

Statement of Dr. John P. Holdren
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Executive Office of the President of the United States
to the
Committee on Commerce, Science, and Transportation
United States Senate
on
The Future of U.S. Human Space Flight
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Chairman Rockefeller, Ranking Member Hutchison, and Members of the Committee, I am pleased to appear before you today to discuss the Administration's new strategy for U.S. human space exploration activities. I welcome the opportunity to provide additional information about these plans.

Let me be clear at the outset: This Administration is steadfast in its commitment to space exploration and to the mission of the National Aeronautics and Space Administration (NASA), as emphasized by the President in his speech at the Kennedy Space Center on April 15. Space exploration plays a vital role for our nation in advancing scientific discovery, stimulating technological innovation, enhancing our economic strength, and promoting international leadership. And the President fully recognizes the space program's unique capacity to inspire future generations of scientists and engineers as we continue to forge new paths in pursuit of unprecedented discoveries and unimagined wonders in space.

The Obama Administration came into office facing a broad range of challenges, not least of which were the technical and budgetary difficulties of the U.S. human spaceflight program – Constellation – that we had inherited. Given the significant investments in funds and scientific capital entailed in that effort, we concluded that it was essential to obtain a fresh and objective assessment of the status of the program, as well as of the options going forward. OSTP and NASA stood up, for that purpose, an independent blue-ribbon panel, the Committee to Review U.S. Human Spaceflight Plans. Led by the distinguished aerospace engineer Norman Augustine, the committee comprised ten experts of diverse experience – in the U.S. government, the military, industry, and the astronaut corps -- relating to the technology, management, and practice of human spaceflight. I believe the intensive review they conducted over a period of five months last year was the most open, transparent, and participatory Federal Advisory Committee activity relating to space ever undertaken.

The Augustine Committee's thorough and thoughtful analysis helped illuminate the range and severity of the challenges faced by the Constellation program --making clear that it had become "unexecutable" under any plausible set of assumptions about costs and budgets going forward – as well as clarifying the options for revamping U.S. human spaceflight activities so as to maximize what could be achieved under budgets that might realistically be available. Most fundamentally, the Augustine report made clear that Constellation had been plagued from the beginning by a mismatch between plans and available resources, and that it had been hindered as well by decades of underinvestment in new technology and innovation at NASA.

The report showed, more specifically, that the new rocket intended to carry U.S. astronauts to low Earth orbit (initially to the International Space Station (ISS) and later in support of lunar missions) after retirement of the Space Shuttle in 2011, the Ares I, was far over budget and so far behind schedule that it wouldn't be available until after the space station had been scrapped at the end of 2015 in pursuit of savings to help pay for the rocket. The program's stated goal of returning U.S. astronauts to the surface of the Moon by 2020, moreover, using a much larger rocket (Ares V) and a lunar lander that were both still on the drawing board, was no longer within reach regardless of how much money might be spent on it. And under plausible NASA budgets going forward, the Constellation program could not have put U.S. astronauts back on the Moon until sometime after 2030.

In addition to scrapping the \$100 billion International Space Station before it had achieved more than a fraction of its scientific and technology-development potential, as well as suffering a six- or seven-year gap in U.S. capability to lift its own astronauts into low Earth orbit, persisting with the pursuit of the increasingly costly Constellation program while nonetheless failing to meet its objectives would have the further liability of continuing to short-change NASA's other critical activities, including robotic missions and space telescopes, Earth observation, and aeronautics. Clearly it was time to press the reset button.

Accordingly, a decision-support process engaging NASA and the White House was initiated to home in on and flesh out a set of options for revamping NASA's human spaceflight efforts – drawing on the Augustine committee's findings and aiming to maximize the level of activity and achievement attainable under realistic budgets – for the President's consideration in connection with the preparation of his FY2011 budget proposal. The result was the set of proposals for NASA's budgets and activities in FY2011-2015, which were rolled out as part of the President's budget request on February 1 and further elaborated in his speech at the Kennedy Space Center on April 15.

Before turning to the ingredients of the new plan, I want to make one further important point about the old one. The President and I – and I know Administrator Bolden – are immensely grateful for the hard work and commitment shown by the men and women of NASA's government and industry workforce for the Constellation program. The mismatch of aims and resources in that program was not their fault. Nor will their efforts have been wasted – much of the knowledge and technology they have produced will be built upon in the new plan. More than that, it's our aim to put their skills and passions to work in the revamped program to the greatest extent that we can. These men and women are a national resource, and the Administration is committed to applying their expertise to a range of national challenges and needs. .

The President's new strategy for maintaining and extending U.S. leadership in human space exploration has a number of important elements. Key among them are:

- (1) extending the life of the ISS to at least 2020, thereby deriving significantly increased benefits from it in science and technology demonstration, providing a locus and focus for increased U.S. astronaut presence in space over the decade ahead, and maintaining the valuable international partnership in space that the ISS represents;

- (2) catalyzing the development of, and then acquiring commercially provided crew and cargo transportation services to the ISS, resulting in what we believe will be more timely and cost-effective U.S. capabilities for this purpose than the previous program;
- (3) substantially increasing our investments in transformative technologies that can expand the reach and reduce the costs of human exploration of deep space, thereby beginning to reverse decades of under-attention to this critical need;
- (4) investing in heavy-lift propulsion R&D, which together with our technology investments will help inform a decision by no later than 2015 on the heavy lift vehicle design that we will pursue and build;
- (5) building a scaled-back version of the Constellation program's Orion crew capsule to provide crew emergency-escape services for the ISS and to provide part of the technological foundation for the advanced spacecraft to be used in future deep-space missions;
- (6) pursuing a series of increasingly demanding human-exploration missions to include a mission to an asteroid by 2025 and an orbital Mars mission in the mid-2030s, demonstrating key capabilities for a later Mars landing while also achieving historical firsts in exploration and discovery; and
- (7) ramping up robotic exploration of the solar system, including missions to "scout" the human trips to follow, as well as conducting the Earth observations necessary to improve our understanding of our climate and planetary home.

This new plan revolves around certain core strategic themes and priorities – achieving a long-needed revitalization of our technology R&D efforts, matching program goals with available resources, partnering with industry in fundamentally new and more effective ways, advancing scientific discovery, and pursuing human exploration with a more flexible, achievable, and affordable set of goals. It is designed to take us ultimately further, faster, to more places in deep space, while spurring the creation of new industries, technologies, and jobs along the way. These activities and approaches together will prove vital for the long-term sustainability of our human spaceflight activities and will help place these programs on a more stable footing for years to come.

I also would like to take this opportunity to provide additional information about certain program elements that the President highlighted on April 15 and that I touched on earlier.

The ISS and a Crew Rescue Vehicle

Under the Constellation program Orion was to be the crew capsule used to transport astronauts to the vicinity of the Moon before trips to the surface using the Altair lander. Orion was also to provide crew transportation to the ISS, where it would have docked for six months before returning crews to the Earth. Though the Orion was to fulfill the ISS mission objectives first, it was not designed primarily for that purpose. Rather, NASA initiated Orion's development with the objective of making it a lunar-capable spacecraft that also could meet the ISS servicing mission.

Developing an Orion-derived escape capsule to provide the ISS crew with assured return to Earth in case of an emergency is a less complex task than completing the Orion with its full suite of mission objectives, but this effort still brings important capabilities while enabling NASA to maintain critical skills in this area and continue to utilize its multi-Center, in-house team for spacecraft development. It will, as the President noted in Florida on April 15, provide “part of the technological foundation for advanced spacecraft to be used in future deep space missions.”

Heavy Lift Decision

The President also directed in his speech that NASA be in a position to select a heavy-lift rocket design by no later than 2015 for its future missions beyond Earth’s orbit. The President noted that “in developing this new vehicle, we will not only look at revising or modifying older models; we want to look at new designs, new materials, [and] new technologies...” The President’s budget includes \$3.1 billion over the next five years in support of research for new engine technologies, new materials, and engine demonstrations or prototypes that can prove vital to a future heavy lift vehicle. Further, NASA is developing initial plans for testing and demonstrating capabilities such as in-space fuel transfer and storage, in-orbit automated and autonomous rendezvous and docking, advanced in-space electric propulsion, and others that could be important in optimizing the characteristics of a heavy lift vehicle (i.e., as part of a future exploration architecture).

NASA will build and test, and in some cases fly in space, these new technologies over the next several years to assess their operational viability and collect information on their effectiveness and performance. NASA can at the same time conduct a variety of design trade studies on potential future approaches for a heavy lift launch vehicle, and by 2015 will be able to make a decision about future heavy lift development that is informed by the combination of lessons learned from these various technology developments and associated studies. It is currently anticipated that this decision would set the general configuration of the vehicle, as well as target performance levels and other attributes. A more detailed and mature design for this vehicle likely would need to be completed following this initial decision, as part of a subsequent development effort. This timetable will enable NASA to begin building a heavy lift launch vehicle two years earlier than was projected under the previous plan.

Workforce Support

There are job losses in store as a result of the retirement of the aging Space Shuttle fleet in early 2011, but that is not a new problem. The decision to retire the Shuttle in this timeframe was made in 2004 by the previous administration, based in part on the findings of the Columbia Accident Investigation Board and in part on the need to develop less costly as well as safer technology to get our astronauts into orbit. (A dilemma in an era of limited budgets is that the high cost of operating the Shuttle consumes the money that would be needed to develop its successor.) Several major independent reviews have affirmed that winding down the Shuttle program for these reasons is the right decision.

The administration recognizes the pain and hardship of Shuttle job losses in the communities affected, and we are taking a number of steps to reduce these impacts. The new plan contains \$1.9 billion over the next five years for modernization of Florida’s Kennedy Space

Center and associated facilities. The promotion of an expanded commercial space-launch industry will create new jobs in many of the places affected by Shuttle job losses, as will the \$3 billion that will go into new R&D on “heavy lift” rockets in this period and additional billions in other new technologies. It’s likely, given the additional spending in the new plan, that the magnitude of the Shuttle-related job losses will be smaller and their duration shorter under the new plan than under the old one. But they will still be real. Further steps the Obama administration is taking to mitigate them include the initiative for regional economic growth and job creation along the “Space Coast” that the President announced in his April 15 speech at the Kennedy Space Center.

As the President explained on May 3, that initiative will be led by a Task Force on Space Industry Workforce and Economic Development. Co-chaired by NASA Administrator Bolden and Secretary of Commerce Gary Locke, it will include membership from eleven other departments, agencies, and White House organizations, including my office. Its aim is to develop, in collaboration with local stakeholders, an interagency action plan for \$40 million in transition assistance intended to facilitate economic development strategies and plans along Florida’s Space Coast, and to provide training and other opportunities for affected aerospace workers so they are equipped to contribute to new developments in America’s space program, related industries, or other industries in the local area. This effort will build on and complement ongoing local and Federal economic and workforce-development efforts. A plan is due to the President by August 15 of this year.

Conclusion

I appreciate this Committee’s interest in and support for the U.S. human-spaceflight program and the other important missions of NASA. Certainly there are challenges ahead in moving forward with the revamping of these efforts that I and the other witnesses are discussing with you today. But I am convinced that it is the best way forward and optimistic that we can get it done. I look forward to continuing to work with you and others in the Congress to that end. I would be pleased to respond to questions.