

House Adds Earth Science Funding to NASA Budget

AAAS R&D Funding Update on NASA R&D in FY 2008 House Appropriations

Highlights

- Frustrated with tough budget choices at the National Aeronautics and Space Administration (NASA), **the House would add to an already large requested increase for 2008, for a total NASA budget of \$17.6 billion, up 8.3 percent or \$1.4 billion** (see Table). The House would add funds for the Science portfolio, particularly for earth observing satellites, and for aeronautics.
- The Constellation Systems program to develop the new Crew Exploration Vehicle and Crew Launch Vehicle would increase 10.2 percent from 2007 to \$3.1 billion in 2008 in the request, House, and Senate plans. Funding shortfalls in 2007 and project delays recently led NASA to push back the launch date from 2014 to 2015 at the earliest. Construction of the International Space Station, now in full gear with the return of the Space Shuttle to flight, would receive the requested \$2.2 billion next year in the House, up \$483 million from this year.
- **The House would boost NASA's Science portfolio 5.7 percent over the current year for a total of \$5.7 billion. The aeronautics program would receive \$700 million, \$146 million more than a steep requested cut to keep the portfolio flat with 2007.**
- NASA's R&D portfolio would receive \$13.0 billion in the House, a large increase of \$1.2 billion or 9.8 percent that would allow NASA's non-human space flight R&D to stay ahead of inflation for the first time in five years.

NASA R&D in FY 2008 House Appropriations

On July 12, the House Appropriations Committee approved its version of the FY 2008 Commerce-Justice-Science appropriations bill (HR 3093) providing funding for the National Science Foundation (NSF), the National Aeronautics and Space Administration (NASA), and the Department of Commerce. The full House is expected to debate and approve the bill by the end of July. The Senate Appropriations Committee has already drafted its own version (S 1745). The House bill contains nearly \$54 billion in 2008 discretionary spending for its programs, \$3.2 billion more than the current year and \$2.3 billion more than the President's request.

The House would add \$313 million to NASA's 2008 request, primarily for earth science and aeronautics programs, for a total NASA budget of \$17.6 billion, \$1.4 billion or 8.3 percent more than the current year. Although a large increase, the House would only bring NASA funding back to 2005 and 2006 levels after a sharp cut in 2007 (see Table). Earlier, the Senate drafted a NASA appropriation giving the agency slightly less, \$17.5 billion. Both would add funds to NASA's research programs on top of the large requests for development and facilities requested by the Bush Administration, and in the House case the appropriation would allow NASA's non-human space flight programs to stay ahead of inflation for the first time since 2003 (see Figure 1). (For details of NASA's FY 2008 request, see the March 21 AAAS R&D Funding Update or Chapter 9 of *AAAS Report XXXII: R&D FY 2008*. For details of Senate appropriations for NASA, see the July 5 R&D Funding Update.)

NASA's R&D funding would climb \$1.2 billion or 9.8 percent to \$13.0 billion in the House plan (see Table), continuing a rebound from a dismal 2005 when Shuttle cost overruns forced the agency to siphon money from R&D programs to the non-R&D Shuttle. **Efforts to develop next-generation human space**

vehicles to replace the Shuttle and ramped-up construction of the International Space Station (ISS) would take up most of the large R&D increase, but the House would add just enough money to Science and aeronautics programs to leave all other NASA R&D programs combined with more money in real terms.

NASA's Constellation Systems program aims to develop a new Orion Crew Exploration Vehicle (CEV) and Ares 1 Crew Launch Vehicle (CLV) to replace the Space Shuttle as the primary means of getting humans into space. This large program to fund development of the CEV, CLV, and related technologies is part of the President's Vision for Space Exploration, announced in 2004, to get humans back to the moon and onward to Mars. Funding quadrupled from just \$422 million in 2005 to \$1.7 billion last year, and increased again to \$2.8 billion in 2007. The 2008 House plan would go along with the request to further boost funding 10.2 percent or \$285 million to \$3.1 billion. Although the goal is to have the new vehicles ready by 2014, a nearly half-billion dollar shortfall in the final 2007 appropriation from the 2007 request and project delays have caused NASA to push back the projected launch date to 2015 or later. The Senate would provide slightly more for the program.

The International Space Station (ISS) budget would climb 28 percent or \$483 million, slightly less than the request, to \$2.2 billion in the 2008 House appropriation, partly because of a transfer of support costs from Constellation Systems to the ISS account and partly for a ramped-up construction schedule aiming for final assembly of the Station in 2010, followed by full operations through 2016.

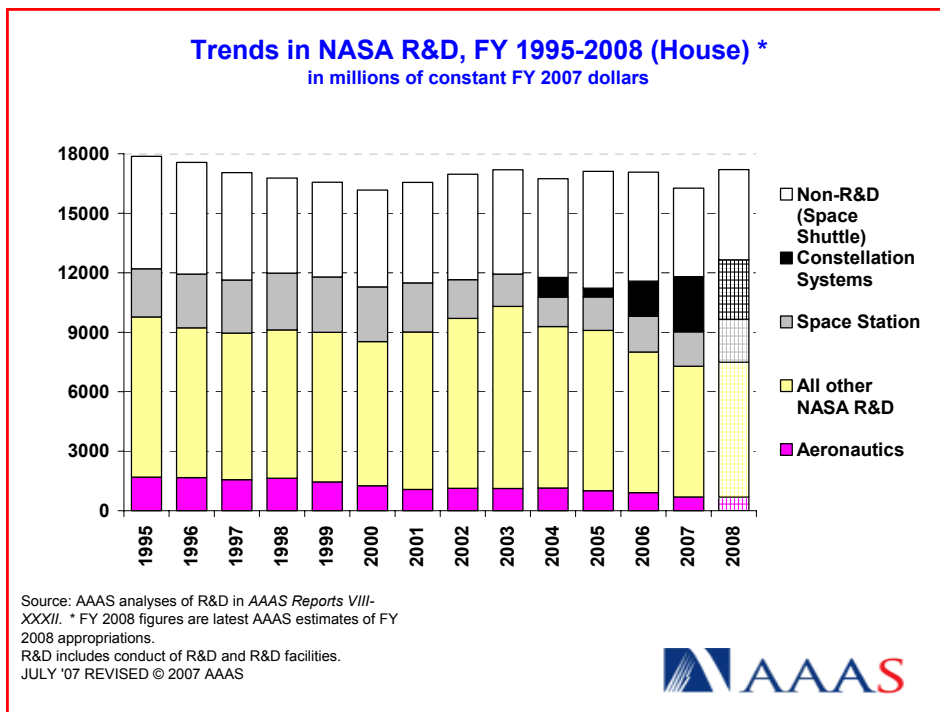


Figure 1. (click on the image for PDF)

Together, increases for the two human space-flight programs of Constellation Systems and the ISS are responsible for most of the 9.8 percent increase in NASA R&D in 2008 in the House (see Figure 1), but the House would add enough funding to Science programs, especially in earth science, and to aeronautics to allow all other NASA R&D programs combined to see a real increase in 2008 following steep cuts in each of the last four years (see Figure 1). Ironically, NASA is a large supporter of physical sciences research but was left out of the President's American Competitiveness Initiative (ACI) to boost basic physical sciences research, and its support for physical sciences research and other research would fall in the 2008 request, and just stay even with inflation in the 2008 Senate appropriation. The House would be the only plan to allow funding to stay ahead of inflation.

Both the House and the Senate would shore up NASA support of the earth sciences with \$1.6 billion for the Earth Science portfolio, in the House 9.3 percent more than the current year. In the Senate, \$25 million in new funding would go to implement recommendations of the National Research Council's recent *Earth Science and Applications From Space: National Imperatives for the Next Decade and Beyond* report. This decadal survey of earth science expresses concern that the number of earth-observing sensors on NASA spacecraft could decrease by 40 percent during this decade if current trends continue, such as a 30 percent real decline in earth science funding so far this decade. The report notes that NASA's satellite capabilities for observing the Earth from space are vital for environmental research, especially for understanding climate change, and would be nearly impossible to replace. The Senate would add funding to various earth science programs, including several earth observing satellite missions, and would provide \$15 million specifically to top up funding for Earth Science Applications, a program that provides competitive grants for scientists to use satellite data for environmental and other research. The House would add \$60 million to the request for earth science satellite missions, and add another \$60 million for research and analysis for the entire Science portfolio, part of which would support increased use and analysis of earth observing satellite data.

In the rest of the Science portfolio, the House would add \$50 million to the request in Astrophysics specifically for the Space Interferometry Mission for a total of \$72 million, and \$10 million to the Planetary Science portfolio for an outer-planets mission. **All told, the Science portfolio would gain 5.7 percent or \$308 million to reach \$5.7 billion in the House.** The appropriation would allow work on the Stratospheric Observatory for Infrared Astronomy (SOFIA) project to restart in 2008 after an abrupt halt in 2007, would allow the James Webb Space Telescope to ramp up development efforts to \$545 million toward a 2013 launch, and would fund a 2008 servicing mission for the current Hubble Space Telescope (\$278 million).

Outside the Science portfolio in other NASA research programs, the House would also add \$146 million to the aeronautics research portfolio, enough to turn a steep requested cut into a slight increase. Aeronautics research funding would tumble 21 percent in the request following similar cuts in previous years; in real terms, the aeronautics research portfolio would be half its size of just four years ago (see Figure 1), but the House appropriation would reverse these recent trends, and the report accompanying appropriation criticizes NASA for threatening U.S. preeminence in aviation and aerospace with its budget cuts. Elsewhere in the House bill, there would be \$19 million allocated to congressionally designated, performer-specific projects (earmarks), a return to earmarking in 2008 after a one-year moratorium in 2007. The House would also boost funding for NASA Education, by 22 percent over the current year to \$220 million. Included would be \$10 million for a new competitive program to educate students on global climate change.

Impacts of the NASA Budget

The proposed increase to NASA's R&D portfolio in FY 2008, now endorsed and added to by the House and Senate, would continue a modest upward trend for the last few years after hitting bottom in 2005, 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. Although the Bush Administration's moon and Mars plan ignited hopes of increasing resources in a time of fiscal austerity, NASA 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 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.

Because recent increases in NASA R&D have gone to development programs such as the Constellation Systems project and facilities such as the International Space Station (see Figure 1), NASA support of research has plummeted in real terms. The 2008 House appropriation could be a first step in arresting and reversing the slide.

Outlook and Next Steps

The full House is expected to debate and approve the Commerce-Justice-Science bill within the next week, although final approval may be delayed by a crowded House floor schedule. The Senate Appropriations Committee has drafted its own version, but has not scheduled time to debate it. Congress will try to send a final version of the bill to President Bush before the October 1 start of FY 2008. The President has threatened to veto any 2008 appropriations bill that exceeds his request, as the House version does by \$2.3 billion, so the bill may have to go through several rewrites and revotes before it can become law.

(This analysis is one of a series of AAAS R&D Funding Updates on FY 2008 congressional appropriations. The complete series of AAAS R&D Funding Updates, including continually updated analyses of R&D in FY 2008 appropriations, is available on the AAAS R&D Web Site (<http://www.aaas.org/spp/rd>) in the "FY 2008 R&D" or the "What's New" sections.)

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Table. NASA R&D in FY 2008 House Appropriations

**Table. National Aeronautics and Space Administration
House Appropriations Committee Action on R&D in the FY 2008 Budget
(budget authority in millions of dollars)**

	FY 2007 Estimate	FY 2008 Request	FY 2008 Senate	Action by House				
				FY 2008 House	Chg. from Request Amount	Chg. from Request Percent	Chg. from FY 2007 Amount	Chg. from FY 2007 Percent
Summary of R&D by Appropriation:								
1. Exploration Capabilities (EC)								
International Space Station	1,735	2,239	2,239	2,219	-20	-0.9%	483	27.9%
Space Shuttle	3,976	4,008	4,008	4,008	0	0.0%	31	0.8%
Space and Flight Support	323	546	546	466	-80	-14.7%	143	44.4%
Total Exploration Capabilities	6,034	6,792	6,792	6,692	-100	-1.5%	658	10.9%
2. Science, Aeronautics and Exploration (SAE)								
Science:								
Earth Science	1,443	1,497	1,625	1,577	80	5.3%	134	9.3%
Heliophysics	1,013	1,057	1,081	1,067	10	0.9%	54	5.3%
Planetary Science	1,391	1,396	1,357	1,421	25	1.8%	30	2.2%
Astrophysics	1,540	1,566	1,554	1,631	65	4.2%	90	5.9%
Total Science	5,388	5,516	5,618	5,696	180	3.3%	308	5.7%
Exploration Systems	3,576	3,924	3,946	3,924	0	0.0%	348	9.7%
- Constellation Systems	2,784	3,068	3,097	3,068	0	0.0%	285	10.2%
- Advanced Capabilities	792	856	849	856	0	0.0%	63	8.0%
Aeronautics Research	695	554	550	700	146	26.4%	5	0.7%
Cross-Agency Support Programs	542	489	518	576	87	17.8%	34	6.3%
- Congressional Projects 1/	0	0	70	0	0	--	0	--
- Education	181	154	149	220	67	43.3%	40	21.9%
- Advanced Business Systems	105	103	74	103	0	0.0%	-2	-2.0%
- Innovative Partnerships	232	198	192	219	21	10.3%	-14	-5.9%
- Shared Capabilities	24	34	34	34	0	0.0%	10	43.7%
Total SAE	10,201	10,483	10,633	10,897	413	3.9%	695	6.8%
3. Inspector General	32	35	35	35	0	0.0%	3	8.1%
Total NASA Budget	16,267	17,310	17,460	17,623	313	1.8%	1,356	8.3%
<i>minus non-R&D Activities:</i>								
Space Shuttle	-3,976	-4,008	-4,008	-4,008	0	0.0%	-31	0.8%
Other non-R&D	-428	-649	-619	-569	80	-12.3%	-141	33.0%
Inspector General	-32	-35	-35	-35	0	0.0%	-3	8.1%
Education and Training	-25	-25	0	-53	-28	112.0%	-28	112.0%
Total NASA Non-R&D Activities	-4,461	-4,716	-4,662	-4,664	52	-1.1%	-203	4.6%
TOTAL NASA R&D	11,806	12,594	12,798	12,959	365	2.9%	1,153	9.8%

AAAS estimates based on FY 2008 appropriations bills. Includes conduct of R&D and R&D facilities.

FY 2007 and FY 2008 request figures based on OMB R&D data and supplemental agency budget data.

FY 2007 figures include 2007 supplemental appropriations enacted in Public Law 110-28.

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

1/ FY 2008 Senate bill includes separate account for congressionally designated projects.

NASA has proposed to restructure its programs in FY 2008.

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

FY 2007 and 2008 figures are in a new full-cost simplification method.

July 20, 2007 - AAAS estimates of House Appropriations Committee-approved appropriations.

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