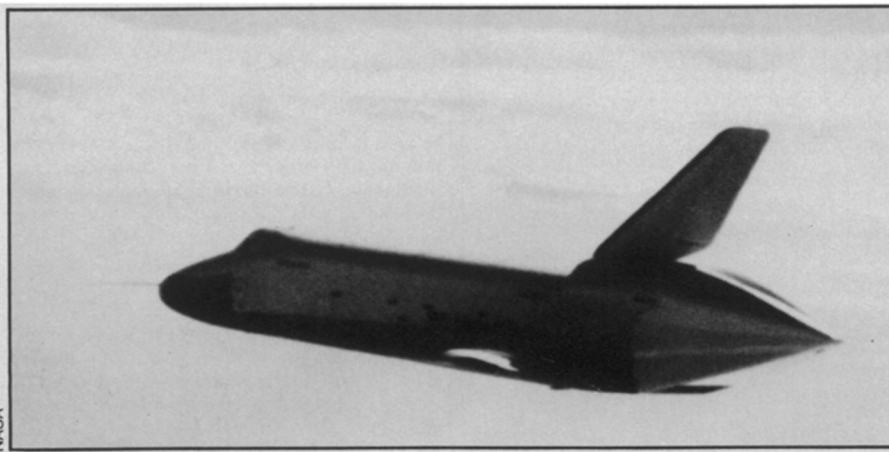


Better Management Urged for Space Shuttle

The space shuttle, now facing an initial launch date that may be a year and a half or more past the one envisioned when the program was begun in 1971, has suffered from a number of technical problems with its engines, thermal insulation system and other aspects. But not all of the problems are matters of nuts and bolts. A panel of consultants, formed at the instruction of National Aeronautics and Space Administration chief Robert Frosch, has concluded after a months-long investigation that the program has been suffering from shortsightedness and unrealistic work schedules, contributing not only to the delays but to cost-overruns, and that it is in need of "a new management approach."

According to the group's report, released last week, impetus for the study began late last year when internal NASA reviews revealed that "the increases in dollar expectations for FY 1979, 80 and 81 were substantial." The agency decided to meet the financial problems by reallocating its already planned distribution of funds and by making adjustments in the program, until Frosch learned during an April 27 meeting with the director of the Office of Management and Budget that "the administration placed a higher priority on adherence to schedules for certain DOD [Department of Defense] shuttle missions than on the objective of holding the NASA budget to the previously approved totals," the report says. There are also probable consequences to the shuttle's civilian missions — the planned Galileo orbiter and probe of Jupiter may be delayed from a 1982 launch until 1984 — but the concerns of DOD, which has already ordered a number of conventional, "expendable" launch vehicles in case the shuttle is not ready on time, seem to have been the driving force in the matter. It was thus decided to request an additional \$220 million in the President's FY 1980 budget ("in order to maintain the shuttle production schedule required by national security considerations"), which prompted congressional questioning about whether the existing shuttle management procedures were capable of providing timely and accurate information on the need for such increases.

On May 7, Frosch called for formation of the fact-finding panel. Members include James A. Abrahamson, program director of the Air Force's F-16 fighter; Richard C. McCurdy, former NASA Associate Administrator for Organization and Management; John E. O'Brien, NASA Assistant General Counsel for procurement matters; Willis H. Shapley, former NASA Associate Deputy Administrator; and A. Thomas Young, Deputy Director of the NASA Ames Research Center in California.



The space shuttle, airborne in approach and landing tests over the California desert.

The group's report notes that the original shuttle cost estimates "established an austere fiscal environment at the beginning of the program," and that "this environment became more constraining under the annual budgets established in subsequent years." It further concludes that "the overall shuttle management system has achieved a commendable level of accomplishment... on a large and very complex program." Others among the panel's findings, however, are more pointed:

- "In the effort to live with funding limitations while still progressing acceptably toward completion," says the report, "shuttle management has generally set up work schedules that demanded more performance than could be delivered." Because of growing amounts of work that had to be deferred due to tight funding, "major planning adjustments were made continually which precluded the establishment of a stable baseline and caused inefficiencies within the program." One consequence of this has been that work by shuttle subcontractors has been speeded up and slowed down repeatedly, making it difficult for the subcontractors to sustain their trained work forces and "resulting in the employment of inexperienced personnel at a cost to overall efficient performance." This, the panel finds, "constitutes a major cause for concern."

- "There has been a lack of adequate long-range planning and timely status reporting," says the group. "Emphasis has been on the current fiscal year, with only secondary attention to succeeding years and estimates to completion." In fact, continues the report, "one of the most significant features of major portions of the shuttle program has been constant near-term replanning," from which the measurement of resulting work and the estimation of the work remaining in the future have been "weak." The only tool available to provide a comprehensive assessment of some

parts of the program has been NASA's "Program Operating Plan," a broad-based guideline which is "not sufficient for program control." As a result, says the group, "discipline is needed now throughout the entire shuttle program."

- "The organization for the shuttle program appears to be functioning well from a technical standpoint, but is not functioning acceptably in the areas of schedule and budget. Strengthening of the organization at all levels is needed in these areas." Part of the reason, the report suggests, is that increasing amounts of work normally monitored from the middle levels of the shuttle management structure have been occupying the attention of the upper levels. "During the course of fact-finding," says the document, "it became apparent that there was broad and detailed involvement of Level I [top management — the program director's office] on technical issues with lesser attention given to cost and schedule." The panel thus recommends clarifying the existing management structure, beefing it up at all levels and improving its internal communications.

- "Fixed shuttle delivery schedules and initial operations require a new management approach," particularly because the program's delays have used up all of the margin of time that would otherwise have allowed some flexibility. Allowance, urges the panel, should be made in subsequent planning for "additional unanticipated problems."

- "... The NASA/DOD interface needs immediate clarification to avoid misunderstandings which could have long-term consequences." Some DOD satellites to be launched by the shuttle may require firmly committed on short-notice launch dates, and the panel urges that "every effort should be made to maintain high-level near-term understandings of DOD planning to avoid problems" when operational launches begin. □