

## House Boosts NASA R&D 5 Percent

### AAAS R&D Funding Update on R&D in House FY 2006 NASA Appropriations

#### Highlights

- The National Aeronautics and Space Administration (NASA) continues to face daunting challenges, even as it receives favored treatment in the federal budget. In the latest House action, **the total NASA budget of \$16.5 billion would be a 1.7 percent increase, but NASA's R&D would increase 5.0 percent or \$552 million in FY 2006** because of money freed up by the Space Shuttle's expected return to flight this summer (see Table).
- While the agency would receive additional resources for its ambitious plans to finish construction of the International Space Station, explore the solar system, and develop the technologies needed for future moon and Mars missions, there would also be tough budget choices. While the House would add funds to keep NASA from making steep cuts to aeronautics research, the House would agree to proposed cuts in the earth sciences portfolio (down 2.7 percent to \$2.1 billion) and biological and physical research (down almost a quarter to \$782 million).
- The House would agree to NASA's plans to shift resources to solar system exploration and R&D for moon and Mars mission technologies. There would be large boosts for robotic moon and Mars exploration (up 17 percent to \$858 million) and development of a Crew Exploration Vehicle within a new Constellation Systems program (doubling to \$1.1 billion).
- The International Space Station would receive \$1.8 billion, up almost 10 percent, in anticipation of the Space Shuttle's return to flight.

#### NASA R&D in FY 2006 House Appropriations

On June 7, the House Appropriations Committee approved its version of the FY 2006 Science, State, Justice, and Commerce appropriations bill (HR 2682). The House bill would provide NASA with a total budget of \$16.5 billion in FY 2006, \$275 million or 1.7 percent above this year's budget. (For details of R&D in the FY 2006 request, please see Chapter 10 of *AAAS Report XXX: R&D FY 2006* or the March 9 AAAS R&D Funding Update.)

Because of an extensive reorganization of appropriations bill jurisdictions, in FY 2006 NASA and the National Science Foundation (NSF) will be funded for the first time with the Departments of Commerce, State, and Justice. NSF and NASA were formerly funded in the now defunct VA-HUD appropriations bill alongside the Departments of Veterans Affairs and Housing and Urban Development. As a result, the former Commerce, Justice, and State appropriations bill now has "Science" in its name. The Senate Appropriations Committee, however, has proposed a different reorganization for its new Commerce, Justice, and Science bill: although Commerce, Justice, NASA, and NSF will still be funded together in the Senate, the Senate bill excludes the Department of State. The differing jurisdictions in the House and the Senate bills will make agreeing on a final (conference) bill extremely difficult.

Unlike last year, when the House Appropriations Committee draft a billion-dollar cut to the NASA budget request on the 35<sup>th</sup> anniversary of the first moon landing, the House would mostly endorse NASA's plans for its FY 2006 budget. In an extremely tough budget environment of rising deficits, restraints on domestic spending, and cuts for many programs, the National Aeronautics and Space Administration (NASA) would escape the tight funding squeeze facing other domestic programs in the proposed FY 2006 budget. But the

proposed increases for NASA would not be enough to keep the agency from making tough choices as it juggles a full plate of high-priority missions along with its traditional R&D programs. NASA's total budget of \$16.5 billion would be a \$275 million or 1.7 percent increase after an \$820 million increase in 2005 (see Table). The House would add \$15 million to the request and shift some funds from the Space Station and moon-and-Mars missions in order to shore up NASA support for aeronautics, but would mostly stick closely to the request. The House appropriation should allow NASA to keep going on grand new plans for space exploration involving a return to the moon and a possible human flight to Mars in coming decades, after first returning the Space Shuttle to flight this summer and using the Shuttle to finish construction of the International Space Station. The House would go along with the NASA 2006 budget proposal to once again restructure NASA's budget accounts, from 7 enterprises in two major budget accounts to 4 directorates in two major accounts (all amounts in the Table are adjusted for comparability to reflect the proposed new structure), but the bill warns NASA that it should stop restructuring its budget every year.

**NASA's R&D (two-thirds of the agency's budget) would total \$11.5 billion in the House plan, a 5.0 percent or \$552 million increase that is likely to be the largest percentage increase among the major R&D funding agencies (see Table and Figure 1).** R&D funding would grow faster than the total NASA budget because the agency anticipates a reduction in the non-R&D Space Shuttle program from a record \$4.7 billion funding level this year down to \$4.5 billion next year after the Shuttle returns to flight. Currently, the long-awaited and much-delayed return to flight is scheduled for July. With the Shuttle safely back in space, the current plan is to trim the program's budget down to \$4.5 billion in FY 2006, which would still be high in historical terms.

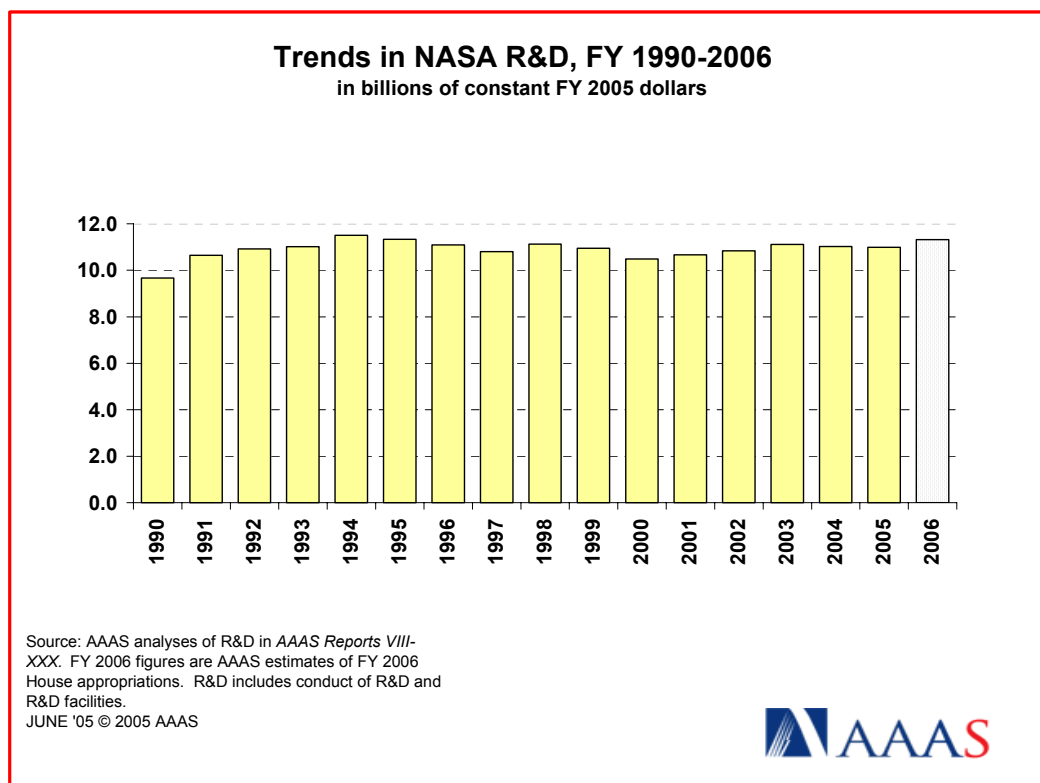


Figure 1. (click on image for PDF)

The House would concur with NASA's plan to increase funding for the International Space Station by \$160 million or 9.6 percent to \$1.8 billion next year, just \$20 million less than the request. The Station is now essentially in maintenance mode of two astronauts supplied by Russian spacecraft, with construction activities in limbo indefinitely until the Space Shuttle resumes its role of carrying Station components into orbit. After shrinking to \$1.4 billion last year, the current plan envisions Space Station construction resuming at \$1.7 billion after the Shuttle returns to flight, and proceeding full speed ahead next year. The

Space Station and the Space Shuttle make up the Exploration Capabilities (EC) account, which totals \$6.7 billion in the House, a decline of 1.7 percent (see Table).

With these two big-ticket current programs provided for in the EC account, **the Exploration, Science, and Aeronautics (ESA) account, which funds most of NASA's research, would rise 4.2 percent in the House bill for a gain of \$391 million to \$9.7 billion. The FY 2006 budget would provide funds for moon-and-Mars programs, especially within the new Exploration Systems (ES) account.** In the new budget structure, NASA would create the Constellation Systems program within ES as the focal point for R&D efforts in the space flight technologies needed to return humans to the moon and then onward to Mars. From \$527 million this year, Constellation Systems funding would double to \$1.1 billion, primarily for R&D on the Crew Exploration Vehicle (CEV), a project to develop a next-generation spacecraft capable of taking humans beyond low-Earth orbit. The first demonstration flights are currently planned for 2008. Exploration Systems R&T (research and technology) would surge 24 percent to \$894 million in the House plan for R&D to meet the technical challenges lying ahead for the moon and Mars missions, \$25 million shy of an even larger proposed increase. At the same time, the Prometheus Nuclear Systems and Technology program to develop new power and propulsion technologies based on nuclear power for future NASA missions would see its funding decline 26 percent to \$320 million in a restructuring of program milestones. Funding for the Mars and Lunar Exploration programs for robotic exploration would total \$858 million in combined funding, up 17 percent from this year to build on recent successes of the headline-grabbing Mars rovers and to gear up for a 2008 robotic mission to the moon.

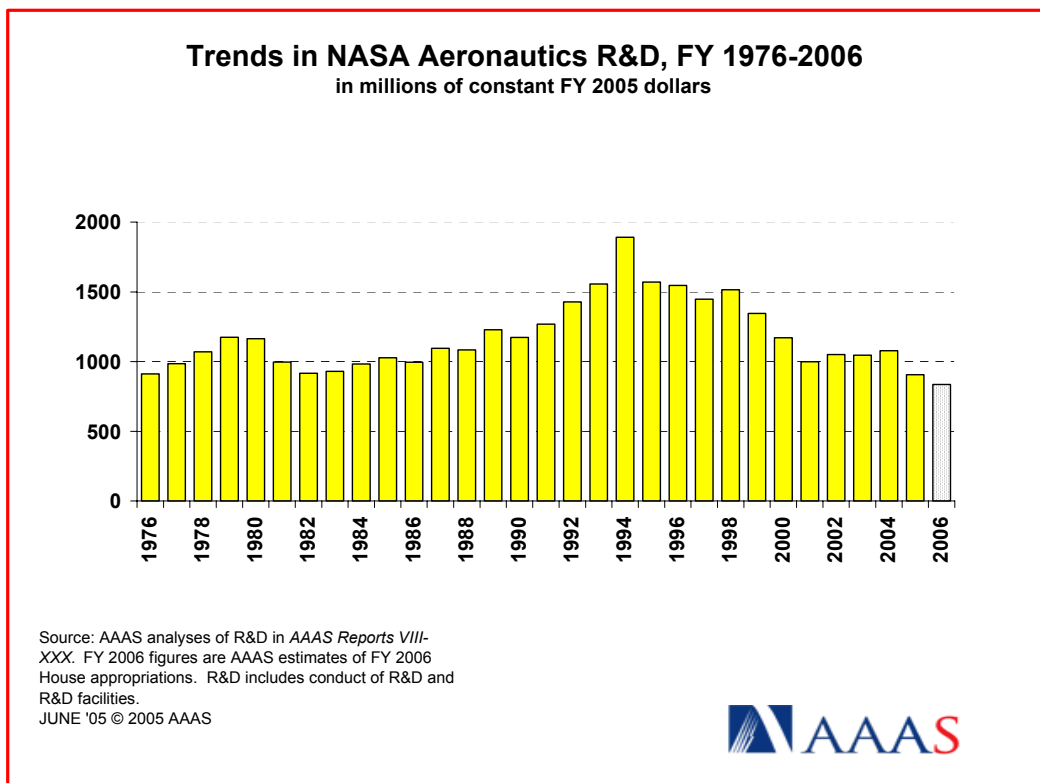


Figure 2. (click on image for PDF)

**The House would try to add funds to NASA efforts in earth sciences and aeronautics, but would leave funding for both programs well below the levels of recent years.** The House would add \$34 million to NASA's Earth-Sun System request to bring the program to \$2.1 billion, still a 2.7 percent cut from this year. This NASA program is a key part of the interagency Climate Change Science Program and is responsible for space-based observations of the earth environment. The House would also reject NASA's proposed 6 percent cut in its aeronautics research portfolio and instead keep funding at this year's level of \$906 million (see Table). Language accompanying the NASA appropriation makes clear the

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Appropriations Committee's support for sustaining NASA's investment in aeronautics research, especially at a time when other industrial nations are increasing their investments. The report language calls on the Bush Administration to develop a National Aeronautics Policy within the next year that would provide a clear policy direction for the federal role in the civil aviation industry, and calls on NASA to prepare a report on how the FY 2006 aeronautics investment would enhance U.S. competitiveness in aeronautics, lead to breakthrough technologies, and contribute to other NASA goals. That said, NASA's aeronautics support has been in steady decline over the last decade (see Figure 2), and even the House appropriation would leave the portfolio at little more than half the size of a decade ago.

**The House would endorse NASA's proposal to dramatically restructure and downsize its biological and physical research portfolio** into a Human Systems Research and Technology program more narrowly focused on research topics relevant to human space flight. Human Systems would receive just \$782 million in the House bill, \$25 million less than the request and far less than the \$1.0 billion current budget.

Elsewhere in the bill, the House would make the unusual move of adding \$50 million in R&D earmarks to the NASA budget, but without specifying them. The report accompanying the bill states that the allocation of the earmarked funds will be specified only in the final bill, which may not be ready until the late fall.

**Although there is no specific appropriation for the Hubble Space Telescope, the House would applaud the recent decision by NASA Administrator Michael Griffin to reassess the possibility of a servicing mission to the telescope.** NASA attracted strong criticism last year for canceling a planned shuttle servicing mission to extend the life of the Hubble, instead focusing on robotic servicing. Congress spoke up in its FY 2005 NASA appropriation by allocating funding for a servicing mission, but the FY 2006 budget proposal in February, prepared under the watch of the previous administrator, would have canceled any servicing mission.

### **Impacts and Next Steps**

The House increase to NASA's R&D portfolio in FY 2006 would continue a modest upward trend for the last few years, as shown in Figure 1. NASA's R&D funding has just kept pace with inflation going back to FY 1991, and recent increases have been just barely ahead of inflation. NASA has committed to carrying out its ambitious plans with a budget plan that would just keep pace with expected inflation over the next decade. Although inflationary increases are more than most R&D funding agencies are likely to get in the next few years, NASA's big plans for the next few years will still require NASA to reshuffle its resources and to meet ambitious targets for deployment, construction, and then phase-out of the Space Shuttle and Space Station programs to make room for moon and Mars programs.

The House is expected to debate and approve the Science, State, Justice, and Commerce appropriations bill the week of June 13. The Senate Appropriations Committee is expected to draft its version later this month.

(This analysis is one of a series of AAAS R&D Funding Updates on FY 2006 congressional appropriations. The complete series of AAAS R&D Funding Updates, including continually updated analyses of R&D in FY 2006 appropriations, is available on the AAAS R&D Web Site (<http://www.aaas.org/spp/rd>) in the "FY 2006 R&D" or the "What's New" sections.)

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Table. NASA R&amp;D in FY 2006 House Appropriations

**Table. National Aeronautics and Space Administration  
House Appropriations Committee Action on R&D in the FY 2006 Budget  
(budget authority in millions of dollars)**

	FY 2005 Estimate	FY 2006 Request	FY 2006 House	House Action			
				Chg. from Request Amount	Percent	Chg. from FY 2005 Amount	Percent
Summary of R&D by Appropriation:							
<b>1. Exploration Capabilities (EC) *</b>							
International Space Station	1,676	1,857	<b>1,837</b>	-20	-1.1%	160	9.6%
Space Shuttle	4,669	4,531	<b>4,531</b>	0	0.0%	-138	-3.0%
Space and Flight Support	485	376	<b>346</b>	-30	-8.0%	-140	-28.8%
Total Exploration Capabilities	6,830	6,763	<b>6,713</b>	-50	-0.7%	-118	-1.7%
<b>2. Science, Aeronautics and Exploration (SAE) *</b>							
Solar System Exploration	1,858	1,901	<b>1,905</b>	4	0.2%	47	2.5%
The Universe	1,513	1,512	<b>1,526</b>	13	0.9%	12	0.8%
Earth-Sun System	2,156	2,064	<b>2,098</b>	34	1.7%	-58	-2.7%
Exploration Systems	2,684	3,165	<b>3,122</b>	-43	-1.4%	438	16.3%
Aeronautics Research	906	852	<b>906</b>	54	6.3%	0	0.0%
Education Programs	217	167	<b>169</b>	2	1.4%	-47	-21.9%
<b>Total ESA</b>	9,335	9,661	<b>9,726</b>	65	0.7%	391	4.2%
3. Inspector General	31	32	<b>32</b>	0	0.0%	1	3.5%
<b>Total NASA Budget</b>	16,196	16,456	<b>16,471</b>	15	0.1%	275	1.7%
<i>minus non-R&amp;D Activities:</i>							
Space Shuttle	-4,669	-4,531	<b>-4,531</b>	0	0.0%	138	-3.0%
Other non-R&D	-485	-376	<b>-346</b>	30	-8.0%	140	-28.8%
Inspector General	-31	-32	<b>-32</b>	0	0.0%	-1	3.5%
Education and Training	-22	-21	<b>-21</b>	0	0.0%	1	-4.1%
Total NASA Non-R&D Activities	-5,207	-4,959	<b>-4,929</b>	30	-0.6%	278	-5.3%
<b>TOTAL NASA R&amp;D</b>	10,989	11,497	<b>11,542</b>	45	0.4%	552	5.0%

AAAS estimates based on FY 2006 appropriations bills. Includes conduct of R&D and R&D facilities.

FY 2005 and FY 2006 request figures based on OMB R&D data and supplemental agency budget data.

FY 2005 figures include emergency supplemental for hurricane damages.

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

**NASA proposes an extensive restructuring of its budget in FY 2006.**

**Figures for all years have been adjusted to reflect the proposed budget structure.**

\* NASA funds are not appropriated by program. The FY 2006 program-level figures are AAAS estimates based on report language in the FY 2006 House appropriations bill; NASA has broad flexibility to shift funds between programs.

**June 14, 2005 - AAAS estimates of House Appropriations Committee-approved bills.**

**These figures may be amended or rejected by the full House.**