

## Congress Finalizes 13 Percent Increase in DOD Basic Research

AAAS R&D Funding Update on Dept. of Defense R&D  
in FY 2009 House-Senate Conference Appropriations  
(revised Oct. 27 – revisions in [ ])

### Highlights

- Congress has agreed on **\$82.4 billion for Department of Defense (DOD) R&D programs in FY 2009, an enormous increase of \$3.0 billion or 3.8 percent to an all-time high (see Table A).**

- **DOD's support of basic research would gain 12.9 percent or \$210 million to \$1.8 billion in 2009** (see Table A). Congress would renew a provision to cap indirect costs on basic research grants at 35 percent. "6.1" funding would increase substantially in all three military services and the Defense Agencies. Applied research ("6.2") would gain 1.7 percent to \$5.1 billion.

- Congress would add \$2.7 billion to the request for DOD's future-oriented investments, almost entirely for earmarked projects, to turn a steep requested cut into a sizeable increase. DOD "Science and Technology" (S&T) spending would reach \$14.3 billion in 2009, up 6.6 percent or \$882 million over 2008 to reach 2.80 percent of the regular DOD budget (see Table C). S&T funding includes basic research, applied research, medical research, and technology development.

- The research-oriented Defense Advanced Research Projects Agency (DARPA) would do well with an 11 percent increase to \$3.1 billion in 2009, despite congressional concerns about the agency's ability to execute its portfolio (see Table B). DOD weapons development would increase dramatically by \$2.1 billion or 3.3 percent to an all-time high of \$68.0 billion.

### DOD R&D in FY 2009 House-Senate Conference Appropriations

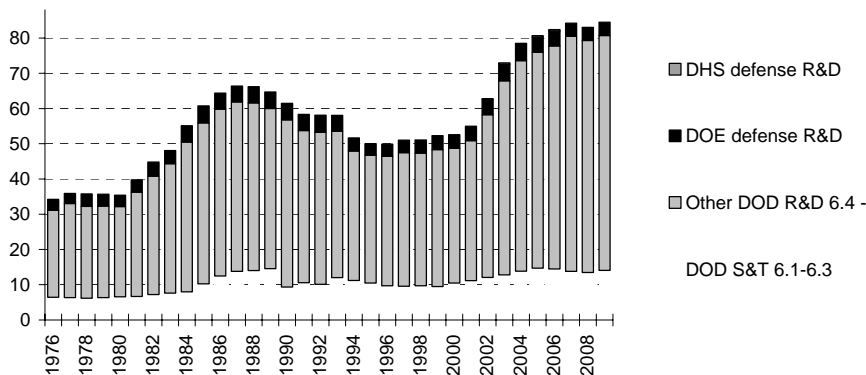
On September 24, the House of Representatives debated and approved a massive FY 2009 continuing resolution (CR; HR 2638 amendment) funding federal government programs through March 6 but also containing \$23 billion in disaster relief spending and three full FY 2009 appropriations bills, including a final Defense appropriations bill with funding for the Department of Defense (DOD). [President Bush signed the bill into law on September 30, making DOD one of only three departments to receive their final 2009 budgets (the others are the Departments of Homeland Security (DHS) and Veterans Affairs (VA)).] Even though neither the House nor the Senate ever reported their respective versions of the Defense bill, the CR Defense bill represents a compromise between the unreleased draft House and Senate versions of the bill and is equivalent to a House-Senate conference report. (For details of the request for DOD R&D, see the February 12 AAAS R&D Funding Update or Chapter 5 in *AAAS Report XXXIII: R&D FY 2009*.)

The Department of Defense (DOD) continues to spend record amounts in wartime and receives a record \$513 billion regular budget in 2009, up from \$480 billion in 2008, in addition to \$66 billion in 2009 supplemental funding for war costs already appropriated in June as part of the 2008 supplemental appropriations bill. DOD is also investing record amounts in the next generation of weapons: **the final FY 2009 Pentagon budget would provide \$82.4 billion for R&D next year, an increase of \$3.0 billion or 3.8 percent** (see Table A). [The 2009 total includes \$3.4 billion in congressionally designated, performer-specific projects, or earmarks, down slightly from \$3.5 billion in 2008 earmarks.] In real terms, the 2009 budget is a new record, exceeding the 2007 budget as the largest DOD R&D budget in history (Figure 1). (The 2009 DOD R&D totals include nearly \$400 million in development funding already approved in June as part of the 2008 supplemental bill, and have been further adjusted to reflect general reductions contained

reductions contained in the 2009 bill; all 2008 figures include \$1.7 billion in R&D funding from the 2008 supplemental bill, and have been further adjusted to reflect rescissions in the CR; see the June 23 R&D Funding Update on the 2008 supplemental bill for more details.)

Congress has endorsed DOD's proposal to dramatically increase its support of basic research. DOD basic research funding (the "6.1" category) would increase 12.9 percent or \$210 million to \$1.8 billion (see Table A). The majority of "6.1" research is performed in universities. Both the 2008 and 2009 basic research portfolios contain substantial numbers of basic research earmarks, but even without them the core (non-earmarked) "6.1" programs would receive substantial increases in 2009. [The 2009 "6.1" portfolio contains \$158 million in earmarks, down slightly from \$165 million in 2008. Without earmarks the DOD basic research increase is 15 percent over 2008 and 2009.] "6.1" funding in all three military services and the Defense Agencies would gain substantially (see Table C), with especially large increases in Army and Defense Agencies 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 2009, DOD sees tremendous gains for its physical sciences-centered basic research portfolio anyway. Funding for the three-service University Research Initiatives program, which awards basic research grants competitively to university performers, would receive a combined \$338 million, up 12.6 percent or \$38 million from 2008. The Defense Research Sciences program, funded in the three services and in DARPA, would receive a combined \$1.1 billion, up 12.0 percent. The National Defense Education program (NDEP) would climb from \$44 million in 2008 to \$69 million next year (up 56 percent). From 2001 to 2007, basic research remained stable at just \$1.5 billion in today's dollars (see Figure 2), but the 2008 and 2009 increases could signal a new era of growth.

Trends in Defense R&D, FY 1976-2009 \*  
in billions of constant FY 2008 dollars



Source: AAAS analyses of R&D in annual R&D reports. \* - FY 2009 figures are AAAS estimates of final FY 2009 DOD appropriations, and the DOE request. FY 2008 and 2009 figures include enacted supplementals. R&D includes conduct of R&D and R&D facilities. DOD S&T figures are not comparable for all years because of changing definitions.  
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Figure 1. (Click on the image for PDF)

The 2009 Defense appropriations bill retains a provision first included in the 2008 bill that would limit indirect cost reimbursements on basic research grants to 65 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 next year.

Applied research (the "6.2" category) would gain 1.7 percent or \$87 million to \$5.1 billion in sharp contrast to a 16 percent requested cut (see Table A) [the FY 2009 request, DOD proposed to cut \$839 million in 2008 congressional earmarks in 2009 budget, but Congress instead added back \$875 million in "6.2" earmarks in the 2009 CR; if 2008 and 2009 earmarks are excluded, then "6.2" funding would increase 1.2 percent in 2009.]

The final Defense bill would give medical research in the Defense Health Program \$903 million (see Table A), up \$9 million from a 2008 total padded with \$350 million in funds from the June supplemental. Congress allocates \$250 million in 2009 (up from \$218 million in 2008) for longstanding programs in breast, ovarian, and prostate cancer research through peer-reviewed, competitively awarded grants. But in 2009, Congress initiates several new peer-reviewed research programs on lung cancer, orthopedics, spinal cord injuries, vision, and selected cancer topics, and also continues a recently initiated peer-reviewed medical research program on miscellaneous topics. These newer programs receive a combined \$186 million in the final Defense bill, for a total of \$436 million in DOD funding in 2009 for competitively awarded medical research grants, up 57 percent in 2008. In addition to these congressionally initiated but peer-reviewed research programs, there are \$77 million in earmarked medical research projects in this account [and \$360 million in earmarked medical research programs in the services' accounts, mostly the Army.] As shown in Figure 2, DOD funding of medical research has grown dramatically over the past decade.

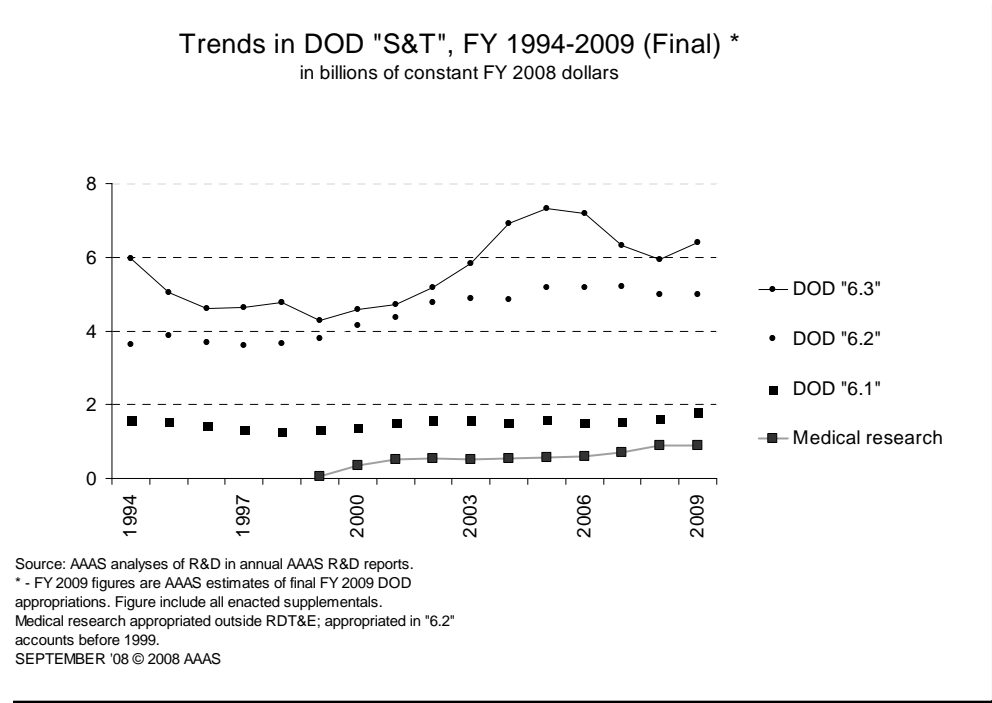


Figure 2. (Click on the image for PDF)

Congress would reverse proposed cuts in DOD funding of "S&T" (the "6.1" through "6.3" categories plus medical research) for a total of \$14.3 billion, an \$882 million or 6.6 percent increase (see Table C). [DOD proposed to discontinue \$2.2 billion in 2008 earmarks in 2009, but Congress added \$2.2 billion to the request, of which \$2.2 billion would be in the form of 2009 earmarks.] In what has now become an annual ritual, the Pentagon proposes cuts each year in S&T funding and Congress adds billions of dollars in the appropriations process, primarily but not entirely through the addition of earmarks. [If 2008 and 2009 earmarks are excluded, then DOD funding would increase \$847 million or 7.5 percent to a non-earmarked \$12.1 billion in 2009.]

The 2009 DOD S&T appropriation represents a gain after three years of decline from the 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; in 2005, most of the cuts have been in the “6.3” programs (see Figure 2), while applied research “6.2” declined less and “6.1” has held steady and even increased in 2008 and 2009. Over the past decade, there has been growing support inside and outside the Pentagon for setting 3 percent of the DOD budget as a target 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 target. There has been up to Congress to boost S&T funding so that the most DOD regular budgets this decade have not met that goal (after taking out Iraq and Afghanistan war spending), but the 2008 and now 2009 appropriations are short with a ratio of 2.80 percent.

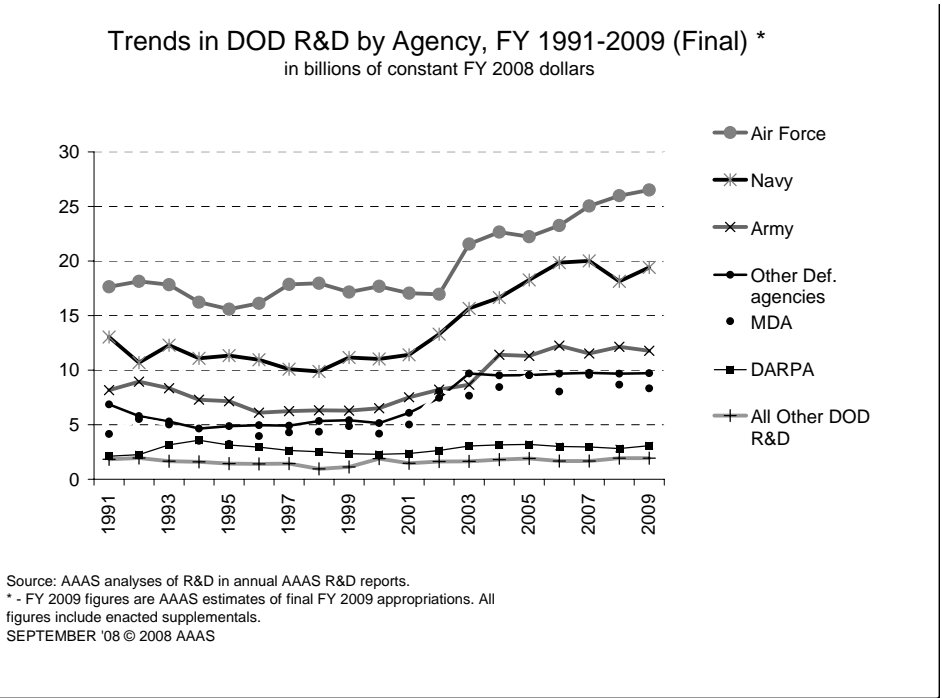


Figure 3. (Click on the image for PDF)

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 \$2.1 billion or 3.3 percent to an unprecedented \$68.0 billion. The Air Force would get the most, with its R&D budget hitting a historical high of \$27.1 billion in 2009 (see Table B), a dramatic \$1 billion or 4.1 percent increase that would have been even larger if Congress had not trimmed the request (see Figure 3). 90 percent of 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. Navy R&D would also increase dramatically, by 9.2 percent to \$19.8 billion, just off historical highs (see Figure 3). The Air Force and Navy are jointly responsible for the largest single development project in the federal budget, the Joint Strike Fighter, which receives \$3.5 billion in 2009 for development, \$419 million more than the request. By contrast, Army R&D would fall by 1.0 percent down to \$12.0 billion.

R&D in the Defense Agencies would gain \$393 million or 1.9 percent to \$21.5 billion (see Table B). The research-oriented Defense Advanced Research Projects Agency (DARPA) would be a winner with a \$321 million or 11.4 percent increase to \$3.1 billion. The appropriation falls short of the request by \$155 million, but DARPA winds up with the same percentage increase as requested because Congress also rescinds \$150 million in unspent funds from 2008 and prior years as part of the final Defense bill. About half of DARPA’s budget goes to “6.1” and “6.2” activities, with the remainder devoted to “6.3” technology



Table A. DOD R&amp;D by Program in FY 2009 House-Senate Conference

**Table A. Department of Defense by Program  
House-Senate Conference on R&D in the FY 2009 Budget  
(budget authority in millions of dollars)**

	FY 2008 Estimate	FY 2009 Request	FY 2009 CONF.	House-Senate Conference			
				Chg. from Request		Chg. from FY 2008	
				Amount	Percent	Amount	Percent
Research, Development, Test, and Evaluation:							
Basic Research ("6.1")	1,625	1,699	<b>1,835</b>	136	8.0%	210	12.9%
Applied Research ("6.2")	4,997	4,245	<b>5,084</b>	839	19.8%	87	1.7%
Total Research, or Tech. Base	6,622	5,944	<b>6,919</b>	975	16.4%	297	4.5%
Advanced Tech. Dev. ("6.3")	5,941	5,532	<b>6,517</b>	985	17.8%	576	9.7%
Total Science and Technology	12,563	11,475	<b>13,436</b>	1,961	17.1%	873	7.0%
Adv. Component Dev. ("6.4")	15,756	15,774	<b>15,651</b>	-123	-0.8%	-106	-0.7%
System Dev. And Demon. ("6.5")	18,341	19,537	<b>18,692</b>	-845	-4.3%	351	1.9%
Management Support ("6.6")	4,550	4,369	<b>4,592</b>	223	5.1%	43	0.9%
Operational Systems Dev. ("6.7")	26,732	28,840	<b>28,228</b>	-612	-2.1%	1,496	5.6%
BA Adjustment	-347	0	<b>0</b>	0	--	--	--
TOTAL RDT&E	77,595	79,995	<b>80,598</b>	603	0.8%	3,003	3.9%
Other appropriations 1/	859	878	<b>878</b>	0	0.0%	19	2.2%
Medical research 2/	893	194	<b>903</b>	709	365.4%	9	1.0%
<b>Total DOD R&amp;D</b>	79,347	81,067	<b>82,379</b>	1,311	1.6%	3,032	3.8%
<b>DOD S&amp;T ("6.1" - "6.3" &amp; medical)</b>	13,456	11,669	<b>14,338</b>	2,669	22.9%	882	6.6%

AAAS estimates based on FY 2009 appropriations bills. Includes conduct of R&D and R&D facilities.

FY 2008 and FY 2009 request figures based on OMB R&D data and supplemental agency budget data.

FY 2008 and 2009 figures include supplementals enacted in Public Law 110-252.

FY 2008 and 2009 figures adjusted to reflect rescissions and general reductions in the FY 2009 Defense appropriations bill.

Figures are rounded to the nearest million. Changes calculated from unrounded figures.

1/ R&D support in military personnel, military construction, and other DOD appropriations.

Includes chemical agents and munitions destruction R&D funded outside RDT&E.

2/ Medical research appropriated in Defense Health Programs, not RDT&E. These funds are not included in "6.2."

**September 24, 2008 - AAAS estimates of final FY 2009 Defense appropriations bill.**

**These appropriations are final unless they are rejected by the House or Senate, or vetoed.**

Table B. DOD R&amp;D by Agency in FY 2009 House-Senate Conference

**Table B. Department of Defense by Agency  
House-Senate Conference on R&D in the FY 2009 Budget  
(budget authority in millions of dollars)**

	FY 2008 Estimate	FY 2009 Request	FY 2009 CONF.	House-Senate Conference			
				Chg. from Request		Chg. from FY 2008	
				Amount	Percent	Amount	Percent
Research, development, test, and evaluation:							
Army	12,142	10,524	<b>12,015</b>	1,491	14.2%	-127	-1.0%
Navy	18,134	19,448	<b>19,801</b>	353	1.8%	1,667	9.2%
Air Force	25,993	28,137	<b>27,053</b>	-1,084	-3.9%	1,060	4.1%
Defense Agencies	21,148	21,697	<b>21,541</b>	-157	-0.7%	393	1.9%
<i>Defense Adv. Res. Projects Agcy.</i>	2,809	3,286	<b>3,130</b>	-155	-4.7%	321	11.4%
<i>Missile Defense Agency</i>	8,662	8,891	<b>8,492</b>	-399	-4.5%	-170	-2.0%
<i>Chem. And Bio. Defense Program</i>	1,017	1,056	<b>1,099</b>	44	4.1%	82	8.1%
<i>Defense Threat Reduction Agency</i>	455	456	<b>471</b>	14	3.1%	15	3.3%
<i>Office of Secretary of Defense</i>	2,468	2,348	<b>2,592</b>	244	10.4%	124	5.0%
<i>Other *</i>	5,736	5,661	<b>5,757</b>	96	1.7%	20	0.4%
Director of Operational Test & Eval.	178	189	<b>188</b>	-1	-0.4%	10	5.7%
<b>TOTAL RDT&amp;E</b>	<b>77,595</b>	<b>79,995</b>	<b>80,598</b>	<b>603</b>	<b>0.8%</b>	<b>3,003</b>	<b>3.9%</b>
Other appropriations 1/	859	878	<b>878</b>	0	0.0%	19	2.2%
Medical research 2/	893	194	<b>903</b>	709	365.4%	9	1.0%
<b>Total DOD R&amp;D</b>	<b>79,347</b>	<b>81,067</b>	<b>82,379</b>	<b>1,311</b>	<b>1.6%</b>	<b>3,032</b>	<b>3.8%</b>

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Table C. DOD S&amp;T by Agency in FY 2009 House-Senate Conference

**Table C. Department of Defense S&T by Agency  
House-Senate Conference on R&D in the FY 2009 Budget  
(budget authority in millions of dollars)**

	FY 2008 Estimate	FY 2009 Request	FY 2009 CONF.	House-Senate Conference			
				Chg. from Request		Chg. from FY 2008	
				Amount	Percent	Amount	Percent
"Science and Technology" (S&T; "6.1" through "6.3" plus medical research)							
Army	2,896	1,842	<b>3,066</b>	1,225	66.5%	170	5.9%
- <i>Basic Research</i> ("6.1")	379	379	<b>438</b>	58	15.3%	59	15.4%
- <i>Applied Research</i> ("6.2")	1,180	724	<b>1,229</b>	506	69.9%	49	4.2%
- <i>Advanced Tech. Dev.</i> ("6.3")	1,337	739	<b>1,400</b>	661	89.4%	63	4.7%
Navy	2,038	1,840	<b>2,152</b>	311	16.9%	114	5.6%
- <i>Basic Research</i> ("6.1")	498	528	<b>545</b>	17	3.2%	48	9.6%
- <i>Applied Research</i> ("6.2")	801	633	<b>774</b>	140	22.1%	-28	-3.4%
- <i>Advanced Tech. Dev.</i> ("6.3")	739	679	<b>833</b>	154	22.7%	94	12.7%
Air Force	2,265	2,075	<b>2,394</b>	319	15.4%	129	5.7%
- <i>Basic Research</i> ("6.1")	421	452	<b>467</b>	15	3.3%	46	10.9%
- <i>Applied Research</i> ("6.2")	1,170	1,044	<b>1,212</b>	167	16.0%	42	3.6%
- <i>Advanced Tech. Dev.</i> ("6.3")	674	578	<b>715</b>	136	23.6%	41	6.1%
Defense Agencies	5,364	5,718	<b>5,824</b>	106	1.9%	460	8.6%
- <i>Basic Research</i> ("6.1")	327	339	<b>385</b>	46	13.7%	58	17.7%
- <i>Applied Research</i> ("6.2")	1,846	1,844	<b>1,869</b>	26	1.4%	24	1.3%
- <i>Advanced Tech. Dev.</i> ("6.3")	3,192	3,536	<b>3,570</b>	34	1.0%	378	11.9%
TOTAL "6.1" through "6.3"	12,563	11,475	<b>13,436</b>	1,961	17.1%	873	7.0%
Medical research 1/	893	194	<b>903</b>	709	365.4%	9	1.0%
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