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United States
General Accounting Office
Washington, D.C. 20548

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National Security and
International Affairs Division

B-254251



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August 13, 1993

The Honorable William S. Cohen
Ranking Minority Member
Subcommittee on Oversight of Government Management
Committee on Governmental Affairs
United States Senate

Dear Senator Cohen:

Enclosed is a copy of our November 1992 report detailing the status of the National Aeronautics and Space Administration's (NASA) Advanced Solid Rocket Motor development program. At your request, this letter updates some of the information in that report.

NOVEMBER 1992 STATUS

In November 1992 we reported that the need for the advanced motor had diminished since the development program was first approved in 1988. The advanced motor program was justified on the basis that it would enhance the shuttle's safety and reliability and increase the shuttle's lift capability by about 12,000 pounds.

When the advanced motor program was approved, NASA had no actual flight experience with the motors, which were redesigned following the January 1986 Challenger accident. While the advanced motor incorporated design features and automated manufacturing processes, which held the potential for a more reliable and safer motor, the design was unproven and its reliability would not be known for a long time. In contrast, the existing, redesigned motors had proven themselves to be very reliable. Through October 1992, NASA had successfully flown the redesigned motors 26 times and had identified no major design problems during post-flight inspections of the motors.

Also, although the advanced motor was expected to increase the shuttle's lift capability, we reported that it might not be used for launching either of the

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two payloads originally identified as needing the additional lift. The Advanced X-ray Astrophysics Facility had been redesigned and no longer needed the additional lift capability, and the advanced motor was not expected to be available in time to launch the space station's U.S. laboratory module.

We also reported that the estimated development costs had increased by about 95 percent--to \$3.25 billion from the program's January 1988 initial estimate and that the first flight schedule had slipped by over 2-1/2 years. The cost increases occurred primarily because the development program scope was expanded to include the first six sets of motors and a comprehensive evaluation of the first six flights, construction costs increased, and NASA added cost reserves to the estimate. The schedule slip occurred because of delays in awarding the development contract, funding constraints, and redesigning the building where propellant will be mixed and motors cast. At the completion of our review in October 1992, NASA expected further cost increases and schedule slips as a result of the Congress' decision to continue the development program but at a lower funding rate; however, officials could not quantify the likely increases.

JULY 1993 STATUS

Since our November 1992 report, NASA has launched the shuttle another five times with no evidence of any significant solid rocket motor safety problems, according to motor project officials. Also, since our November 1992 report, NASA has redesigned the space station. The report of the Advisory Committee on the Redesign of the Space Station¹ shows that the advanced motor is not required to launch the redesigned station. According to the Committee's report, even if NASA decides to place the station in a higher inclination orbit where the shuttle's lift capability is reduced, the necessary capability can be obtained by (1) redesigning the shuttle's external fuel tank to reduce its weight, (2) using some of the shuttle's capability that is normally kept in reserve, and (3) assembling some of the heavier components at a lower altitude and later boosting them to the station's final orbit using the station's own propulsion system.

Estimated development costs have increased another \$575 million since our November 1992 report, bringing the total to \$3.825 billion. NASA attributes this latest increase to a stretch-out of the development caused by reductions

¹Final Report to the President, Advisory Committee on the Redesign of the Space Station, June 1993.

in the program's annual funding levels for fiscal years 1993 and subsequent years. For example, NASA estimated that it needed about \$520 million in fiscal year 1993 to avoid the schedule slip, but the Congress appropriated only \$360 million. Because of the reductions in the previously planned annual funding levels, NASA delayed the first flight of the advanced motor another 3 years and 10 months, bringing the total schedule delay to almost 6-1/2 years. The first flight was originally scheduled for July 1994.

FUNDING STATUS

Through fiscal year 1993, the Congress has appropriated about \$1.5 billion for the advanced motor program--\$1 billion for motor development and \$500 million to construct and equip motor development, test, and production facilities. The President requested an additional \$280.4 million for development and \$32.6 million for construction of facilities for the advanced motor program in fiscal year 1994.

Of the \$1.5 billion appropriated, \$180 million remained unspent as of June 30. However, NASA was spending at a rate of about \$31 million a month for the program, and projected that at the end of the fiscal year only \$80 million will remain unspent.

NASA also estimates that it would cost about \$212 million to terminate existing contracts as of September 30, 1993. The estimate of the cost to terminate the existing contracts assumes that construction that is currently at least 90 percent complete will be finished and other partially completed buildings will be enclosed to protect NASA's investment.

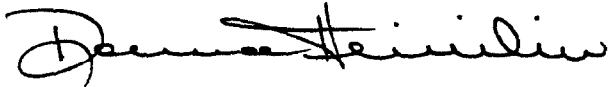
METHODOLOGY

To identify changes in the status of the advanced motor development program, we analyzed NASA program and budget documents and external reports such as the report of the Advisory Committee on the Redesign of the Space Station.

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We also discussed the program's status with cognizant NASA officials. If you or your staff have further questions, please call me on (202) 512-8412.

Sincerely Yours,

A handwritten signature in cursive script, appearing to read "Donna M. Heivilin".

Donna M. Heivilin, Director
Defense Management and NASA Issues

Enclosure

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