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The New U.S. Space Policy

***Editor's Note**: With the retirement of its space shuttle fleet in 2011, the United States will close a long and troubled chapter in the history of human spaceflight. This trio of articles considers what might come next. Jeff Foust reports on the new space policy approved by the president and Congress, and the continued political wrangling over it. Robert Zubrin argues that the space age could learn a thing or two from the age of the Iron Horse. And Rand Simberg explains why NASA needs a policy in keeping with the time-tested values that have made America great.*

NASA's Course Correction

Jeff Foust

While presidents do not devote much attention to space policy during their tenures, each has the opportunity to reshape—or at least attempt to reshape—the nation's civil space program while in office. Some have been successful in their efforts, the canonical example being John F. Kennedy's pledge to land a man on the Moon by the end of the decade. Others have failed, as when George H.W. Bush's proposed Space Exploration Initiative fell victim to congressional sticker shock and political infighting.

Now, the current president, Barack Obama, is attempting to put his own stamp on space policy. Rather than going back to the Moon, as his predecessor, George W. Bush, sought to do with the Vision for Space Exploration, President Obama has proposed a very different direction for NASA's human spaceflight plans, with a greater emphasis on technology development and commercial capabilities and a reduced emphasis on traditional government programs. That approach set off perhaps the most heated debate about American space policy in a generation.

The proposed new NASA space exploration policy had its roots in an independent review of the agency's existing plans, commissioned by the administration in May 2009. The Review of U.S. Human Space Flight Plans Committee (more commonly called the Augustine Committee after its chairman, retired Lockheed Martin CEO Norm Augustine) spent the summer of 2009 examining the progress NASA had made on Constellation, the system of launch vehicles and spacecraft designed to implement the Vision for Space Exploration, and various alternatives.

In its final report in October 2009, the Augustine Committee concluded that, while Constellation was a "reasonable architecture," it had not been funded sufficiently since its inception, resulting in delays. Although NASA had been planning the first crewed flight of the Orion spacecraft on its Ares I rocket in 2015, the committee found that it would likely be pushed back to 2017 or later. Worse, the Vision's central goal—returning humans to the Moon by 2020—would be delayed virtually indefinitely under the projected long-term funding profile for NASA. "The U.S. human spaceflight program appears to be on an unsustainable trajectory," the committee's report noted.

The committee offered the Obama administration several options but no specific recommendations for alternative architectures for and approaches to human spaceflight. The administration then began working behind the scenes for several months to draw up a new plan, while the space community—industry, contractors, advocates—anxiously waited to see what changes, if any, the White House planned for NASA.

The answer came on February 1, 2010, with the release of the White House's annual budget proposal, which included its plans for NASA. That remarkably low-key rollout, however, belied the major changes the budget proposal contained. While increasing the agency's overall budget somewhat—from $18.7 billion in 2010 to $19 billion in 2011, rising to nearly $21 billion by 2015—the proposal cancelled the entire Constellation program, including the Ares I and Orion. Under this plan, the Vision for Space Exploration was effectively dead.

In its place, the administration proposed several new directions for NASA. There would be a greater emphasis on technology development, including specifically for a heavy-lift launch vehicle, leading to a decision by 2015 on a design for such a vehicle for future, unspecified human exploration beyond Earth orbit. Meanwhile, the International Space Station (ISS), in danger of being shut down and deorbited as early as 2016

under the Vision, would be continued through at least 2020. NASA would also invest $6 billion over five years to develop commercial capabilities to transport astronauts to and from the ISS, analogous to the commercial cargo development efforts already underway as part of the Vision.

"I believe we have a robust program here that I believe will get us certainly beyond low-Earth orbit, to the Moon, to the asteroids, with our partners on a timetable that would definitely beat where we would have been heading," concluded NASA deputy administrator Lori Garver during a media teleconference announcing the plan. However, not everyone agreed with that assessment.

The release of the proposal kicked off an extended debate about the space agency's future, pitting advocates of Constellation, including companies working on the program and members of Congress representing districts where the work was being done, against entrepreneurial "NewSpace" companies and others seeking a different direction for human spaceflight. While past debates about NASA have focused on its level of funding, in 2010 nearly everyone accepted without question the $19 billion figure the administration proposed. Instead, the discussion was about how best to spend it.

Supporters of Constellation leapt to the program's defense, citing the progress that the program had made, such as the Ares I-X suborbital test flight the preceding October. Without a clear successor to Constellation in place, they warned, the United States would be in danger of ceding for an indefinite length of time its leadership in human spaceflight to Russia, China, and other countries. "This budget effectively ends America's leadership in human space exploration," claimed Representative Bill Posey (R.-Fla.) in a statement after the budget proposal's release.

Coupled with those strategic concerns were worries about job losses in places like Alabama, Florida, Texas, and Utah—which build or manage elements of Constellation—should the program be cancelled. Along with layoffs already planned with the impending end of the space shuttle program, local officials in those places worried about additional losses of thousands or even tens of thousands of jobs, all during the worst economic crisis since the Great Depression.

Many of those critical of the proposal to kill Constellation also opposed the proposal to develop a private-sector capacity to carry astronauts to space. Their worries stemmed from a perceived lack of experience by commercial space companies in human spaceflight. The prime example of

such companies was SpaceX, the firm founded by high-tech entrepreneur Elon Musk in 2002 to develop low-cost launch vehicles and one of two companies with NASA awards to develop ISS cargo transportation systems. At the time of the budget's release, SpaceX had yet to perform the first launch of the Falcon 9—the rocket it was developing for those ISS missions and other applications.

"This request represents nothing more than a commercially-led, faith-based space program," Senator Richard Shelby (R.-Ala.), the most strident critic of the administration's commercialization plans, said at an April 2010 hearing on the NASA budget. "Today, the commercial providers that NASA has contracted with cannot even carry the trash back from the space station much less carry humans to or from space safely."

Proponents of the commercial crew initiative countered that not only could such an approach close the post-shuttle gap in U.S. human spaceflight faster than Constellation, it could bring into the mix companies much more experienced than SpaceX. Two such companies are United Launch Alliance, the joint venture of Boeing and Lockheed Martin that manufactures the Atlas and Delta rockets used by NASA and the Defense Department for satellite launches, and Boeing itself, which has proposed developing a crew capsule called the CST-100. Both were among five companies that received a total of $50 million in NASA funds in early 2010 to refine their concepts.

"I think we're uniquely positioned to deliver safe and reliable transportation that is also affordable in a commercial environment," said John Elbon, vice president and program manager for commercial crew transportation systems at Boeing, in a September 2010 press conference. To demonstrate the commercial viability of Boeing's efforts—another issue of concern to critics of the Obama proposal—the aerospace industry giant is partnering with Bigelow Aerospace, a small Las Vegas company developing commercial orbital habitats, on developing the CST-100. Boeing also has an agreement with space-tourism operator Space Adventures to sell extra seats on any CST-100 missions to the ISS.

Those commercial crew developers, though, would be limited to providing access to the ISS and elsewhere in low-Earth orbit. Another criticism of the plan the Obama administration announced in early 2010 was that it provided no clear vision of where humans would next go beyond Earth, and by when. The goal of returning to the Moon by 2020 was clearly eliminated, but there was nothing to replace it. "Leaving NASA with no

detailed plan or timeline for exploring beyond Earth's orbit will cede our international leadership in space, cost our country the numerous economic benefits of human spaceflight, and fail to inspire this and future generations to excel in science and technology," said Representative Suzanne Kosmas (D.-Fla.), whose district includes the Kennedy Space Center.

NASA officials said that the lack of specific destinations and schedules was deliberate, allowing the agency to develop capabilities that could be used to reach any number of places in the solar system, including the Moon, in the future. That approach resembled the "flexible path" architecture that was one of the options presented in the Augustine Committee report, eschewing an immediate return to the Moon in favor of asteroid and other missions, allowing NASA to spread out the costs of developing landers and other surface systems. "Rather than setting those destinations and timelines, we're setting goals for capabilities that can take us further, faster, and more affordably into space," said Garver.

After the initial reaction to the budget proposal, which played out in both public statements and congressional hearings, came the harder work of turning that budget proposal into both an appropriations bill as well as a separate NASA authorization bill, setting policy for the agency. And while opponents of the administration's plan repeatedly stated the proposal was dead, both Congress and the White House were searching for a compromise.

The administration altered its proposal in an April 15, 2010 speech by President Obama at the Kennedy Space Center. In it, he announced that the Orion spacecraft would be retained, but only as a "lifeboat" for the ISS. He also laid out a series of destinations and deadlines of the sort that the plan's critics had been seeking: a human mission to a near-Earth asteroid by 2025 and a human mission to orbit Mars in the mid-2030s. "And a landing on Mars will follow," the president added. "And I expect to be around to see it."

By summer, the House and Senate had developed dueling versions of NASA authorization legislation. The Senate version was closer to the administration's proposal, providing funding for technology development and commercial crew programs, although at a somewhat lower level than the president's request. The Senate bill, though, called for continued development of what it called a "Multi-Purpose Crew Vehicle"—Orion, for all intents and purposes—that would be launched by the "Space Launch System," a heavy-lift vehicle initially capable of launching 70 to 100 tons to

low-Earth orbit but upgradable to a 130-ton version. That vehicle, per the Senate bill, would have to be ready to enter service by the end of 2016.

The House took a different tack, effectively rescuing both Ares I and Orion in its version of the bill and deferring work on a heavy-lift vehicle. It also approved little funding for commercial crew development: just $150 million a year, most of that in the form of government loan guarantees, compared to the administration's proposal for $500 million in 2011, increasing to over $1 billion per year in 2012 and later. During a hearing about the bill by the House Committee on Science and Technology, members rebuffed efforts to increase funding for commercial crew while others argued for even deeper cuts. "This is the epitome of socialism and corporate welfare," declared Representative Alan Grayson (D.-Fla.) at one point in the hearing.

The Senate's bill sailed through, passing the full Senate by unanimous consent without any floor debate. The House version, though, stalled after some members objected to the technology and commercial crew cuts in the bill and blocked efforts to bring it to a vote. By late September 2010, with still no movement on the House bill, sponsors decided to replace their version with the Senate bill. After a short debate on the House floor where members warned of dire consequences if the bill didn't pass, the House approved the bill by a margin of more than 2 to 1. President Obama signed the authorization bill into law on October 11.

The passage of the authorization bill, though, marks the end of only the first chapter of the debate about NASA's future. Congress is not expected to pass appropriations bills for fiscal year 2011, instead using a process of continuing resolutions and rescission bills to shape the budget—thus creating uncertainty about how much money the agency will actually receive. Moreover, growing concern about massive budget deficits has led to calls to reduce spending—suggesting that the agency's budget could be cut in future years, jeopardizing its ability to carry out the work that Congress has assigned it. Some also wonder whether, even in the best conceivable funding scenario, it is possible for NASA to develop a giant new launch vehicle in six years, given the delays it encountered with the much smaller Ares I. The act "contains a rocket designed not by our best engineers but by our colleagues over on the Senate side," warned Representative Gabrielle Giffords (D.-Ariz.) during debate in the House about the legislation, adding that the rocket would likely cost "significantly more" than the Senate estimated and would "become operational years later than the Senate plan assumes."

There will also be continuing examination of the commercial sector's capabilities to fly astronauts to the ISS, but developments in 2010 may begin to assuage those fears. SpaceX successfully launched its Falcon 9 rocket for the first time in June, placing a demonstration payload into low-Earth orbit; six months later, a second successful launch put a cargo spacecraft into orbit, where it performed a series of maneuvers before reentering and splashing down in the Pacific off the coast of Baja California. SpaceX declared the flight a complete success, and Elon Musk went so far to say that had the spacecraft carried a person, he would have enjoyed "a very nice ride."

Even assuming that the budgetary and technical hurdles are met, there may be a bigger challenge to sustaining the Obama plan's long-term goals, including the visions of human missions to asteroids and to Mars. The future of these plans could well depend on how much progress has been made by the time the next president takes office, be it in 2013 or 2017. The next administration may want to reconceive American space policy yet again, implementing another major policy shift. Such lapses in strategic continuity may be a regrettable but unavoidable consequence of our democratic system of government. But they also point to one of our nation's great strengths—an ability to adjust our priorities and programs in the face of evolving technical, budgetary, competitive, and political realities. As frustrating as these strategic shifts can be for those of us who want to see indisputable progress in space, they are, oddly, part of what makes America's space program distinctly American.

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