

Written Testimony of

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Mr. Chairman, Ranking Member Johnson, members of the committee, colleagues: I am Ron Sega, Vice Chair of the National Research Council's Committee on NASA's Strategic Direction. On behalf of Albert Carnesale, chair of this committee and our 12 members, it is my pleasure to come before you today to speak to you about the work of our committee. The National Research Council (NRC) is the operating arm of the National Academy of Sciences, National Academy of Engineering, and the Institute of Medicine of the National Academies, chartered by Congress in 1863 to advise the government on matters of science and technology. In late 2011, the United States Congress directed the NASA Office of the Inspector General to commission a "comprehensive independent assessment of NASA's strategic direction and agency management." Subsequently, NASA requested that the NRC conduct this independent assessment. In the spring of 2012, the NRC Committee on NASA's Strategic Direction was formed and began work on its task. (The full Statement of Task appears at the end of this written testimony.) I am here to report on the results of that study.

Our committee was charged with considering "the strategic direction of the agency as set forth most recently in 2011 NASA Strategic Plan and other relevant statements of space policy issued by the President of the United States." We were also charged with considering the goals of the agency as set forth in the 1958 National Aeronautics and Space Act as well as recent legislation, and with assessing the relevance of NASA's goals to national priorities. Finally, we were charged with recommending "how NASA could establish and effectively communicate a common, unifying vision for NASA's strategic direction that encompasses NASA's varied missions." Our committee was not charged with establishing strategic goals for NASA, and we did not do so.

Our committee consisted of members from industry and academia, former NASA aerospace officials, and former analysts and experts from both the executive and legislative branches. We met five times throughout 2012. The committee received input from nearly 800 members of the public through a web-based questionnaire, and small groups of committee members visited each of the nine NASA field centers and the Jet Propulsion Laboratory (JPL). Furthermore, the committee considered a large number of studies conducted by the NRC and other groups over the decades that made recommendations about the conduct of NASA's programs and the agency's future, as well as NASA's strategic plans dating back to 1986. The resulting report entitled: "NASA's Strategic Direction and the Need for a National Consensus" is a consensus report by the committee.

As I am sure you are aware, NASA has been tugged in multiple directions for the past several years. The agency has had many astonishing accomplishments. Just this past summer NASA landed the Curiosity rover on Mars, and spacecraft such as Cassini (which is orbiting Saturn), MESSENGER (which is orbiting Mercury), and New Horizons (which is speeding toward Pluto) are greatly expanding our understanding of the solar system and our place in it. Both the Hubble and Kepler space telescopes continue to make remarkable discoveries about our universe, with Kepler discovering

dozens of planets orbiting distant stars. NASA spacecraft also collect vital data on Earth's condition and such information is used for many purposes, including improving computer models of how hurricanes form. NASA continues to operate, resupply, and maintain the International Space Station. NASA is also developing new commercial resupply and crew launch capabilities and working on a rocket and spacecraft to eventually take humans beyond low Earth orbit.

Despite these many, important activities, there remains a lack of consensus on the agency's future direction among the United States' political leadership. Without such a consensus, the agency cannot be expected to develop or work effectively toward long-term priorities. In addition, there is a mismatch between the portfolio of programs assigned to the agency and the budget allocated by Congress.

What we found during the course of our deliberations was rather obvious: although NASA develops a strategic plan on a regular basis, the agency itself does not establish its strategic goals. Those are developed by the national leadership, and the key stakeholders within national leadership do not always agree on the goals the agency should pursue.

After considering the current situation facing NASA, the information collected by the committee, and the committee's own deliberations, the committee prepared a final report with the following recommendations regarding NASA's strategic goals and plans:

Recommendation: The administration should take the lead in forging a new consensus on NASA's future that is stated in terms of a set of clearly defined strategic goals and objectives. This process should apply both within the administration and between the administration and Congress, and should be reached only after meaningful technical consultations with potential international partners. The strategic goals and objectives should be ambitious, yet technically rational, and should focus on the long term.

Recommendation: Following the establishment of a new consensus on the agency's future, NASA should establish a new strategic plan that provides a framework for decisions on how the agency will pursue its strategic goals and objectives, allows for flexible and realistic implementation, clearly establishes agency-wide priorities to guide the allocation of resources within the agency budget, and presents a comprehensive picture that integrates the various fields of aeronautics and space activities.

Recommendation: NASA's new strategic plan, future budget proposals prepared by the administration, and future NASA authorization and appropriation acts passed by Congress should include actions that will eliminate the current mismatch between NASA's budget and its portfolio of programs, facilities, and staff, while establishing and maintaining a sustainable distribution of resources among human spaceflight, Earth and space science, and aeronautics, through some combination of the kinds of options identified below by the committee. The

strategic plan should also address the rationale for resource allocation among the strategic goals in the plan.

To reduce the mismatch between the agency's activities and the resources allocated to it, the White House, Congress, and NASA, as appropriate, could employ any or all of the following four (non-mutually exclusive) options. The committee does not recommend any one option or combination of options, but presents these to illustrate the scope of decisions and trades that could be made.

- *Option 1.* Institute an aggressive restructuring program to reduce infrastructure and personnel costs to improve efficiency.
- *Option 2.* Engage in and commit for the long term to more cost-sharing partnerships with other U.S. government agencies, private sector industries, and international partners.
- *Option 3.* Increase the size of the NASA budget.
- *Option 4.* Reduce considerably the size and scope of elements of NASA's current program portfolio to better fit the current and anticipated budget profile. This would require reducing or eliminating one or more of NASA's current portfolio elements (human exploration, Earth and space science, aeronautics, and space technology) in favor of the remaining elements.

Each of the above sample options, with the possible exception of Option 2, would require legislative action. Every option except for Option 3 would require substantial changes within NASA in order to substantially address the mismatch between NASA's programs and budget. Before implementation of any such options, the advantages and disadvantages, including possible unintended consequences, would deserve careful consideration. For example, if not handled carefully, Option 1 could constrain future mission options or increase future mission costs if unique facilities needed by future missions were decommissioned. Option 1 might also diminish NASA's workforce capabilities if changes in policies were to prompt large numbers of key personnel to retire or seek other employment. To be effective, Option 2 might require congressional authorization for NASA to make long-term financial commitments to a particular program to assure prospective partners that neither NASA nor the Congress would unilaterally cancel a joint program. Option 3, of course, is ideal from NASA's perspective, but its selection also seems unlikely given the current outlook for the federal budget. Option 4 is perhaps the least attractive, given the value of each major element in NASA's portfolio.

The Role and Management of NASA's Field Centers

The success of NASA's past, present, and future endeavors in aeronautics and space would be impossible without the contributions of the field centers and JPL. However, changes in the goals, funding, staffing, and facility requirements of NASA programs, as well as changes in the goals, activities, and capabilities of other government agencies and industry, imply that changes in the operation of the NASA field centers are warranted.

During its visits to the NASA centers, JPL, and from testimony of NASA headquarters leadership, our committee heard that NASA's leadership desires more flexibility in general to manage their facilities. The committee determined that two particular areas where flexibility can be improved are especially relevant:

- *Personnel flexibility.* NASA is restricted by law from performing reductions-in-force (RIFs). The prohibition is currently in the 2010 NASA Authorization Act, which expires at the end of FY2013. Congress could act before then (for instance, in an appropriations act) to repeal that language—or could omit the language from new authorization and new appropriations acts. In addition, NASA could be given the ability to convert civil service positions to contractor positions in select instances.

- *Infrastructure flexibility.* The General Services Administration (GSA) imposes restrictions on government agencies charging less than fair market value for facilities, making it difficult for NASA to dispose of facilities it no longer needs. Easing such restrictions for NASA could save the government money by not having to maintain or demolish buildings no longer required by NASA. In addition, current regulations require that disposed property first be offered to state and local governments, a requirement that could slow down or hinder the ability to find private users. If NASA were given more authority to manage its infrastructure instead of leaving this process to GSA, the agency could take better advantage of opportunities in the private sector.

The committee recognizes that personnel and infrastructure restrictions have been imposed upon NASA, as well as the federal government in general, for many valid reasons. Naturally, any changes would require careful consideration and evaluation by the legislative and executive branches, but they demonstrate that not all solutions require additional money, and legislative and policy changes can play an important role as well.

Recommendation: With respect to NASA centers:

- The administration and Congress should adopt regulatory and legislative reforms that would enable NASA to improve the flexibility of the management of its centers.
- NASA should transform its network of field centers into an integrated system that supports its strategic plan and communications strategy and advances its strategic goals and objectives.

Although the committee lacked the capability and time to conduct the detailed supporting analysis required to make specific recommendations for changes in NASA's infrastructure, the committee did conclude that better coordination with other relevant government agencies is required:

Recommendation: NASA should work with other U.S. government agencies with responsibilities in aeronautics and space to more effectively and efficiently coordinate the nation's aeronautics and space activities.

The Role of International Cooperation

Today it is common to say that all future human spaceflight or large-scale Earth and space science projects will be international. Many U.S. leaders also assume that the United States will take the lead in such projects. However, U.S. leadership in international space cooperation requires that several conditions be met. First, the United States must have a program that other countries want to participate in, which has not always been the case. Second, the United States must be willing to have substantial responsibilities assumed by its partners. In the past, the approach of the United States to international partnership has too often been perceived as being based on a program conceived, planned, and directed by NASA. Third, other nations must be able to see something to gain, in other words, a reason to partner with the United States. Finally, the United States must demonstrate its reliability and attractiveness as an international partner.

Recommendation: The United States should explore opportunities to lead a more international approach to future large space efforts both in the human space program and in the science program.

Conclusion

The committee was impressed with the quality of personnel and the level of commitment of NASA's civil service and contractor staffs and with the superb quality of the work done by the agency in general. However, the committee also heard about the frustration of many staff with the agency's current path and the limitations imposed upon it by the inability of the national leadership to agree upon a long-term direction for the agency. Only with a national consensus on the agency's future strategic direction, along the lines described in this report, can NASA continue to deliver the wonder, the knowledge, the national security, and economic benefits, and the technology that has typified its history.

Thank you for the opportunity to testify. I would be pleased to respond to any questions the Committee might have.

Statement of Task

The National Research Council will appoint an ad hoc committee to assess whether the strategic direction of the National Aeronautics and Space Administration, as defined by the 2011 NASA strategic plan, remains viable and whether the agency's activities and organization efficiently and effectively support that direction in light of the potential for constrained budgets for the foreseeable future. In particular the committee will:

1. Consider the strategic direction of the agency as set forth most recently in 2011 NASA Strategic Plan and other relevant statements of space policy issued by the President of the United States.
2. Consider the goals for the agency set forth in the National Aeronautics and Space Act of 1958 (as amended) and the National Aeronautics and Space Administration Authorization Acts of 2005, 2008 and 2010.
3. Consider previous studies and reports relevant to this task.
4. Assess the relevance of NASA's strategic direction and goals to achieving national priorities.
5. Assess the viability of NASA's strategic direction and goals in the context of current budget expectations and stated programmatic priorities for the agency.
6. Discuss the appropriateness of the budgetary balance between NASA's various programs;
7. Examine NASA's organizational structure and identify changes that could improve the efficiency and effectiveness of the Agency's mission activities; and
8. Recommend how NASA could establish and effectively communicate a common, unifying vision for NASA's strategic direction that encompasses NASA's varied missions.

Any recommendations made by the committee will be predicated on the assumption that NASA's out year budget profile will be constrained due to continuing deficit reduction.