

House Slashes \$1 Billion from NASA Request, Delays Moon and Mars Programs

AAAS R&D Funding Update on R&D in FY 2005 NASA House Appropriations

Highlights

- **The ambitious NASA plan to send humans back to the Moon and onward to Mars hit a roadblock when the House Appropriations Committee, acting on the FY 2005 NASA budget, approved a big cut to these new programs.** The FY 2005 total NASA budget of \$15.1 billion would be \$229 million less than this year and \$1.1 billion short of the request (see Table).

- **The House plan would cut new initiatives first in order to spare existing NASA programs, thus decimating the budgets for the new programs proposed to get the moon-to-Mars missions underway.**

- **NASA R&D would fall by 6.2 percent or \$674 million to \$10.2 billion.** While funding for construction of the International Space Station would increase 12 percent to \$1.7 billion, **NASA's support of basic and applied research would plummet 18 percent**, primarily from a halt or delay of new programs related to the moon and Mars.

- The non-R&D Space Shuttle program would receive the requested \$4.3 billion in preparation for a long-delayed return to flight now scheduled for spring 2005.

- The Space Science program would emerge a relative winner among science programs in the House bill with \$4.0 billion, down \$105 million from the request because of the elimination of moon-and-Mars supporting programs but still up 1.6 percent from this year. There would be large increases for Mars Exploration (up 16.1 percent to \$691 million) to build the next generation of robotic explorers, but no funds in the new Lunar Exploration account to begin preparations for the return to the moon.

NASA R&D in FY 2005 House Appropriations

On July 22, the House Appropriations Committee drafted its version of an FY 2005 VA/HUD appropriations bill that would dramatically cut funding for most National Aeronautics and Space Administration (NASA) programs in FY 2005. The House bill would provide NASA with a total budget of \$15.1 billion in FY 2005, slightly below FY 2004 and \$1.1 billion short of the request. This would be far below the 5.6 percent requested increase to \$16.2 billion proposed by NASA in February to initiate grand new plans for space exploration. **NASA's R&D (two-thirds of the agency's budget) would take a big hit of 6.2 percent down to \$10.2 billion** because non-R&D programs, of which the largest is the Space Shuttle, would be protected from cuts. The House appropriation would reduce NASA R&D funding down to levels not seen since 1990 in today's dollars. (For details of R&D in the FY 2005 request, please see Chapter 10 of *AAAS Report XXIX: R&D FY 2005*.)

The House FY 2005 VA-HUD bill would provide \$93 billion for discretionary programs, almost \$1 billion more than the President's request and \$2 billion more than this year's funding level. The bill funds science agencies including the National Science Foundation (NSF), NASA, the Environmental Protection Agency (EPA), and non-R&D programs for veterans and housing. Although the overall bill total would be an increase, the House would devote all the additional funds and then some to veterans and housing programs, complaining that the Administration request significantly underfunds these needs. The House is constrained from adding even more funds to the VA-HUD bill because both the House and Senate are

working with a total of \$822 billion for all discretionary programs in FY 2005 that is \$1 billion lower than the President's request, necessitating difficult choices in funding priorities.

With the January presidential announcement of plans to send humans to the moon again on the way to Mars, the **National Aeronautics and Space Administration (NASA)** was supposed to embark on a new era in its history, with a major commitment of new resources to enable the agency to begin preparing for a new lunar mission. The February release of the FY 2005 budget request of \$16.2 billion for NASA made the agency one of the few domestic agencies favored with a proposed increase (5.6 percent) in tough budgetary times even as other R&D funding agencies faced cuts or flat budgets. But on closer examination, nearly all of the increase would have gone to returning the non-R&D Space Shuttle to flight (up 9.5 percent to \$4.3 billion) and resuming construction of the Space Station (up 24.3 percent to \$1.9 billion).

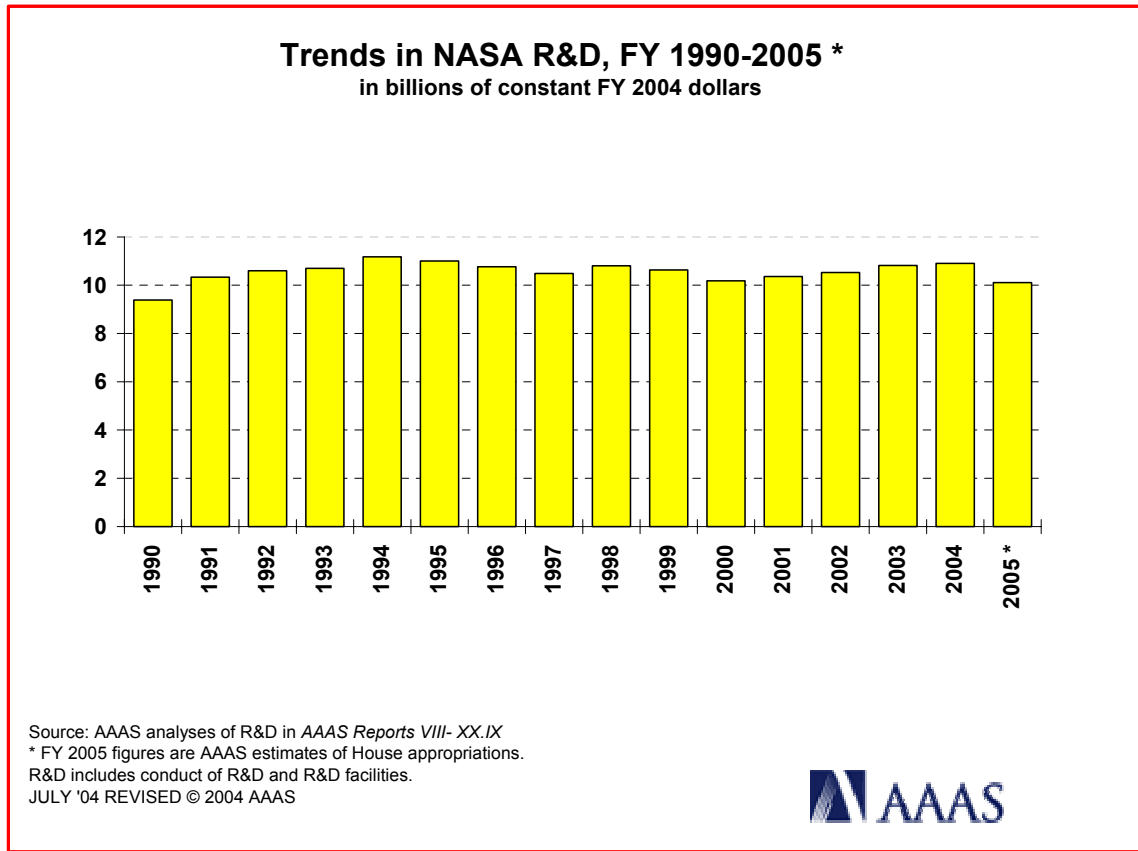


Figure 1. (click on the image to view or download a color, full-page PDF version of the chart)

The House VA-HUD bill, ironically drafted on July 20, the 35th anniversary of the first lunar landing, would kill or at least delay NASA's ambitious plans even before they get started. Faced with extremely tight budget constraints in the overall VA-HUD bill, House appropriators chose to preserve as much of NASA's current program funding as possible, with clear priority assigned to getting the Space Shuttle back in flight so that it can then resume construction work on the International Space Station. The House chose to sacrifice new programs, nearly all of which are connected with the moon-and-Mars initiative.

The House would fully fund the requested increase of 9.5 percent or \$374 million for the non-R&D Space Shuttle, bringing FY 2005 funding to \$4.3 billion. NASA hopes that the return to flight of the Shuttle will take place in spring 2005, but there are already signs that in order to accomplish the task NASA will need even more money to pay for needed safety upgrades and other equipment before the next launch.

The House would give \$1.7 billion to the Space Station, \$190 million less than the request but still a boost from \$1.5 billion in FY 2004. With the original deadline of February 2004 for completion of the core station long shattered, 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. Thus, it is likely that not all of the \$1.7 billion appropriation will be needed, and some of these funds could be transferred to the Space Shuttle in mid year.

New moon-and-Mars related programs in Exploration Systems (ES) program would take a big hit in the House VA-HUD bill. The House would eliminate the entire \$428 million in requested research funding for the Crew Exploration Vehicle (CRV), a project to develop the next-generation spacecraft capable of taking humans beyond low-Earth orbit. The House bill describes the reduction as a delay in CRV development, but it would set back the project timetable by at least a year. The CRV project is designed to replace the Space Launch Initiative, another program to develop next-generation space launch vehicles. The House would reduce the request for the Space Launch Initiative by \$100 million, bringing FY 2005 funding down to \$151 million, a mere shadow of the \$967 million funding level for FY 2004. Together, these two programs make up the Transportation Systems (TS) account in ES, and would fall from \$967 million down to \$151 million, effectively halting NASA's research on the next generation of human spacecraft.

The House would also sharply scale back proposed NASA initiatives outside the moon-and-Mars plan. The new Human and Robotic Technology (HRT) program would receive \$862 million, down from the request but still up 26.9 percent from the comparable programs in FY 2004. The House would cut \$230 million from the \$438 million requested for Project Prometheus to develop new power and propulsion technologies based on nuclear power for future NASA missions. The remaining \$208 million would delay plans to integrate new power systems on the Jupiter Icy Moons Orbiter mission, scheduled for launch in 2011.

The Exploration, Science, and Aeronautics (ESA) account, which funds most of NASA's research, would be battered in the House bill with a reduction to \$7.6 billion, down 2.7 percent from this year.

The Space Science program would see its budget rise modestly by 1.6 percent to \$4.0 billion, but the House would go along with NASA's plan to dramatically boost funding for Mars Exploration by 16 percent to \$691 million. Another Space Science program to receive an increase would be Astronomical Search for Origins (ASO) with \$1.1 billion, up 19 percent. Within ASO, the House would provide the requested \$155 million (up from \$71 million this year) for the Space Interferometry Mission, a mission scheduled for launch in 2009 to detect planets around other stars. ASO also funds the Hubble Space Telescope. NASA has attracted strong criticism in recent months for canceling a previously planned shuttle servicing mission to extend the life of the Hubble, instead focusing on robotic servicing. The House bill urges NASA to keep alive the option of a shuttle mission for Hubble, but does not provide any additional funds beyond the \$130 million request (down sharply from \$241 million this year). The ASO also funds development of the next-generation James Webb Space Telescope to replace the Hubble (scheduled for launch in 2011) and other space-based observatories. Other Space Science efforts in Solar System Exploration, understanding the Sun-Earth connection, and exploring the structure and evolution of the universe would see their funding fall to make way for the additional Mars funds. Another casualty would be \$70 million in requested new funding, reduced to zero by the House, for the Lunar Exploration program to develop the new technologies needed for a human return the moon.

The Earth Science program would fall 8.6 percent to \$1.5 billion in the House plan, confirming the lower priority assigned to space-based observations of the Earth within NASA's portfolio of activities. In Biological and Physical Research, the House would take \$103 million out of the request for bioastronautics research related to the moon-Mars missions, turning a requested increase into a \$28 million cut to \$957 million. And the House would confirm NASA's trend of moving away from the first 'A' in its name by cutting Aeronautics funding by 7.6 percent down to \$955 million, a slight improvement over NASA's own plans. The House would add \$32 million in R&D earmarks to the request for Education Programs for a total of \$200 million, down \$26 million from FY 2004. **The House would add add \$101 million in R&D earmarks to the NASA budget, further squeezing the shrinking resources for these programs.**

Impacts of the NASA R&D Portfolio

The proposed cuts to NASA's R&D portfolio in FY 2005 would put a sharp decline in NASA R&D after level funding for the past decade, as shown in Figure 1. NASA's R&D funding has barely kept pace with inflation going back to FY 1991, and there are few signs now that it will grow significantly, at least in the near future. Although the Bush Administration's moon and Mars plan promised new development efforts and increasing resources in a time of fiscal austerity, a closer look at the FY 2005 budget showed that most of the money would come from reprogramming from other NASA programs rather than large funding increases in FY 2005 and later. With a return to the moon nearly twenty years away and a possible trip to Mars nearly three decades away, the presidential announcement did little to change NASA's near-term budget prospects, and now the House appropriation could put the vision even further in the future.

Although much of NASA's R&D portfolio funds development and facilities projects such as the Space Station, **NASA is also an important source of federal support for basic and applied research.** Engineering research makes up the largest part of the NASA portfolio. NASA funds approximately a quarter of total federal support for engineering research. NASA supplies nearly all the federal support for some engineering sub-fields such as astronautical engineering and aeronautical engineering. NASA is the leading federal sponsor of the environmental sciences (oceanography, atmospheric sciences, geological sciences). The environmental sciences are a quarter of NASA's portfolio, but NASA accounts for a third of total federal support for environmental sciences research. NASA also invests heavily in the physical sciences (astronomy, chemistry, and physics). NASA is the second largest federal sponsor of physical sciences behind the Department of Energy, and is by far the leading sponsor of astronomy research.

The House cuts would hit NASA research disproportionately, with an estimated 18 percent decline in NASA basic and applied research, mostly from cuts in applied research related to the new moon and Mars efforts but also from cuts in Earth Science, Biological and Physical Research, and aeronautics research.

Next Steps

The House VA-HUD bill's proposed cuts to NSF, NASA, and EPA look so steep, especially in an election year, that the bill may be rejected by the full House. If that looks likely, the House leadership may prevent the bill from reaching the House floor in September. The Senate, facing the same fiscal constraints, may not draft its VA-HUD bill at all. Thus, the bill is almost certain to be included in a year-end omnibus appropriations bill. There is already talk that funding for NSF and NASA will have to be boosted through the infusion of additional funds in a year-end budget deal. Where the additional funding might come from, however, is uncertain, and it is possible that these House-proposed funding levels could eventually prevail in the final FY 2005 appropriations package.

(This analysis is one of a series of AAAS R&D Funding Updates on the FY 2005 congressional appropriations process. This analysis includes information on R&D in House appropriations for NASA. The complete series of AAAS R&D Funding Updates, including continually updated analyses of R&D by agency in FY 2005 appropriations, is available on the AAAS R&D Web Site (<http://www.aaas.org/spp/rd>) in the "FY 2005 R&D" or the "What's New" sections.)

- July 26, 2004
AAAS R&D Budget and Policy Program
(202) 326-6607
e-mail: science_policy@aaas.org
AAAS R&D Web site: <http://www.aaas.org/spp/rd>



Table. NASA R&D in FY 2005 House Appropriations

**Table. National Aeronautics and Space Administration
House Appropriations Committee Action on R&D in the FY 2005 Budget
(budget authority in millions of dollars)**

	FY 2004 Estimate	FY 2005 Request	Action by House				
			FY 2005 House	Chg. from Request Amount	Chg. from Request Percent	Chg. from FY 2004 Amount	Chg. from FY 2004 Percent
Summary of R&D by Appropriation:							
1. Exploration Capabilities (EC) / Space Flight Capabilities							
Space Flight							
International Space Station	1,498	1,863	1,673	-190	-10.2%	175	11.7%
Space Shuttle	3,945	4,319	4,319	0	0.0%	374	9.5%
Space and Flight Support	432	492	492	0	0.0%	60	14.0%
Total Space Flight	5,875	6,674	6,484	-190	-2.8%	609	10.4%
Exploration Systems							
Human and Robotic Technology	679	1,094	862	-232	-21.2%	183	26.9%
Transportation Systems	967	689	151	-538	-78.1%	-816	-84.4%
Total Exploration Systems	1,646	1,782	1,013	-770	-43.2%	-633	-38.5%
Total EC	7,521	8,456	7,497	-960	-11.3%	-24	-0.3%
2. Exploration, Science, and Aeronautics (ESA) / Science, Aeronautics and Exploration							
Space Science	3,971	4,138	4,034	-105	-2.5%	62	1.6%
Earth Science	1,613	1,485	1,475	-11	-0.7%	-138	-8.6%
Biological and Physical Research	985	1,049	957	-91	-8.7%	-28	-2.8%
Aeronautics	1,034	919	955	36	3.9%	-79	-7.6%
Education Programs	226	169	200	32	18.8%	-26	-11.6%
Total ESA	7,830	7,760	7,621	-139	-1.8%	-209	-2.7%
3. Inspector General	27	28	31	4	13.8%	4	16.3%
Total NASA Budget	15,378	16,244	15,149	-1,095	-6.7%	-229	-1.5%
<i>minus non-R&D Activities:</i>							
Space Shuttle	-3,945	-4,319	-4,319	0	0.0%	-374	9.5%
Other non-R&D	-432	-492	-492	0	0.0%	-60	14.0%
Inspector General	-27	-28	-31	-4	13.8%	-4	16.3%
Education and Training	-65	-71	-71	0	0.0%	-6	9.8%
Total NASA Non-R&D Activities	-4,469	-4,910	-4,914	-4	0.1%	-445	10.0%
TOTAL NASA R&D	10,909	11,334	10,235	-1,098	-9.7%	-674	-6.2%

AAAS estimates based on FY 2005 appropriations bills. Includes conduct of R&D and R&D facilities.

FY 2004 and FY 2005 request figures based on OMB R&D data and supplemental agency budget data.

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

**July 26, 2004 - House Appropriations Committee-approved funding levels.
These funding levels may be amended or rejected by the full House.**