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Space Exploration: Overview of President Bush's New Exploration Initiative for NASA, 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 the "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 shows 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. In the FY2005 VA-HUD-IA appropriations bill (H.R. 5041), the House Appropriations Committee cut NASA's total request of $16.2 billion by $1.1 billion, with cuts to several programs associated with the exploration initiative. See CRS Report RS21744 for more on NASA's FY2005 budget. This report is updated regularly.

Overview of President George W. Bush's Exploration Initiative

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 following are its main features.

- 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 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," but no date was 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 NASA Administrator O'Keefe later said there were no plans to "turn out the lights" then. 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, multidisciplinary research program that had been planned.
- Other countries were invited to participate. None were specified, but NASA made clear that it is not limited only to those participating in ISS.
- NASA FY2005 budget documents show 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 FY2005-2009, for example, comprises $1 billion in new money and $11.6 billion redirected from other NASA activities. The characterization of the $12.6 billion as an "addition"must be viewed cautiously, however, because it 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. NASA budget materials describe the entire NASA budget request for FY2005-2009 ($87.1 billion) as the budget for the "exploration vision," of which $31.4 billion is "exploration specific." Thus it is difficult to determine exactly how much the President is proposing to spend on this initiative. See CRS Report RS21744 for more on FY2005 funding, specifically.
- A Commission on the Implementation of U.S. Space Exploration Policy was created by the President to advise NASA on implementation of the policy. 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

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[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].

improve our lives in countless ways." The President said that returning to the Moon was an important step for the space program because establishing an extended human presence on the Moon could vastly reduce the costs of further space exploration. Since the Moon has less gravity than Earth, spacecraft assembled and provisioned there could be launched using less energy, and therefore at lower cost, according to the President.

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.spacefoundation.org/].

Congressional Reaction. The committees that oversee NASA's budget (House Science, Senate Commerce, and House and Senate Appropriations VA-HUD-IA subcommittees) have held several hearings. Committee members on both sides of Capitol Hill and of both parties have expressed concern about the potential cost, the possible impact on other NASA activities, and other issues. The House Appropriations Committee's version of the FY2005 VA-HUD-IA appropriations bill (H.R. 5041, H. Rept. 108-674) cuts NASA's total request of $16.2 billion by $1.1 billion, including significant cuts to exploration initiative projects. The committee expressed support for the initiative, but said they had insufficient resources to fully fund it. Cuts included $230 million from the $438 million requested for Project Prometheus, all $428 million from the Crew Exploration Vehicle, all $70 million from robotic lunar probes, $103 million from the $309 million for bioastronautics research, and $190 million from the $1.9 billion in the space station line item.

Comparison with President George H.W. Bush's 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,[4] 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

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[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] 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.

and go on to Mars. He said: "Why the Moon? Why Mars? Because it is humanity's destiny to strive, to seek, to find. And because it is America's destiny to lead."

Major Features of the 1989 "Space Exploration Initiative". The program was known as the Space Exploration Initiative (SEI). The major goals were building the space station as a stepping stone to returning humans to the Moon and someday sending them to Mars, though dates were not set. In response to congressional criticism that the plan lacked specifics, the senior President Bush gave a speech in May 1990 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 speech that fulfilling the goals would cost $400 billion over 30 years. Other cost estimates (some higher, some lower) were offered later by NASA, but no decision was made on exactly how to proceed, so detailed cost estimates were not provided. Mr. Darman's original estimate continues to be the one most often associated with the SEI program. NASA was the lead agency for SEI, but it also involved the Department of Defense (DOD) and Department of Energy (DOE), which were involved primarily because of their work with NASA on a program (SP-100) to develop new nuclear power systems for space missions.

Congressional Reaction to the 1989 SEI. The initiative was announced during a period when Congress was attempting to cut government spending to reduce the federal deficit, and it 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. At first, OMB used a "maximalist" definition, labeling a number of existing programs in the NASA and DOD budgets as related to SEI. As opposition to the program grew, it became prudent to narrow the list of activities related to SEI and a "minimalist" definition was used thereafter. Under the "maximalist" definition, 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, using the "minimalist" definition, the NASA request for SEI was $94 million. Congress approved $32 million. For FY1993, the definition was revised again, and $64 million was requested for NASA. The FY1993 NASA authorization bill (P.L. 102-588) approved approximately half of that; the appropriations bill (P.L. 102-389) essentially zeroed it.

Similarities and Differences in the 1989 and 2004 Proposals. The senior President Bush's long term space goals were very similar to those enunciated by the current President Bush — return humans to the Moon and someday send them to Mars (the current President Bush adds that they also will go to "worlds beyond"). One difference is that the senior President Bush heralded the space station program, on which construction had not yet begun, as a stepping stone to the Moon/Mars goals. Today, construction of the space station is underway, and the space shuttle has suffered another catastrophic accident. (The shuttle's first accident, the explosion of *Challenger* 73 seconds after launch, was in 1986.) Thus, the current President Bush's plan sets end dates for both the space shuttle and space station programs. Another similarity is that the 1989 announcement was made when the federal budget deficit was high, as it is today. Congressional Quarterly (CQ Weekly, January 17, 2004, p. 131) points out that the political climate associated with deficits is not the same now, in the sense that there is less pressure for a balanced budget. Thus, the deficit's size does not necessarily imply that the

proposal will meet the same fate. Nonetheless, cost is a major issue as Congress debates the proposal.

Key Issues for Congress

Although most media accounts of the Bush initiative 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. Among the questions being asked are:

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 upgrades, if any, to the shuttle should NASA continue to pursue? What new launch vehicle(s) may need to be developed?
- 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 the other ISS partners without the shuttle to take crews and cargo to and from ISS during the operational period?
- If the shuttle is not terminated in 2010, must it be recertified? If so, what will it 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. Construction 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 construction was complete. Now, the research program would be redirected to support only that which is needed for the new initiative, and the NASA "sand chart" shows NASA funding for ISS

ending in FY2017 (although NASA Administrator O'Keefe states 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 ($32 billion through FY2003) 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 on Moon and Mars exploration?
- What will happen to the space station when NASA ends funding for it? Will it be turned over to the other partners to make use of as they wish? 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.
- What role should the private sector play in the exploration initiative?
- What countries should be invited to join? Should China be included? Or India, which has announced plans to send a robotic probe to the Moon? 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?