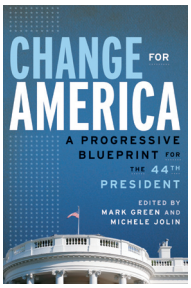
Center for American Progress Action Fund

NEW DEMOCRACY PROJECT

# The U.S. Space Program

## Restoring Preeminence in Space Science and Exploration

By Neal Lane and George Abbey




This chapter is part of an online effort by the Center for American Progress Action Fund and New Democracy Project to offer expert advice to the new administration as part of its *Change for America* book project.

The United States has maintained a proud record of leadership in space—in the realms of science and human exploration—for over four decades. The Apollo program, which will go down in history as one of the greatest achievements of all time, captivated the imaginations of thousands of young people. These same young people went on to become the nation's scientists, mathematicians, and engineers, a brain trust for U.S. industry that fueled American progress for decades.

More recently, the planetary and astronomy missions, such as the Hubble Space Telescope, have completely changed our understanding of the universe in a human lifespan. The International Space Station, or ISS, which involves close partnerships with Russia and several other nations, is an incredible accomplishment. When it is completed, it will represent the largest international cooperative technological project in history.

But the future of the U.S. space program is very much in doubt. In spite of continued great accomplishments, a number of setbacks—including the tragic shuttle accidents—combined with a series of bold pronouncements by the Bush administration followed by inadequate funding, have led to serious questions of the nation's commitment to space and, consequently, to a steady erosion of NASA and the aerospace industry that supports its missions.

On January 14, 2004, President George W. Bush joined the act, announcing his Vision for Space Exploration, a bold plan for the U.S. space effort to complete the ISS and phase out the space shuttle by 2010. In its place, the president's VSE program would design and build a replacement shuttle by 2008 and fly it by 2014—returning humans to the moon by 2020 and preparing for missions to Mars. NASA quickly reset its priorities, pushing science further down the list.

Critics of President Bush's plan expressed a number of concerns, calling the plan bold but incomplete and unrealistic.[1] First and foremost, the mandate to stop flying the space shuttle in 2010 meant the United States would depend on Russia for human access to

space for at least four years, but more realistically a decade. President Bush and NASA also made clear that the president's VSE would be a U.S.-led effort.

Now that the Europeans and the Japanese finally have their research modules installed on the station, and can gain a return on their substantial investment, it must be galling to be told that Washington will simply cut their lifeline by ending shuttle support (with its critical up-and-down mass capability) and yet not welcome access to the new VSE program. The arbitrary decision to stop flying the shuttle signaled that the United States is no longer interested in the ISS, and that after 2010 other nations are pretty much on their own. NASA plans to buy trips to the ISS on Russian Soyuz and Progress (cargo) spacecraft, but with relations between the United States and Russia at a low point Congress has already questioned this arrangement.

President Bush's vision, however, was incomplete in other ways. No cost estimates were presented for returning humans to the moon. The commitment by the president was to add $1 billion to the NASA budget each year for five years—far short of what would actually be required to build a new space vehicle and prepare for a return to the moon. The cost of Apollo was approximately $135 billion in 2004 dollars, but the president did not request even these small increases. Former Sen. John Glenn of Ohio has called the Bush VSE program "one of the biggest unfunded mandates that we have had in all of government history." [2]

As for space-based science, President Bush's 2004 speech and NASA press releases signaled that science would not be a priority. As NASA has scraped to find the money to fund the VSE program, science has paid the price with large cuts in its research programs, space-based science missions, including earth observation satellites, and the aeronautics program. A comprehensive look at President Bush's budget for research and development in fiscal year 2009 shows the National Aeronautics and Space Administration budget would grow $497 million or 2.9 percent to $17.6 billion, but the science portfolio would be cut by 5.6 percent and aeronautics research would be reduced by 13 percent.

Meanwhile, the VSE program is in trouble. Progress on developing the new "Constellation" space vehicle—the Orion crew exploration vehicle riding on a new Ares I rocket—has been delayed due to a number of significant technical design problems. Even if all these problems can be solved given more time and money, the new system falls far short of the shuttle in many ways. For instance, the Orion capsule, a larger version of the 1960s Apollo capsule, does not allow for extravehicular activity, cannot stay long in orbit, carries no payload up or back, and requires a water landing.

Given budget and manpower shortfalls, NASA is unable to provide firm cost estimates for the projects, while tight White House deadlines continue to put pressure on both the Ares I and Orion projects. Both projects are likely to experience substantial schedule slips and growth in costs. The best advertised estimate of when the Constellation might fly is 2015, though realistically it could be much later. We could be looking at a flight gap as great as eight years, perhaps more. And all the while, science will continue to be held hostage.

The frustration of NASA's administrator, Michael Griffin, is clear from his words in a recently published email. "It will appear irrational—heck, it will be irrational—to say we've built a Space Station we cannot use, that we're throwing away a $100 billion investment, when the cost of saving it is merely to continue to flying the Shuttle."[3]

NASA is trapped by expectations it cannot meet and promises not kept. Morale at NASA is at a low point, many of the agency's most experienced workers are retiring, and NASA as well as the aerospace companies face dire manpower challenges. Early decisions need to be made by the new president, and those decisions will determine whether the United States continues to lead in space or cede that position to other nations.

## Recommendations

The new president should immediately assign White House coordination of all non-defense space activities to his science advisor, the assistant to the president for science and technology, who will also serve as director of the Office of Science and Technology Policy. In the first 100 days, the president, with the advice of his science advisor, should appoint a commission to assess the current status of the U.S. space program and make specific recommendations for necessary actions in both the short term and the long term.

Specifically, the decision to phase out the shuttle by 2010 should be reconsidered; it should be flown until a suitable replacement becomes available. Talks with our international ISS partners should be held to openly discuss the future of the ISS and commitments by the partner nations. The Vision for Space Exploration should be reevaluated and modified to reflect realistic goals and expectations of future budgets, manpower, national priorities, and opportunities for international cooperation, including access to the program for our space partners. And any future plans by the United States to return women and men to the moon and someday to Mars should involve many U.S. federal agencies, universities, and industry, and should be fully international in scope.

In the meantime, science, including earth observations, should be restated as a top priority for NASA. Wasteful cuts and delays in science missions should be reevaluated and, where warranted, restored. Coordination between NASA, the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey should be strengthened. Consideration also should be given to the suggestion that NOAA and USGS be combined to form a new Earth Systems Science Agency.[4]

The steady decline in funding for NASA's aeronautics programs—down 32 percent between FY2004 and 2007—should be reversed. And a group of eminent aeronautical experts from the government, academia, and industry should be constituted and charged with laying out a roadmap for a revitalized NASA aeronautics program, along with supporting test facilities that would provide the research and development to ensure U.S. leadership in this critical discipline.

A key stated objective of all NASA's research and technology programs should be to excite a new generation of scientists and engineers and rebuild scientific and technical expertise within NASA and across the nation—a critical need highlighted in the National Academy report "Rising above the Gathering Storm."[5] NASA's research center structure should be reestablished with this objective in mind.

A revitalized NASA will be essential to ensure U.S. leadership as a strong international partner in the peaceful uses of space. Over these past eight years, there has been a movement urging U.S domination of space. We should heed instead the words of John F. Kennedy:

> *"We set sail on this new sea because there is new knowledge to be gained, and new rights to be won, and they must be won and used for the progress of all people. For space science, like nuclear science and all technology, has no conscience of its own. Whether it will become a force for good or ill depends on man…"*

Our civil space activities must continue to play a preeminent role in making President Kennedy's words a reality.

## Endnotes

1 George Abbey and Neal Lane, "United States Space Policy: Challenges and Opportunities" (Cambridge, MA: American Academy of Arts & Sciences, June 2005).

2 Brian Berger, "John Glenn Calls Bush Space Vision an Unfunded Mandate," Space News, July 21, 2008, available at http://www.space.com/news/080731-glenn-bush-space-vision.html

3 Robert Block, "Frustrated NASA chief vents about agency's fate," *Orlando Sentinel*, September 6, 2008, available at http://blogs.orlandosentinel.com/news_space_thewritestuff/2008/09/frustrated-nasa.html.

4 Mark Schaefer et al, "An Earth Systems Science Agency." *Science*, July 4, 2008, pp 44-45.

5 "Rising Above the Gathering Storm" (Washington, D.C.: National Academies Press, October 2005).

## About the authors

**Neal Lane** is the Malcolm Gillis University Professor and Senior Fellow of the James A Baker III Institute for Public Policy at Rice University and served in the Clinton Administration as science advisor to the President and director of the National Science Foundation.

**George Abbey** is Senior Fellow of the James A Baker III Institute for Public Policy at Rice University and former director of the NASA Johnson Space Center in Houston, Texas.