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Future of the U.S. Space Program

The high-level committee that considered the future of the U.S. space program produced a document that is searching and hard hitting.* The committee and its working groups received testimony from nearly 400 witnesses, including key people inside and outside of the National Aeronautics and Space Administration (NASA). Near the beginning of the report are listed some of the concerns about NASA that have recently been voiced. The concerns include the technical capability of the organization, the ability to estimate and control costs, the growth of bureaucracy, and a lack of an overall space plan. The document then cites events leading to the appointment of the committee: “The failure of the Challenger, the recent hydrogen leaks on several space shuttle orbiters, the spherical aberration problem encountered with the Hubble Space Telescope, and various launch processing errors such as a work platform left in an engine compartment and discovered during launch preparations. . . .”

The body of the report includes a detailed examination of problems that have raised concerns, an outline of a future balanced space program, and recommendations for improvement of policies and management.

Highlights of the recommended space efforts include highest priority for space science, urgency for a mission to Planet Earth (global monitoring), and methodical preparation for a mission from Planet Earth that includes establishment of a lunar base and an eventual manned visit to Mars.

The committee agreed that there should be a future manned space program, but the report repeatedly expressed doubts about the role of the space shuttle. The space shuttle was authorized in 1972 as the manned follow-on to Apollo. It was sold on the basis of promises of great utility and low costs that were never fulfilled. For more than a decade the space shuttle held a top priority at NASA. Space science programs were forced to use the shuttle even though employment of expendable launch vehicles would have provided mission flexibility and lower cost. Space scientists became bitterly critical. Forced use of the shuttle led to delays, cancellations, and frustrations and multiplied the cost of experimental equipment. In addition, funds that might have been budgeted for space science were allocated to the shuttle.

The gist of some of the comments of the committee follows. The shuttle is a complex system that has yet to adhere to a fixed schedule. To process a space shuttle for flight requires that 1.2 million separate procedures be accomplished. The opportunities for human error are formidable. “[T]he statistical evidence indicates that we are likely to lose another Space Shuttle in the next several years . . . probably before the planned Space Station is completely established on orbit.”

Another quotation follows: “[T]he Committee believes, in *hindsight*, that it was . . . inappropriate in the case of Challenger to risk the lives of seven astronauts and nearly one-fourth of NASA’s launch assets to place in orbit a communications satellite.” In the light of the tragic loss of life and the blow to national prestige, financial considerations seem crass. However, the reality is that the total cost of a shuttle flight is on the order of \$750 million. A communication satellite was recently placed in orbit by an expendable launch vehicle that cost \$50 million. In general, most space missions can be performed by robots for a fraction of the cost of a manned effort.

The committee also stated that “the most significant deficiency in the nation’s future civil space program is an insufficiency of reliable, flexible, and efficient space launch capability. The nation needs to move ahead and attain a more robust launch capability.” A related principal recommendation is that “Space Shuttle missions be phased over to a new unmanned (heavy lift) launch vehicle except for missions where human involvement is essential or other critical national needs dictate.”

The foregoing comments are only a sample of a report that is unusually rich in content, including some positive remarks about NASA. It is likely to have considerable impact on NASA. For example, one of the topics treated was Space Station Freedom. The committee urged simplifying modifications and emphasis on space biology and medicine in microgravity. A recent announcement from NASA indicates that the recommendations will be implemented.—PHILIP H. ABELSON

*“Report of the Advisory Committee on the Future of the U.S. Space Program” (U.S. Government Printing Office, Washington, DC, December 1990).