

# Space Station and Manned Flights Raise NASA Program Balance Issues

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No one can fail to be entranced by observing courageous and highly trained men and women enduring the rigors of space flight and performing simple tasks under exotic and perilous conditions. I share, vicariously, in these adventures and keep a personal log of all space flights of human crews. But I am much more deeply and durably entranced by the achievements of space technology in advancing knowledge of our planet, of the solar system, and of the entire observable universe and in yielding applications of pervasive human importance.

Space science has two primary themes.

First, it seeks to establish the physical-chemical environment for all forms of life on Earth—on a global basis and in the most general sense. The work of space science delineates the long-term habitability of Earth and provides the basis for many utilitarian applications. Such applications are the product of intentional, hard-headed, and specific developments.

Second, space science addresses the detailed nature of the universe in which we live. Surely this is a worthy objective of an affluent nation.

The histories of the space programs of the United States, the Soviet Union and all other countries provide overwhelming evidence that space science is best served by unmanned, automated, commandable spacecraft—the obvious and only important exception being the study of human physiology and psychology under free-fall or low-g conditions.

Yet the U. S. civil space program continues to emphasize manned space flight. The underlying assertion—that such activities are essential to public support—is an ideological opinion, the validity of which has not been tested. Even if it were valid once (perhaps the 1960s), this assertion cannot survive as we gain experience and maturity. I submit that the assertion already is obsolete. Indeed it is an insult to an informed and intelligent citizenry.

The failure of our national policy of exclusive dependence on the manned

space shuttle for launching all spacecraft has been evident to practitioners for many years. The Challenger disaster dramatized the wrong-headedness and fragility of that policy and has, at last, brought these facts to public attention.

The disaster elicited different responses from the Defense Dept. and NASA.

Soon after the accident, Secretary of the Air Force Edward C. Aldridge, Jr., said, "We made a great mistake in planning exclusive reliance on the shuttle to deliver military payloads into space. Believe me, we will never make that mistake again." He placed the nearly-completed Vandenberg shuttle launch facility in

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caretaker status and resumed the procurement of several classes of unmanned, expendable launch vehicles.

In contrast, NASA passed up the opportunity to re-examine the validity of its policy of the 1970s and early 1980s and hunkered down to vindicate it. The agency has continued to devote a major fraction of its resources to manned flight. It has undertaken to remedy known weaknesses in the remaining shuttles and associated boosters; has initiated the procurement of a replacement shuttle, and has planned to continue still another costly project—the development of a large, permanently manned space station.

Congress gave belated recognition to the validity of such requirements by making minor modifications to NASA's requested authorization for Fiscal 1988.

Only within the past few months has NASA itself "nibbled the bullet" and expressed a tentative inclination to return to

a mixed fleet of manned shuttles and unmanned expendable launch vehicles. We must await the release of NASA's Fiscal 1989 budget proposal to learn the true intentions of the agency and the White House.

Meanwhile, no really comprehensive recovery of our civil space program has yet been achieved.

A steadily expanding NASA budget could respond to all of the diverse constituencies of the civil space program. But the public mandate for balancing the federal budget appears to negate such an expansive point of view. Hard choices must be made. There is no way that a shuttle fleet of three or four orbiters can meet the pent-up launching requirements of the next 10 years, especially if the space station goes forward.

The optimistic shuttle launch rate is 8-10 per year. At that rate, the shuttle system is the world's most expensive and least robust of available techniques and is grossly inadequate for national needs. Moreover, the launching of most candidate payloads does not require a human crew in the launch vehicle.

Surely the wisdom of NASA's prevailing policy must be seriously questioned.

Even if one gives full credibility to a public desire for human space flight and to the elusive, and perhaps obsolete, expectation of the international prestige of such endeavors, the usefulness of human crews in space must be addressed at a pragmatic level.

The dominant view of practitioners is that emphasis must be shifted back to the use of expendable launch vehicles for the delivery of unmanned, automated, commandable spacecraft. Engineering and modern technology can fulfill most of the in-flight functions that inexperienced individuals think require performance by human crews. Many of us learned this the hard way as we progressed from being laboratory workers to being space scientists and engineers.

A "re-balancing" of our civil space program urgently is required considering the essentially zero-sum budgetary game that we appear to be facing. A truly dramatic development might lift the cap on NASA's annual budget, but meanwhile we must live with the facts of national life.

Development of a large space station at this time is grossly inappropriate. We must seek much less expensive, incremental approaches to those of its declared objectives that can be validated by critical and informed consideration. □