

# CRS Report for Congress

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## The National Aeronautics and Space Administration: Overview, FY2006 Budget in Brief, and Key Issues for Congress

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### Summary

The National Aeronautics and Space Administration (NASA) conducts U.S. civilian space activities. For FY2006, NASA is requesting \$16.456 billion, a 2.4% increase over the \$16.070 billion NASA received in the FY2005 Consolidated Appropriations Act (P.L. 108-447). Separately, NASA received \$126 million in a FY2005 supplemental for hurricane relief. Key issues for Congress center on President Bush's Vision for Space Exploration, announced in January 2004. If it proceeds as the President plans, the Vision could have significant effects on NASA's programs and budgets, and the agency as a whole, including job cuts. Returning the space shuttle to flight is the first step in the Vision, but the Vision also calls for the shuttle to be retired in 2010. The future of the shuttle, including whether it should be used to service the Hubble Space Telescope, is one focus of attention. This report is updated regularly.

### Agency Overview

The National Aeronautics and Space Administration (NASA) was created by the 1958 National Aeronautics and Space Act (P.L. 85-568). NASA conducts civilian space and aeronautics activities. NASA opened its doors on October 1, 1958, almost exactly one year after the Soviet Union ushered in the Space Age with the launch of the world's first satellite, Sputnik, on October 4, 1957. In the more than 45 years since, NASA has conducted far reaching programs in human and robotic spaceflight, technology development, and scientific research.

The agency is managed from NASA Headquarters in Washington, D.C. It has nine major field centers around the country: **Ames Research Center**, Moffett Field, CA; **Dryden Flight Research Center**, Edwards, CA; **Glenn Research Center**, Cleveland, OH; **Goddard Space Flight Center**, Greenbelt, MD; **Johnson Space Center**, Houston, TX; **Kennedy Space Center**, near Cape Canaveral, FL; **Langley Research Center**, Hampton, VA; **Marshall Space Flight Center**, Huntsville, AL; and **Stennis Space Center**, in Mississippi, near Slidell, LA. The **Jet Propulsion Laboratory**, Pasadena, CA

(often counted as a 10<sup>th</sup> NASA center), is a Federally Funded Research and Development Center operated for NASA by the California Institute of Technology. Goddard Space Flight Center manages the Goddard Institute of Space Studies (New York, NY), the Independent Validation and Verification Facility (Fairmont, WV); and the Wallops Flight Facility (Wallops, VA). Ames Research Center manages Moffett Federal Airfield, Mountain View, CA. Johnson Space Center manages the White Sands Test Facility, White Sands, NM. See [<http://www.nasa.gov/about/highlights/OrganizationIndex.html>] for links to these facilities. According to NASA, the agency has approximately 19,000 civil servant full time equivalents (FTEs) budgeted for FY2005.

Mr. Frederick Gregory is the Acting Administrator of NASA. The White House has announced its intention to nominate Dr. Michael Griffin to be the next NASA Administrator. NASA headquarters has four “mission directorates”: Aeronautics Research, Exploration Systems, Science, and Space Operations (including the space station and space shuttle). Links to those directorate and individual NASA programs, are at [<http://www.hq.nasa.gov/hq/org.html>].

## NASA’s FY2006 Budget Request

NASA is requesting \$16.456 billion, a 2.4% increase over the amount appropriated in the FY2005 Consolidated Appropriations Act (\$16.070 billion when adjusted for the rescission). NASA also received \$126 million in a FY2005 supplemental for hurricane relief, giving it a total of \$16.196 billion for FY2005. The FY2006 request is a 1.6% increase above that total. Last year, NASA was projected to receive a 4.7% increase for FY2006. NASA has substantially changed its budget structure again, as it has done each year for the past several years, making comparisons across fiscal years difficult. Footnotes to **Table 1** explain budget structure changes from FY2005.

**Table 1: NASA’s FY2006 Budget Request  
(Budget Authority, in millions of dollars)**

Category	FY2004 Actual	FY2005 Estimate*	FY2006 Request
<b>Science, Aeronautics, and Exploration (SA&amp;E)</b>	<b>7,873</b>	<b>**7,681</b>	<b>**9,661</b>
Science <sup>A</sup>	5,600	5,527	5,476
Aeronautics	1,057	906	852
Biological and Physical Research	986	1,004	— <sup>B</sup>
Exploration Systems	— <sup>C</sup>	25	3,165
Education	230	217	167
<b>Exploration Capabilities</b>	<b>7,478</b>	<b>**8,358</b>	<b>**6,763</b>
Space Operations	5,890	6,704	6,762
- <i>Space Shuttle</i>	<i>4,061</i>	<i>4,543</i>	<i>4,531</i>
- <i>International Space Station</i>	<i>1,364</i>	<i>1,676</i>	<i>1,857</i>

Category	FY2004 Actual	FY2005 Estimate*	FY2006 Request
- <i>Space and Flight Support</i>	466	485	376
Exploration Systems	1,588	1,654	— <sup>c</sup>
<b>Inspector General</b>	<b>27</b>	<b>31</b>	<b>32</b>
<b>Total Regular Appropriations</b>	<b>15,378</b>	<b>16,070</b>	<b>16,456</b>
<b>FY2005 Hurricane Supplemental</b>		<b>126</b>	
<b>Grand Total</b>	<b>15,378</b>	<b>16,196</b>	<b>16,456</b>

Source: Office of Management and Budget [<http://www.whitehouse.gov/omb/budget/fy2006/nasa.html>], except for space shuttle, space station, and space and flight support, which are from NASA's FY2006 budget justification. Totals may not add due to rounding. Grand Total was added by CRS.

\* Figures in this column are from NASA's Initial Operating Plan (IOP) and are not final.

\*\* The FY2005 totals for the SA&E and Exploration Capabilities accounts are different from those in the table included in NASA's FY2006 budget justification documents because OMB shows the shift of "Exploration Systems" from one account to the other. The NASA table uses the FY2006 budget structure without showing a "trace" between last year's budget presentation and this year's. Since the OMB data show that trace, and include FY2004, they are used in this report.

<sup>A</sup> In the FY2006 request, "Science" incorporates the former Space Science and Earth Science line items.

<sup>B</sup> In the FY2006 request, Biological and Physical Research became part of Exploration Systems.

<sup>C</sup> In the FY2006 request, funding for Exploration Systems was moved into the SA&E account.

Congress gave NASA "unrestrained transfer authority" to shift funds between its two major accounts in FY2005, but required the agency to notify Congress through the operating plan process of how it plans to spend the funds. NASA apparently plans to provide those details periodically throughout FY2005, while Congress simultaneously considers the FY2006 request.

## President Bush's "Vision for Space Exploration"

On January 14, 2004, President George W. Bush announced a new Vision for Space Exploration, directing NASA to focus its efforts on returning humans to the Moon by 2020, and someday sending them to Mars and "worlds beyond." Other highlights include the following (for more information see CRS Report RS21720):

- Robotic probes would serve as trailblazers for human explorers, and study the solar system and universe for signs of life.
- The space shuttle would be used to complete construction of the International Space Station (ISS), and then be retired, with 2010 as the target. NASA would redirect its ISS research to only what is needed to support the Vision, instead of the broadly-based program that was planned earlier. The United States would meet its obligations to its international partners in the ISS program. A NASA budget chart shows NASA completing its use of ISS by FY2017.
- NASA would build a Crew Exploration Vehicle (CEV) to take astronauts to and from the Moon, with an Earth-orbit capability by 2014. It would also conduct research on nuclear power and propulsion systems, and develop new technologies, including using "prizes" to stimulate innovative ideas.
- Other countries were invited to participate.

- No cost estimate was provided for the Vision overall, but NASA released a “sand chart” with projected NASA budgets through FY2020 [[http://www.nasa.gov/pdf/54873main\\_budget\\_chart\\_14jan04.pdf](http://www.nasa.gov/pdf/54873main_budget_chart_14jan04.pdf)]. Later, NASA stated that returning humans to the Moon would cost \$64 billion (in 2003 dollars) between FY2004 and FY2020, not including the cost of robotic probes. Most of the funding would come from redirecting funds from other NASA activities, not new money.

The President’s speech came almost exactly one year after the space shuttle *Columbia* tragedy that killed seven astronauts (see CRS Report RS21408). One of the conclusions of the *Columbia* Accident Investigation Board (CAIB) was that NASA lacked a national mandate providing it with a compelling mission requiring human presence in space. CAIB chairman Adm. Harold Gehman (Ret.) told Congress in September 2003 that the nation needs an “agreed vision” that NASA can execute.<sup>1</sup>

President Bush’s announcement of the Vision initiated the process of finding an “agreed vision.” Whether or not a consensus has emerged on adopting the President’s goals is debatable. Supporters cite congressional action on the FY2005 NASA budget as one sign of that consensus. Congress approved almost the full NASA request for FY2005. However, conferees on the bill emphasized in the accompanying report that although they were providing substantial funds, “to date there has been no substantive Congressional action endorsing this initiative.”<sup>2</sup> Supporters also point to a 2004 Gallup poll that showed that 68% of the public supports the Vision. Others note, however, that the poll was sponsored by the Coalition for Space Exploration, composed of companies and organizations that support the Vision. Thus, as debate about the Vision and NASA’s FY2006 budget request ensues, the depth and breadth of support for it in Congress and the public remains uncertain. According to NASA briefing charts, the FY2006 budget includes \$6 billion for “exploration specific” activities. That does not include \$6.4 billion for the space shuttle and space station programs, which are often described as the first steps in the Vision.

## Key Congressional Issues

### The Relative Priority of NASA in the Federal Budget

With the current emphasis on cutting spending to reduce the federal budget deficit, some may question the amount of money proposed for NASA in FY2006 and beyond. Space program advocates often cite the small percentage of federal budget authority that is allocated to NASA — 0.7 % in FY2005 — as an indication that it is not a significant factor in the nation’s overall spending. The Coalition for Space Exploration [<http://www.spacecoalition.org>] points out that benefits accrue from space exploration,

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<sup>1</sup> U.S. Congress. House. Committee on Science. The *Columbia* Accident Investigation Board Report. Hearing. September 4, 2003. 108<sup>th</sup> Congress, 1<sup>st</sup> sess. Washington, U.S. Govt. Print. Off., 2004. p. 57.

<sup>2</sup> FY2005 Consolidated Appropriations Act. Conference report (H.Rept. 108-792). Congressional Record, November 19, 2004, p. H10860. No FY2005 NASA authorization bill was introduced in the House. The Senate Commerce Committee reported a FY2005-2009 NASA authorization bill (S. 2541), but there was no further action.

inter alia, in terms of stimulating children to study math and science, and driving invention, which supports a robust economy. Skeptics counter that spending more than \$16 billion on NASA is a luxury when many domestic discretionary programs are being cut, and federal R&D spending overall is not keeping pace with inflation. Thus, a fundamental question facing Congress is the relative priority of funding NASA compared with other government programs, including other R&D programs. In a statement [<http://www.house.gov/science/hearings/full05/index.htm>] at a February 17, 2005, House Science Committee hearing, Chairman Representative Sherwood Boehlert said that while he supports the Vision, “I don’t think NASA should be our top budget priority either in the Committee or the Congress.” Science Committee Ranking Member Representative Bart Gordon said [[http://www.house.gov/science\\_democrats/releases/05feb17.htm](http://www.house.gov/science_democrats/releases/05feb17.htm)] that he strongly supports exploration, but “NASA is headed for a potential train wreck as it puts all its eggs in the exploration basket at a time when deficit concerns are going to keep squeezing discretionary spending.”

## The Relative Priority of the Vision Versus Other NASA Activities

**Funding.** The President’s plan calls for most of the funding for the Vision to come from redirecting spending from other NASA activities. In the “sand chart” (discussed earlier), the programs that are not included in the Vision are labeled *Aeronautics and Other Science Programs*. Funding for those activities is shown as remaining flat through the FY2004-2020 time frame. The “other science” is Earth science, and two Space Science disciplines, Sun-Earth Connections, and Structure and Evolution of the Universe (SEU). Advocates of aeronautics and the science disciplines in the “other” category worry that funding for their research will suffer. Tracking funding for those science activities is difficult because, in the FY2006 budget, they are merged with other programs. Aeronautics funding, however, is projected to decline 32 percent, from \$1 billion in FY2004 to \$718 million in FY2010, according to the FY2006 budget documents. Then-NASA Administrator O’Keefe said on January 31, 2005 [[http://www.nasa.gov/pdf/107627main\\_ok\\_aiaa.pdf](http://www.nasa.gov/pdf/107627main_ok_aiaa.pdf)] that the space “community must bluntly confront the fact that as momentum continues to build for the Vision, some programs ... must fall by the wayside.” In their statements at the February 17, 2005 House Science Committee hearing (referenced above), Chairman Boehlert and Representative Gordon each expressed concern, however. Chairman Boehlert said that he was “for a NASA that sees itself as a science agency, with all of Space Science, Earth Science and Aeronautics receiving the attention and funding accorded to priority areas.” Representative Gordon said that “cannibalizing NASA’s science and aeronautics programs to fund the exploration initiative will further erode the base of support for NASA in Congress.”

**Workforce and Institutional Issues.** The amount of funding for various activities will affect workforce levels at the various NASA centers. For example, according to NASA briefing charts, the reduction in aeronautics funding will mean the elimination of 1,100 civil service jobs at NASA centers. NASA officials insist that there are no plans to close any NASA centers, but the agency is studying how to “transform” its centers. Also, a 2003 assessment of NASA’s aeronautics program by the National Research Council found that its center infrastructure exceeds its current needs. How to “right size” NASA, its facilities, and its workforce, and ensure NASA has the necessary skill mix for the Vision, are among the issues facing Congress. According to figures provided to CRS by NASA, the number of budgeted FTEs would drop from 19,227 in

FY2005, to 18,798 in FY2006, to 16,738 in FY2007, a decrease of 2,489 FTEs between now and the start of FY2007.

## **The Future of the Space Shuttle and International Space Station**

The Vision calls for the space shuttle fleet to be retired in 2010, primarily to make that funding available for other aspects of the Vision. Another factor may have been a requirement set by the CAIB for the shuttle system to be recertified if it is used beyond 2010. Placing a fixed termination date on the shuttle system, however, may create schedule pressure similar to what the CAIB found to have contributed to the *Columbia* accident (see CRS Report RS21408). Also, retiring the shuttle without another vehicle to replace it means that the United States would be completely dependent on Russia to take American crews to and from ISS at least until the new CEV is available (projected in 2014). NASA has not committed to using the CEV to service ISS, however — its main purpose is taking crews to and from the Moon. Some argue that the shuttle should be retained until another U.S. vehicle is available. Also, Russia has indicated that it will not provide transport services for free, and NASA is not permitted to make payments to Russia related to the ISS under terms of the Iran Nonproliferation Act (INA, P.L. 106-178) unless Russia stops proliferating certain technologies to Iran. Thus, the future of NASA's ability to use the ISS is unclear (see CRS Report RS22072 and CRS Issue Brief IB93017). Another concern is how to ensure that shuttle flights remain safe as funding decreases and the workforce and vendors dissipate.

NASA officials have indicated that NASA may complete its use of the ISS by FY2017. Under the Vision, the only U.S. research that will be conducted on ISS is that needed to fulfill the Vision, i.e., to support human health and safety in exploring the Moon and Mars. NASA spends about \$2 billion a year on ISS, in addition to the costs of the shuttle program. Some question whether ISS is worth that level of investment considering the modest research objectives that remain. NASA is building ISS in partnership with Canada, Japan, Russia, and 10 European countries. Fulfilling U.S. commitments to those partners may be another rationale for continued U.S. involvement.

## **The Future of the Hubble Space Telescope**

Two days after the President's Vision speech, NASA announced that it would not use the shuttle to conduct further servicing missions to the Hubble Space Telescope (see CRS Report RS21767). Then-Administrator O'Keefe cited shuttle safety concerns as the primary reason for his decision. Widespread criticism of that decision led NASA to explore the possibility of a robotic servicing mission. A December 2004 report from the National Research Council, however, concluded that a robotic servicing mission was not likely to succeed in the time available. Meanwhile, cost estimates of \$1 billion or more for either a shuttle or a robotic servicing mission raised questions about affordability, regardless of which option was chosen. In the FY2006 request, NASA is requesting money only for a deorbit mission (to ensure that Hubble reenters from orbit without posing danger to populated areas), even though Congress directed NASA to spend \$291 million in FY2005 on a servicing mission. Whether or not to service Hubble, robotically or with the shuttle, is a major issue facing Congress.