

## CRITICAL QUESTIONS

**The Future of NASA**

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President Barack Obama is about to appoint a new NASA administrator. NASA, while still the world leader in civil space, is facing daunting challenges.

**Q1: How can NASA restore the spirit of innovation, discovery, and global leadership while satisfying the political constituency of the national space program?**

**A1:** Last year, we celebrated the 50th anniversary of NASA. This year, we will mark the 40th anniversary of Apollo 11, the first human lunar landing. During the early years, NASA and its human spaceflight program were maybe the most visible symbols of peace, hope, and progress for all humankind, as well as a very powerful foreign policy tool that enabled the United States to demonstrate global leadership and exercise soft power. Since then, NASA has developed and diversified to the point that it appears ossified, overstretched, and isolated. Among the problems NASA faces today are a decreasing share of the federal budget, a risk-adverse culture generally incompatible with innovation, export regulations that impede international cooperation, an industrial consolidation that prevents true competition, and hard-to-kill, expensive legacy programs. Huge spending on the space shuttle and the International Space Station (ISS), while satisfying greatly the local constituencies, is not compatible with either the current NASA budget or its essential missions of innovation, inspiration, and discovery. There is no denying that the shuttle is an incredible machine and that the ISS is the most complex international infrastructure ever built, but NASA cannot stop here. This country is based on Joseph Schumpeter's principle of "creative destruction," which is a prerequisite for innovation. This concept has proven difficult to apply to NASA in the past, and the current economic situation makes it even more difficult. It is utopist and dishonest to expect NASA to keep the jobs of the past as well as create the jobs of the future, all within a flat budget. If the new administrator cannot make this case, will legacy programs get in the way of innovation and discovery?

**Q2: How can NASA structure a balanced space program geared toward innovation and discovery?**

**A2:** NASA's contribution to human spaceflight has been enormous. With the collapse of the Soviet Union, it remains the anchor player in this field—especially when one considers that NASA's budget of \$18 billion is higher than all the foreign space budgets combined—and should be able to aggregate partners in new ways and toward new goals, such as a return to the Moon. Further, human spaceflight remains the most inspirational activity within NASA. Every kid dreams of becoming an astronaut. The ISS is at the heart of NASA's leadership on human space exploration. Indeed, with the ISS now fully operational, it has to be utilized to prepare the future—the future of launch infrastructure beyond the shuttle and the future of international cooperation. With the emergence of new space-faring nations, such as China and India, the NASA administrator will need the full support and personal involvement of the president to take the next steps, just as previous presidents were involved in the inception and the evolution of the ISS program. Aviation is no human spaceflight, but it remains key for global and regional economic development. The new administrator should take a fresh look at the need for NASA to remain involved in this area. Security, environment, and air traffic management issues are indeed critical, but given the maturity of the industry and the role of other agencies such as the Department of Defense and the Federal Aviation Administration, this is an issue to consider. Beyond aviation and astronautics, NASA has developed, over the decades, a more varied portfolio. The science programs have achieved amazing results, with space telescope series—the freshly repaired Hubble being a striking example—robotic planetary exploration, and Earth observation satellites. With some \$5 billion a year, NASA's science program appears to be well funded when compared to other science and technology agencies like the National Science Foundation. On the other hand, Earth observation has been neglected in recent years, at a time when satellites have been directly identified as the source of data that enabled the 200 scientists of the UN Intergovernmental Panel on Climate Change (IPCC) to decrease the uncertainty around climate change and the contribution of human activity to global warming. Indeed, space

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made possible a global view and understanding of our planet. It seems that planet Earth has now entered a new era called “Anthropocene.” The new administrator will also have to consider NASA’s role in climate change research; should NASA be monitor and expert or should it simply support operational agencies, such as the National Oceanic and Atmospheric Administration (NOAA), which is likely to become a “climate service”?

**Q3: How can NASA balance national systems with international partnerships in a global space environment?**

**A3:** NASA should focus on the risky side of space activity, concentrating on projects with low technical readiness and on far space (beyond geostationary orbit) and on unique NASA needs, such as the super heavy Ares V rocket and the Deep Space Network. Anywhere a commercial entity can provide the service, the concept of public-private partnerships (PPP) should be applied. For example, there is no need for NASA to own its space telecommunication system—a PPP, similar to the one put in place by the British Ministry of Defense, would suffice and save tremendous tax payer dollars. NASA should also try to build synergies with other departments. For example, the Department of Defense could have a significant contribution to the launch transportation infrastructure, and the Department of Commerce, with NOAA, could take the leading role in observing the planet to understand climate change and mitigate and adapt to its effects. The Department of State has an important role to play with International Traffic in Arms Regulations (ITAR) export controls, and more importantly, with professional and timely foreign policy advice based on geostrategic analysis. The geostrategic and the space environments are very different now from when NASA was founded. NASA leadership should keep in mind that possibly the most important role of the agency is global leadership and that civil space is a foreign policy tool. The new administrator must strive to build closer relationships with current partners as well as involve emerging space nations. The spoke and wheel model of cooperation that was used for the ISS, and that integrates a collection of bilateral relationships, is likely not to work in the current environment, where many powerful space-faring nations or regions interact independently from the United States. Going back to the Moon will require new governance, multilateral coordination to promote interoperability, redundancy, and standards, and joint planning. The new administrator has the opportunity to reposition NASA as the global leader for space exploration.

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