

CRS Report for Congress

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Space Exploration: Overview of President Bush's "Vision for Space Exploration," and Key Issues for Congress

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Summary

On January 14, 2004, President George W. Bush announced new goals for the National Aeronautics and Space Administration (NASA), directing the agency to focus on returning humans to the Moon by 2020, and eventually sending them to Mars and "worlds beyond." Under this "Vision for Space Exploration," the space shuttle would be retired in 2010, and the United States would end its involvement in the International Space Station by FY2017. NASA's FY2005 budget request showed that \$12.6 billion would be "added" for FY2005-2009 to begin achieving the new goals, but only \$1 billion is new money; the remainder is redirected from other NASA programs. A cost estimate for the entire program was not provided. The President invited other countries to join. Whether to proceed with the Vision as outlined by the President, and the impact of the Vision on other NASA activities and NASA's workforce, are among the issues being debated by Congress. This report is updated regularly.

Overview of President George W. Bush's Vision for Space Exploration

On January 14, 2004, President George W. Bush announced new goals for the U.S. space program [<http://www.whitehouse.gov/news/releases/2004/01/20040114-3.html>]. Amplified by documents from the White House Office of Science and Technology Policy (OSTP) [<http://www.ostp.gov>] and NASA, the main features of this "Vision for Space Exploration" are the following.

- Astronauts would return to the Moon in the 2015-2020 time period. (The last Americans walked on the Moon in 1972.) NASA would build a Crew Exploration Vehicle (CEV) whose primary purpose would be to take astronauts to the Moon. It would be available for human space flights in 2014, and could be used to take astronauts to the International Space Station (see CRS Issue Brief IB93017) as well.
- Eventually, astronauts would go to Mars, and "worlds beyond." No dates were announced.

- Robotic probes would serve as trailblazers for human explorers. The first probe to support the initiative would be launched to the Moon in 2008.
- Construction of the International Space Station (ISS) would be completed by 2010. The shuttle system (see CRS Issue Brief IB93062) then would be retired. The President promised that the United States would meet its obligations to its partners in the ISS program — Europe, Canada, Japan, and Russia.¹ According to a NASA budget chart, U.S. involvement in ISS would end by FY2017, although then-NASA Administrator O’Keefe later said there were no plans to “turn out the lights.” Between 2010 and 2014, U.S. astronauts would rely on Russia to take them to and from ISS (though NASA currently does not have such an agreement with Russia).
- NASA would redirect its research aboard the ISS to that which specifically supports human exploration of space, instead of the broadly based research program that was planned.
- Other countries were invited to participate in the Vision. NASA made clear that it is not limited only to those countries participating in ISS.
- NASA FY2005 budget documents showed that \$12.6 billion would be “added” to its budget for FY2005-2009 to begin achieving the new goals, and a NASA projected budget chart (the “**sand chart**”²) suggests that \$150-170 billion would be spent on the initiative from FY2004-2020. Most of the money comes from other NASA programs. The \$12.6 billion for example, comprised \$1 billion in new money and \$11.6 billion redirected from other NASA activities. The characterization of the \$12.6 billion as an “addition” is based on a NASA assumption that without the President’s initiative, NASA would have been held to a flat budget. The “increase,” therefore, is above a hypothetical budget that is lower than what NASA projected in its FY2004 budget. The plan called for NASA’s total budget to increase about 5% per year for FY2005-2007, then at less than the rate of inflation (which is estimated at about 2%) for FY2008-2009. See below for more information on NASA’s budget.
- A Commission on the Implementation of U.S. Space Exploration Policy was created by the President to advise NASA on implementation of the Vision. Headed by former DOD official E.C. “Pete” Aldridge, its report [http://www.nasa.gov/pdf/60736main_M2M_report_small.pdf] was released on June 16, 2004.

Rationale. The President’s speech came 11 months after the tragedy of the February 2003 space shuttle *Columbia* accident (see CRS Report RS21408), and two weeks after the January 3, 2004 successful landing of a U.S. robotic probe (Spirit) on Mars. Invoking the explorations of Lewis and Clark, the President explained that America has ventured into space for the same reasons, “because the desire to explore and understand is part of our character. And that quest has brought tangible benefits that improve our lives in countless ways.”

¹ A 1998 Intergovernmental Agreement (IGA), and Memoranda of Understanding between NASA and its counterparts, detail those obligations. See [<http://www.hq.nasa.gov/office/codei/>].

² The “**sand chart**” is at [http://www.nasa.gov/pdf/54873main_budget_chart_14jan04.pdf].

Public Reaction. An Associated Press-Ipsos poll conducted several days (January 9-11) before the President's speech, in response to press reports that the announcement was imminent, found 48% of the respondents in favor of a Moon/Mars program, 48% opposed, and 4% not sure.³ A June 22-July 7, 2004 Gallup poll sponsored by the Coalition for Space Exploration found 26% strongly support, 42% support, 15% oppose, and 9% strongly oppose the plan (the remainder were neutral, did not know, or did not answer). The poll is available at [<http://www.spacecoalition.com>].

Congressional Reaction. The committees that oversee NASA's budget (House Science, Senate Commerce, and House and Senate Appropriations VA-HUD-IA subcommittees) have held many hearings on the Vision. Members of both parties on both sides of Capitol Hill have expressed support for the overall goals, but also concern about the cost, the impact on other NASA activities, and other issues.

FY2005 Funding. In their reports on the FY2005 VA-HUD-IA appropriations bill (H.R. 5041/S. 2825), the House and Senate Appropriations Committees voiced support for the Vision, but noted that it comes at a time of sharp budget constraints. Both committees recommended cuts to Vision-related programs. The House committee cut \$1.1 billion from NASA's \$16.2 billion request, eliminating all funding for the Crew Exploration Vehicle, for example. The committee's recommendations prompted Office of Management and Budget Director Joshua Bolten to write to House Appropriations Committee Chairman Young on July 22, 2004 stating that he would recommend a veto if the final bill included those cuts. The Senate committee recommended \$135 million more than requested for NASA, a total of \$16.4 billion, but \$800 million of that was designated as emergency spending: \$500 million for the space shuttle (see CRS Report RS21408), and \$300 million for a repair mission to the Hubble Space Telescope (see CRS Report RS21767). Thus, the amount for the rest of NASA actually was a cut of \$665 million from the request, including cuts to Vision-related projects.

There was no floor action on those bills. Final agreement on NASA's FY2005 appropriation instead was incorporated into the FY2005 Consolidated Appropriations bill (H.R. 4818, P.L. 108-447). The conferees appropriated almost all the funding that NASA requested for FY2005 (\$16.200 billion compared with the \$16.244 billion requested), leading many Vision supporters to claim victory. Press reports widely credit House Majority Leader DeLay and the White House for winning that level of funding for NASA.⁴ The conferees, however, explicitly stated that although they were appropriating substantial funds for the Vision, "to date there has been no substantive Congressional action endorsing this initiative."

It also should be noted that even though Congress appropriated \$16.2 billion, that is subject to an 0.80% rescission, making the actual total \$16.07 billion, a 4.5% increase over FY2004 instead of the 5.6% increase requested. In addition, over \$1 billion of that funding must go to activities that were not included in the budget request. The conferees gave NASA "unrestrained transfer authority" to shift funding between its two major

³ (1) Associated Press. Results of AP Poll on Space Exploration. Jan. 2, 2004, 14:44. (2) Lester, Will. AP Poll: U.S. Tepid on Bush's Space Plans. Associated Press, Jan. 12, 2004, 14:50.

⁴ For example, see Gugliotta, Guy. DeLay's Push Helps Deliver NASA Funds. Washington Post, December 6, 2004, p. A1.

budget accounts, but must notify Congress of how it plans to spend the money. NASA submitted an initial FY2005 operating plan on December 23, 2004 showing those plans, noting that additional changes are expected throughout the year.

FY2006 Request. 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. NASA’s total budget request is \$16.5 billion, a 2.4% increase over what was appropriated in the FY2005 Consolidated Appropriations Act. This is about half of what was projected when the Vision was announced (4.7% for FY2006). If a \$126 million FY2005 supplemental (for hurricane relief) is added, the increase for FY2006 is 1.6%. See CRS Report RS22063 for more on NASA’s budget request.

Comparison with the 1989 Space Exploration Initiative

Although some media stories portray the current President Bush’s speech as the first new vision for NASA since the Apollo era,⁵ President George H.W. Bush made a similar proposal in 1989. On July 20, 1989, the 20th anniversary of the first human landing the Moon, the senior President Bush announced that Americans would return to the Moon and go on to Mars. Known as the Space Exploration Initiative (SEI), its major goals were building the space station as a stepping stone to returning humans to the Moon and someday sending them to Mars. In May 1990, President Bush made another speech adding more detail, including that he believed humans would reach Mars by 2019. Richard Darman, then Director of the Office of Management and Budget (OMB), stated at a press conference the day of the President’s original speech that fulfilling the goals would cost \$400 billion over 30 years. Other estimates (some higher, some lower) were offered later by NASA.

The initiative was announced during a period when Congress was attempting to cut government spending to reduce the federal deficit, and the proposal was not received enthusiastically. Funding for SEI was requested in the FY1991, FY1992, and FY1993 budgets, though what constituted “SEI funding” changed significantly during those years. For FY1991 NASA requested \$953 million for SEI. The FY1991 NASA authorization bill (P.L. 101-611) approved almost full funding, but the appropriations bill essentially zeroed it (P.L. 101-507). Congress subsequently allowed NASA to reprogram \$37 million into SEI for FY1991. For FY1992, the NASA request was \$94 million. Congress approved \$32 million. For FY1993, \$64 million was requested. The FY1993 NASA authorization bill (P.L. 102-588) approved approximately half of that; the appropriations

⁵ The Apollo program was initiated by President John F. Kennedy in May 1961 to land a man on the Moon and return him safely to Earth before the end of that decade. NASA first developed experience with launching people into space, and extravehicular activities (EVAs, or spacewalks), through the Mercury (1961-1963) and Gemini (1965-1966) programs. The first Apollo mission was to be launched in 1967, but the crew died on January 27, 1967 when a fire erupted in the Apollo command module during a pre-launch test. The first successful Apollo mission was launched in 1968, and the first Americans landed on the Moon on July 20, 1969 (Neil Armstrong and Buzz Aldrin, while pilot Michael Collins orbited above in the Apollo 11 spacecraft). A total of six two-man crews walked on the Moon from 1969-1972. Another crew (Apollo 13) intended to land on the Moon in 1970, but made an emergency return to Earth when the Service Module of their spacecraft exploded enroute to the Moon.

bill (P.L. 102-389) essentially zeroed it. Dr. Michael Griffin headed the SEI program for NASA. The White House announced on March 11, 2005 that it intends to nominate him to be NASA's next Administrator.

Key Issues for Congress

Although most media accounts of the current Vision for Space Exploration focus on the long term "Moon/Mars" goals, nearer term questions of how long to fly the space shuttle and utilize the International Space Station, and what NASA activities might be cut in order to pay for the new goals, are an immediate focus.

What Are the Implications of Terminating the Shuttle Program in 2010?

The space shuttle has made 113 flights, two of which ended in tragedy — *Challenger* in 1986 and *Columbia* in 2003. The *Columbia* Accident Investigation Board (CAIB) endorsed returning the shuttle to flight, but said that if NASA plans to use it beyond 2010, it must be recertified. The shuttle is the only U.S. vehicle capable of taking astronauts to and from space. President Bush said the shuttle would be retired when space station construction is completed in 2010. A new Crew Exploration Vehicle would be developed, and fully operational for Earth orbital missions by 2014.

- What would be the consequences of a four-year hiatus in U.S. human spaceflights (2010-2014)? How much would Russia charge for taking U.S. astronauts to and from ISS, and how would NASA pay (the Iran Nonproliferation Act, P.L. 106-178, prohibits NASA from paying Russia for ISS-related activities unless Russia stops proliferating certain technologies to Iran)? Would China be considered as an alternative now that it can launch people into space?
- What would happen to the shuttle's workforce of approximately 15,750 contractors and 1,700 civil servants?
- How would NASA meet its commitments to its ISS partners without the shuttle to transport crews and cargo during ISS' operational period?
- If the shuttle is not terminated in 2010, must it be recertified? If so, what will that cost? A NASA shuttle official has stated that the current Return to Flight effort will produce a shuttle system that is certified for whatever period of time it is needed, but it is not clear if all stakeholders agree.
- If the "Moon/Mars" goal is not adopted, what would be the future of the shuttle? Should it be terminated in 2010 nonetheless?
- What steps must NASA take to ensure that the space shuttle returns safely to flight status, and the shuttle program is not unduly pressured by the new schedule to complete space station construction by 2010? CAIB cited schedule pressure as a factor in the *Columbia* tragedy.

Should U.S. Involvement in ISS End by FY2017? ISS is discussed in CRS Issue Brief IB93017. It is being assembled in orbit. Assembly began in 1998 and is expected to be completed in 2010. Plans had called for ISS to be operated for at least 10 years after assembly was completed as a laboratory for microgravity experiments. Now, the U.S. research program would be redirected to support only the life sciences research needed to support human exploration of the Moon and Mars. The NASA "sand chart" shows NASA funding for ISS ending in FY2017 (although then-NASA Administrator

O’Keefe later said there are no plans to “turn out the lights” because the partners intend to keep using it “and we may too.”)

- Is the taxpayer investment in the space station (about \$34 billion through FY2004) worth the benefits if the only U.S. research conducted there is related to the “Moon/Mars” goals? What are the lost opportunities in other scientific disciplines of focusing the research only on the Vision?
- What will happen to the space station when NASA ends funding for it? Will it be turned over to the other partners? Will it be “privatized”? Will it be deorbited? If so, how, and at what cost?
- If the “Moon/Mars” goal is not adopted, should NASA return to its plan to use ISS for a broadly-based research program for at least 10 years after construction is completed, or terminate its involvement nonetheless?

What Are the Costs and Other Details? The Bush Administration has not provided a total cost estimate for the President’s initiative, or specific plans on how to implement it. As noted, NASA’s “sand chart” suggests that \$150-170 billion would be spent between FY2004 and FY2020. NASA has estimated the cost for returning humans to the Moon by 2020 at \$64 billion — \$24 billion to build and operate the CEV from FY2004-2020, plus \$40 billion for FY2011-2020 to build the lunar lander portion of that vehicle, a new launch vehicle, and operations. The cost of robotic missions are not included. A September 2004 Congressional Budget Office [<http://www.cbo.gov>] report cautioned that, based on historical trends at NASA, the actual cost could be much higher.

- How much would the total Moon/Mars endeavor cost and over how many years? To what extent will Congress support the initiative absent credible cost estimates?
- What would happen to NASA’s other programs in aeronautics and space science and technology? What impact might there be on federal funding for non-space related national priorities? The President envisions little added funding for NASA, which may mitigate concerns it would increase the deficit or detract from other national priorities, but raises issues about the impact on other NASA activities and whether the level of funding is adequate to achieve the goals. NASA’s FY2006 budget request proposes significant cuts to aeronautics programs, for example, with an associated cut of 1,100 aeronautics jobs by the end of FY2006.
- What role should the private sector play in the exploration initiative?
- Will other countries be willing to participate if the United States does not live up to its obligations on the ISS program, and if the United States insists on directing how the Moon/Mars program is to be conducted?
- What was learned during the three years of work on the earlier Space Exploration Initiative that can be applied to this endeavor?
- To what extent can robotic spacecraft accomplish these exploration goals instead of humans, at less cost and risk to human life?
- Should the White House and Congress adopt the recommendations of the Aldridge Commission, which include a major restructuring of NASA?