



Raytheon

Thank you for inviting Raytheon to meet with you to express our views on future directions for NASA. As a global organization with more than 40 years' service to NASA, we understand the agency's vision, missions, and goals, and we are proud to once again be considered a part of the NASA team. The ideas and recommendations that follow spring from our experience supporting NASA programs, and providing integrated solutions in Information Technology, data systems, and program management to NASA and many of its partner agencies.

January 7, 2009

Science Programs

- Rebalance NASA's science portfolio around a new charter for earth system science. Currently, NASA science resources are divided almost equally among the four divisions of the Science Mission Directorate – Earth, Heliophysics, the Planets, and Astrophysics. Altering this balance can be challenging, but a rebalancing that is guided by value criteria rather than organizational constructs would support greater emphasis on earth science.
- The earth system science program and the future land imaging programs should have two parts – a research component and an operations support component. These two components should not be rolled together or forced to compete for resources. Trade-offs among research programs are fair, but trading operational needs for research needs is not appropriate.
- NASA has the potential to play a key role in the science that supports critical policy decisions regarding climate change and the environment. We recommend the view that this role may be leveraged by partnerships with NASA's peer operating agencies such as NOAA, EPA, USGS/DOI, and DOE. And we suggest that this urgent work is urgent not only because of its climatologically implications but, indeed, because of its national security implications.
- NASA is considering two exciting but expensive programs – a Mars sample return mission and a mission to the outer planets. Although each has merit, a decision to pursue both could lead to inadequate mission funding, even with outyear funding increments. In this as in other such science program decisions, Raytheon recommends that NASA choose and sufficiently fund one mission.
- Although NASA tends to anchor its science programs on the recommendations of the National Academy of Sciences, the agency has eliminated programs in microgravity science, human systems, and space biology. Although NASA may not need these programs today, America may need them tomorrow. Raytheon recommends their slow restart as part of a program to extract all the intellectual property we can from the International Space Station Program. We support a decadal study by the National Academy that would define when and how each program should be reinstated.

Aeronautics Programs.

- Fundamental aeronautics research can and should be a part of America's research portfolio. We support NASA's efforts to integrate its aeronautics research initiatives with those of the U.S. Air Force.
- NASA's Advanced Air Traffic program has shown considerable promise for increasing efficiency in the use of the Nation's airways, saving energy, and even saving lives. However, as with any generational change precipitated by technology, turning these promises into reality will require as much hard work on cultural and political issues as on scientific problems. This is an important research program at the national level and we recommend that the promise of research vs. the debate over economic and political realities (which is common to all science programs) be addressed in the Aeronautics program, as well as in the other areas of NASA research.

Agency Issues

- Raytheon fully supports NASA's campaign to gain greater leverage in managing its skill base. NASA must have the freedom to apply relevant talent to tasks that align with its missions rather than create tasks to match a fixed skill set. This directly applies to the Shuttle transition issues; it also applies to the agency as a whole.
- We share NASA's concerns regarding an apparent shrinking pool of qualified engineers. This is why we participate in several public/private partnerships on the college/university level, and why we sponsor Math Moves U, a program that introduces middle-school students to the exciting possibilities of careers in engineering and related fields. We recommend that NASA continue to seek ways to encourage young Americans to consider careers in engineering.
- Raytheon supports NASA's efforts to harmonize its IT infrastructure with its approach to cyber security. We have considerable value to offer in this arena, and in fact we have already assisted the agency in securing valuable intellectual and data assets. NASA is no less a target for hostile cyber attacks and intrusion than DoD or the intelligence community; therefore, a similar level of planning and protection is required.

Human Space Flight.



- Raytheon supports a NASA-led American manned space program that can provide inspiration and we believe manned beyond low earth orbit should be our next outward step.
- NASA should bring a Shuttle replacement launch system online ASAP. NASA needs to plan now to turn access to low earth orbit over to industry; we include low earth manned programs in this recommendation as well.
- COTS and COTS D should continue, but it is important to plan for schedule challenges and avoid creating overly aggressive dependencies. The long-term benefits of NASA programs that create a capability in industry are usually greater than those of programs executed by NASA internally.
- A firm shuttle phase-out plan makes good sense from policy, technical, and fiscal standpoints. “Manifest certain” allows an orderly phase-down of the supply base while providing management flexibility and the wherewithal to honor our international agreements.
- In many ways, NASA is a foreign policy instrument. The political choices we make as a Nation will drive the International component of the manned program.