see Figure 2). These

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programs received \$536 million in 2008, including \$228 million (up from \$218 million in 2007) 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. In addition to these congressionally initiated but peer reviewed research programs, there are several earmarked medical research projects in this account and hundreds of millions of dollars in earmarked medical research programs in Army accounts. There would also be \$50 million for peer reviewed medical research in 2008 on other topics. All of these medical programs would be eliminated in the 2009 request.

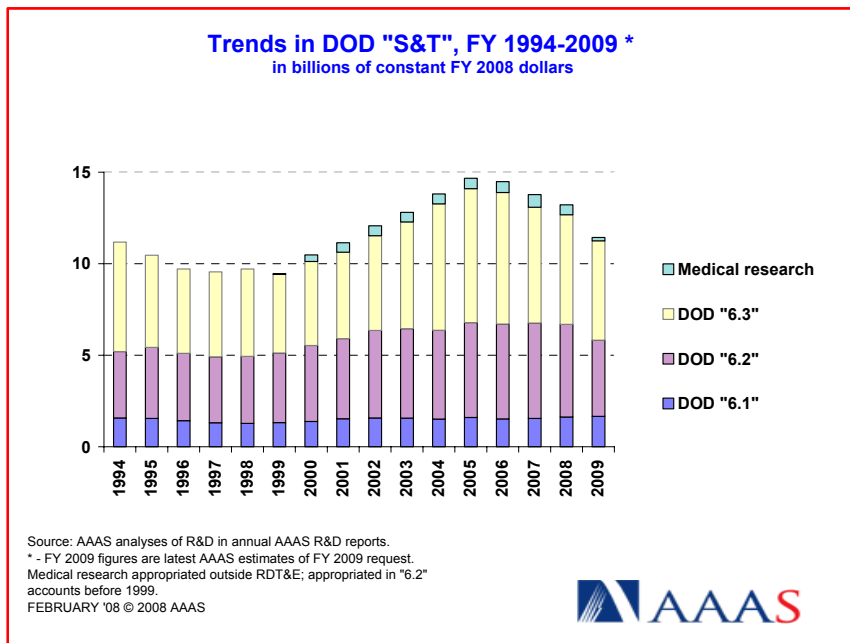


Figure 2.

DOD funding of "S&T" (the "6.1" through "6.3" categories plus medical research) would fall 11.7 percent or \$1.5 billion to \$11.7 billion in FY 2009 (see Table II-5), because DOD would discontinue \$2.2 billion in S&T 2008 earmarks in 2009. Without 2008 earmarks, the DOD S&T request would be a 5.6 percent increase over 2008. The cuts would be in the "6.2" and "6.3" accounts (see Figure 2), while "6.1" funding would increase. 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, 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. In the 2009 request, DOD S&T would be 2.26 percent of the non-emergency DOD budget.

The 2009 DOD request marks a continuing retreat from DOD S&T's record-high 2005 funding level in real terms (see Figure 1). DOD S&T increased in the first half of this decade after hitting post-Cold War lows in the late 1990s; since 2005, most of the cuts have been in the "6.3" programs (see Figure 2), while applied research "6.2" has declined less and "6.1" has held steady and even increased in 2008 and the 2009 request.

Once again, development programs would be big winners in the 2009 budget. DOD weapons development (the non-S&T portion of DOD R&D) would increase \$4.5 billion or 6.9 percent to an unprecedented \$69.0 billion, a total likely to top \$70 billion when supplemental appropriations are added. The Air Force would benefit the most, with its R&D budget hitting a historical high of \$28.1 billion in 2009 (see Table II-3), a dramatic \$2.2 billion or 8.4 percent increase (see 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, while Air Force S&T funding would actually fall. Navy R&D would also increase significantly, by 8.8 percent to \$19.3 billion, slightly off historical highs for the moment (see Figure 3). By contrast, Army R&D would fall sharply by 12.5 percent to \$10.5 billion.

R&D in the Defense Agencies would gain \$1.0 billion or 4.9 percent to \$21.5 billion (see Table II-3). The research-oriented **Defense Advanced Research Projects Agency (DARPA) would be a big winner with a \$326 million or 11.0 percent increase to \$3.3 billion after several**

years of hovering in the \$3.0 billion range. About 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 12 percent to \$196 million, and funding for many of its applied research programs would also increase. The 2009 request would keep funding for the research-oriented Defense Threat Reduction Agency (DTRA) flat at \$456 million. The Chemical and Biological Defense Program (CBDP) is another relatively research-oriented agency, devoting a third of its resources to research. CBDP would gain 3.8 percent to \$1.1 billion, but with a shift in resources away from research to “6.3” technology development.

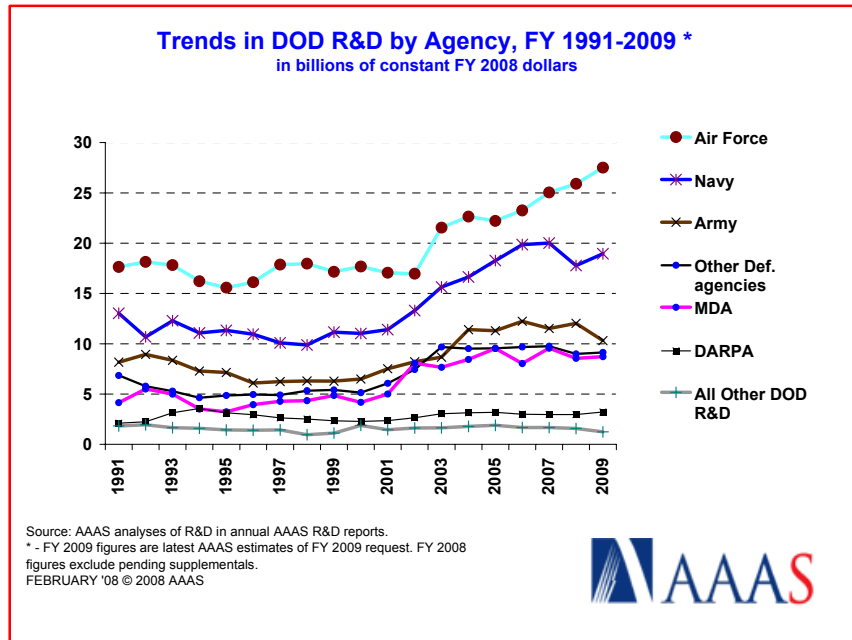


Figure 3.

Among other Defense Agencies, the Missile Defense Agency (MDA) remains the largest with a 2009 request of \$8.9 billion, up compared to 2008 but down from recent highs (see Figure 3). MDA no longer funds research and is a development-oriented agency with almost all of its funding in the “6.4” category; its annual budget has doubled in real terms since the beginning of the decade.

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 (see Figure 1). The 2009 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, at least until supplemental appropriations push both 2008 and 2009 funding to new highs.

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.

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. A third of DOD research is performed by DOD laboratories, while 40 percent is performed by industry. 21 percent of DOD basic and applied research (and a majority of "6.1" basic 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

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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.

OUTLOOK FOR DEFENSE R&D

DOD is presiding over a 2008 budget that could soon hit a record \$670 billion if Congress approves a \$102 billion war supplemental in the next few weeks on top of supplementals and the regular 2008 DOD budget approved a few months ago. With war occupation costs in Iraq and Afghanistan approaching \$4 billion a week in spending over and above the regular DOD budget, DOD spending is expected to keep hitting new highs. DOD's 2009 regular request is \$515 billion, and there is a \$70 billion placeholder 'allowance' for war costs, although the Pentagon admits that the allowance would only provide enough money for war costs until January 2009 or so. When all 2009 supplementals are approved, the 2009 DOD budget could top \$700 billion. 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, until now DOD's longer-term investments in S&T have lagged. The 2009 budget represents a break from past budgets in its call for increasing DOD support of basic research. Congress, which has traditionally added to Pentagon requests for research, will likely support these increases and add more money for research earmarks. And 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 development funding as well.