United States General Accounting Office

GAO

Report to the Chairman, Subcommittee on Oversight of Government Management and the District of Columbia, Committee on Governmental Affairs, U.S. Senate

July 1995

SPACE SHUTTLE

Declining Budget and Tight Schedule Could Jeopardize Space Station Support

GAO/NSIAD-95-171

GAO

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

National Security and
International Affairs Division

B-260359

July 28, 1995

The Honorable William S. Cohen
Chairman, Subcommittee on Oversight
of Government Management and the
District of Columbia,
Committee on Governmental Affairs
United States Senate

Dear Mr. Chairman:

The National Aeronautics and Space Administration (NASA) plans to use the space shuttle on 21 flights over a 5-year period to assemble the International Space Station. To meet this requirement, the shuttle will have to undergo substantial redesign to gain additional lift capability. As requested, we examined the extent to which the shuttle program can support the space station's assembly requirements. In doing so, we focused on the impacts of a declining shuttle budget and a demanding schedule to support the space station.

Background

The shuttle is the only U.S. launch vehicle capable of carrying humans into space. As a result, it will be critical to the space station's assembly and operation. From December 1997 to June 2002, NASA plans to use the shuttle primarily to transport station components into orbit for assembly. During this period, 27 of the shuttle's 34 primary payloads are to be station-related.[1]

At times, only two of the four shuttles will be available for station assembly. One shuttle—Columbia—cannot provide adequate lift, and, one of the remaining three shuttles will be undergoing scheduled maintenance during some portions of the assembly schedule. Also, most station components will have to be launched in a particular sequence to provide power and structural support for other hardware.

In March 1993, the President directed NASA to redesign the space station. The new configuration—renamed the International Space Station—combines the efforts of Europe, Japan, Canada, Russia, and the United States. It also increased the station's planned orbital inclination to make it more accessible from Russian launch sites, creating the need for

[1]NASA plans to use the shuttle for 21 space station assembly flights and 6 additional station-related missions.

additional shuttle lift capacity. Easterly shuttle launches from Kennedy Space Center take advantage of the earth's normal west to east rotation. Launches to higher inclinations such as those needed for the space station lose some of this advantage, with a resulting loss in lift capability.

In November 1993, the space station program manager requested that the space shuttle program implement modifications to provide the increased lift needed to support space station assembly. The shuttle program office responded by committing the program to increasing lift capability by at least 13,000 pounds on every station flight.

Results in Brief

NASA's plans for increasing the shuttle's lift capability are complex and challenging, involving about 30 individual actions, including hardware redesigns, improved navigational or flight design techniques, and new operational procedures. Some of the hardware redesign programs have experienced early development problems, and the potential exists for additional problems according to one independent review team.

NASA's schedule for meeting the space station's launch requirements appears questionable—particularly in a declining budget environment. To support the first space station launch, NASA must successfully complete numerous shuttle-related development programs on a tight schedule. The remaining launch schedule is compressed and will be difficult to achieve without additional funding or more efficient processing methods. Delays in the launch schedule could substantially increase the station's cost.

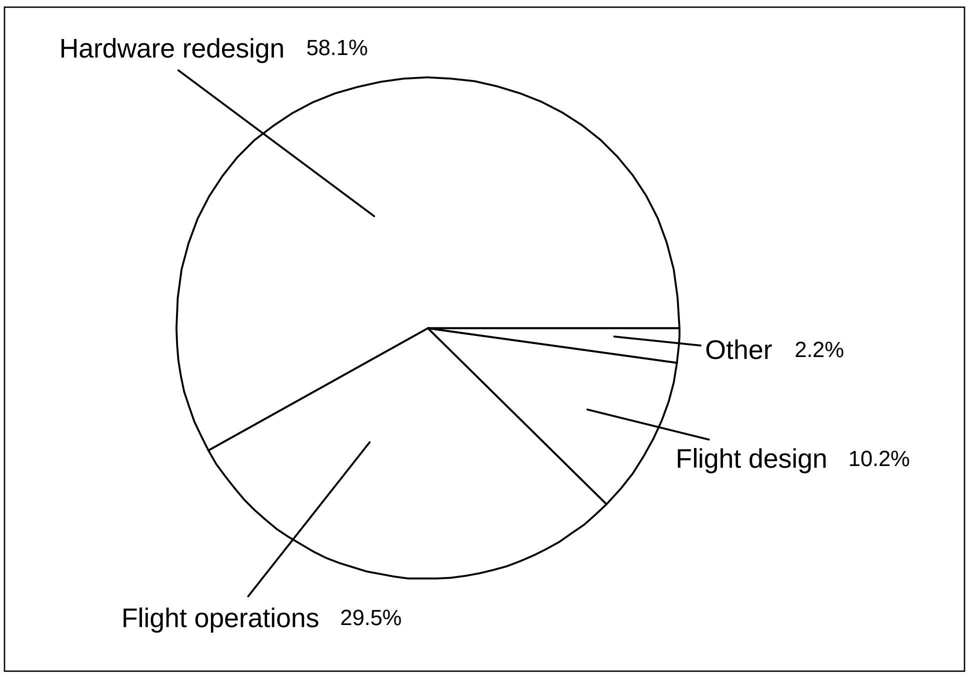
The shuttle's modification and launch enhancement program includes plans to defer some recertification activities and forgo full integration testing of the propulsion system. As a result, shuttle modifications will be fully integrated and flown for the first time on the first launch of station components. NASA plans to assess the implications of the design changes through a combination of tanking and component tests and systems analyses. Given the magnitude and complexity of the shuttle enhancement program, we believe it is prudent to take additional measures to ensure that (1) the implications of integrating numerous individual design changes are fully understood and (2) safety is not compromised.

NASA's Program to Provide Added Lift Is Complex and Challenging

The lift enhancement plan—first approved in March 1994—has been amended a number of times to introduce new ideas for achieving the required lift at the least cost. The original plan identified 13,000 pounds of added lift at a cost of about $535 million. In May 1995, NASA estimated that about 16,100 pounds of lift gain would be achieved at a cost of about $444 million. Both estimates included some recurring costs for enhancement hardware, as well as costs to integrate the enhancements, and reserves to cover the possible need for additional changes.

The current plan includes about 30 individual actions that involve hardware redesign, improved navigational or flight design techniques, and new operational procedures.[2] Figure 1 depicts the percentage of added lift NASA estimates will come from these areas, based on the May 4, 1995, approved baseline.

Figure 1: Actions to Increase Shuttle Lift Capability



Hardware design changes account for more than one-half of the added lift. The primary redesign program is the development of a new external fuel tank—the super lightweight tank—which involves incorporating a new

[2]NASA defines hardware design as subsystem configuration. It defines flight design as the way the vehicle is flown, and flight operations as the usage of consumables such as propellent and water.

aluminum alloy into the tank design. This alloy will reduce the tank's weight and change its material properties. In addition, the tank will have to accommodate a new set of design loads[3] created by the mix of hardware and flight design changes. Other development programs necessary to support the space station include various orbiter[4] modifications and improved main engines.[5]

The super lightweight tank program has experienced some early development problems that could affect its performance. Shortly after beginning development of this tank, technical concerns about the properties of the new material were raised. An independent review of the program was performed, and based on its results, NASA adopted a more rigorous test plan for the tank and modified the tank's production strategy. More recently, the uniqueness of the new metal caused delays in manufacturing a test article. NASA believes these early concerns have been resolved, but it recognizes that uncertainty with the development and manufacturing of the new material could ultimately reduce the amount of lift gain projected for the new tank.

The main engine improvements are expected to make the engines heavier than the current engines. However, the new engines are expected to be more efficient, thus needing less propellent. They are also expected to permit occasional use at higher than normal thrust levels. Early test results indicated that the engines would not achieve all of the efficiency originally expected. NASA made additional modifications, and it now expects to achieve most of the originally predicted performance. However, as of May 1995, shuttle program officials still considered the engine development status to represent a threat to the lift gain expected from the enhancement program.

An independent shuttle management review team also expressed concerns with these two programs. In its report,[6] the team (1) concluded that the new tank had the potential for problems during development and manufacturing and (2) questioned using the improved engines for increased thrust capability.

[3]Design loads are forces or pressures imposed on the shuttle during various parts of its mission such as launch, ascent, and landing.

[4]The shuttle system includes an aircraft portion—the orbiter—and propulsion components.

[5]The main engine improvements are not included in the list of baselined enhancements since they were initiated to improve safety margins. However, their availability for space station flights is required in the overall strategy.

[6]NASA, Report of the Space Shuttle Management Independent Review Team, February 1995.

In addition to hardware redesign, NASA plans to incorporate flight design and operation enhancements. These enhancements include the use of more advanced navigational tools as well as software changes to create a more efficient trajectory. The effect of achieving greater efficiency during ascent is that less propellent would be needed.

The most significant operational change involves the deletion of some of the contingency fuel, water, oxygen, and other consumables. NASA protects each mission by ensuring that there are sufficient quantities of consumables to continue the mission in the event of unexpected problems such as difficulties in docking and retrieving payloads. In the past, it has been NASA's policy to cover nearly every possible contingency. The new policy reduces the amount of consumables by about 4,000 pounds per flight.

According to NASA, the revised approach will still ensure that individual unexpected problems can be handled without jeopardizing the mission. However, the reduction in consumables increases the risk of mission failure if a combination of unexpected events occurs. Under the new policy, for example, it might not be possible to perform a second rendezvous with the station, if necessary, and, as a worst case, it could be necessary to jettison a payload before landing.

NASA believes the increase in risk is minimal and cites the new policy as a means to reduce weight, increase lift, and save money. In addition, it notes that the maximum reduction in consumables will only be necessary on the heaviest of station flights. According to the program director, this change helped make it possible to terminate two of the more expensive enhancements—development of a lightweight booster and extended motor nozzle—at a savings of about $35 million.

To support the first shuttle space station launch, all of the enhancement programs must be integrated and recertified into the shuttle system within a demanding schedule. NASA has developed a systems integration plan identifying the major events and schedules associated with the shuttle enhancement program, as currently approved. The plan describes over 200 individual events related to the development and integration of shuttle lift-increasing modifications. The events began in early calendar year 1994, and they will end with the first space station flight, which is scheduled for December 1997.

The single most critical event is the delivery of the super lightweight tank, and, according to the chief engineer of the shuttle integration office, it is on a very success-oriented schedule that has already experienced some delays. While the tank's critical design review has already been held, the final set of design loads are still being updated. Thus, many design and environment definition activities will occur in parallel. If any of the assumed design loads substantially change, additional certification cycles may have to be conducted. However, there is no schedule or budget margin that allows for major adjustments because the first tank is to be delivered only 2 to 3 months before the first launch.

Shuttle's Ability to Support Station's Assembly Schedule Is Questionable

Based on its launch history and projected budget, the shuttle may not be able to meet the demanding launch requirements of the space station's assembly schedule. To meet the station's "assembly complete" milestone, shuttle officials have designed a very compressed launch schedule.

During certain periods of the station's assembly, clusters of shuttle flights are scheduled to be launched within very short time frames. The schedule calls for five launches within a 6-month period in fiscal year 2000 and seven flights during a 9-month period in fiscal year 2002. On two other occasions, three launches are scheduled in a 3-month period. This schedule equates to about 1 launch per month, or a rate of up to 12 flights a year for these periods. In addition, on two occasions, the schedule calls for launches of two missions with less than 35 days separating them. While NASA has achieved similar launch rates a few times, it will have fewer processing personnel during the space station era.

The space station's flight rate frequency cannot be met unless the orbiter is processed in 20 to 30 days less than standard.[7] To process the orbiter at this rate, shuttle personnel will have to work overtime. However, according to operations officials, budget constraints could make it difficult to fund overtime.

Because the schedule is so compressed at times, there is very little margin for error. According to shuttle and station officials, there is little flexibility in the schedule to meet major contingencies, such as late delivery of station hardware, or technical problems with the orbiters. Between December 1991 and September 1994, 9 of 22 shuttle flights slipped from the planned launch dates established 6 months before launch. The shuttle

[7]According to Kennedy Space Center's guidelines, standard processing for the orbiter is about 127 calendar days—92 in the orbiter processing facility, 7 in the vehicle assembly building, and 28 on the pad.

program maintained its annual flight rate, in part, by launching payloads out of sequence. However, during station assembly, most payloads must be launched in the established sequence. The Shuttle Program Director told us that he recognizes the launch schedule is tight and that if a significant delay occurs with any station flight, subsequent flights are likely to slip also.

The shuttle program will be attempting to accomplish the demanding station assembly schedule with fewer resources than were available in the past. For example, to reduce operating costs, NASA has reduced the shuttle processing workforce at Kennedy Space Center by 1,400 people, or 20 percent, since 1992. According to a February 1995 internal workforce review, schedule risk already exists in areas such as engine testing, crew training, and flight software development, and NASA plans further funding cuts in the future. According to shuttle processing officials, NASA will reduce the shuttle processing workforce by another 900 people, or 15 percent, through fiscal year 2000. NASA continues to review all elements of shuttle operations to improve processes and increase efficiency and believes that these savings are achievable.

At the time of the fiscal year 1996 budget request, estimated shuttle operations funding requirements exceeded projected budgets by at least 10 percent—a cumulative total of $1.3 billion—in fiscal years 1996 through 2000. Shuttle managers were concerned about their ability to achieve the additional funding cuts needed to meet the projected budgets. In February 1995, independent review teams recommended additional ways to reduce shuttle operations costs. NASA does not have an estimate of savings that may result from implementing the recommendations. According to the Director of Shuttle Management and Operations at Kennedy Space Center, the station's assembly schedule will slip unless (1) NASA provides additional funds for shuttle operations or (2) more efficiencies are found.

Officials in the Office of Space Flight told us that they estimated that there is a medium to high risk that the station's assembly completion date will slip because of shuttle delays. These officials estimated that the schedule could slip about 4 to 5 months. Their estimate was based on the fact that the shuttle achieved one less flight than planned in 2 of the past 4 years.

A recent internal NASA study acknowledges the possibility of a slip in the schedule. According to the April 1995 study conducted for the International Space Station Independent Assessment Office at Johnson

Space Center, the shuttle cannot support the planned schedule unless additional launch resources are provided or shuttle processing methods are streamlined. The study identified a possible slip of up to 4 years in completing station assembly due to shuttle processing delays and the relatively low reliability of the Russian Zenit launch vehicle. According to the study, shuttle processing presents the largest schedule risk. To meet the manifest, NASA would have to reduce processing time to 50 percent of current levels.

A delay in completing the space station assembly would increase the station's cost because fixed costs would be continued for a longer period. No reliable estimate of the increased cost exists since the estimate would depend on the length of the delay and assumptions about how long the station would remain operational after assembly is complete. However, when NASA redesigned the station in 1994, officials estimated the redesign would reduce costs by $1.6 billion because it would accelerate the assembly complete date by 15 months, from September 2003 to June 2002. At a minimum, a portion of these savings would be lost if the assembly complete date slips.

NASA Plans to Defer Some Orbiter Recertification Activities and Forgo System Testing

NASA plans to defer some orbiter recertification activities and forgo testing all of the changes in an integrated fashion. NASA is confident that the maturity of the current system and existing databases from earlier testing are sufficient to justify the current approach.

To reduce costs, NASA plans to alter the depth of a previously planned materials review. The review was to have been part of a program to recertify the individual shuttle orbiters after incorporating the performance enhancements for the space station program. It would have provided specific and detailed assurance that every piece of the orbiter structure could safely withstand the aerodynamic environments during space station missions. The space station mission environments are expected to be more stressing than those of previous missions. The purpose of the materials review was to identify and reevaluate those structural components that were previously accepted even though they did not fully conform to design specifications.

NASA currently plans to assess the impact of the new environments on these components based on the design rather than the actual hardware. A materials review will be performed on critical structures, according to NASA. NASA officials also told us that they are confident the streamlined recertification program will adequately ensure that the orbiter will perform in all possible station era environments. They noted that the orbiter now has a lengthy flight history record, and the experience gained from those flights ensures that the design changes made to support the space station will be fully understood.

In addition, NASA does not plan to perform test firings of the modified propulsion system in an integrated setting. Instead, the agency plans to verify system performance based on individual component testing and predictive analyses. A 1989 study performed for the Stennis Space Center addressed the concept of integrated system testing. The study cited the unpredictability of the "interactive characteristics of the propulsion, structural, and electrical systems" and concluded that propulsion system testing should be considered even in cases of "existing designs modified to accommodate one or more major system redesigns." The same study noted, however, that the technology base for the shuttle propulsion system is more advanced than for other vehicles, thus mitigating the engineering risks.

NASA does not believe integrated system test firings are necessary in this case. Program officials noted that the propulsion system's design changes do not affect the way in which fluids and propellent are moved throughout the system. As a result, they believe component testing, coupled with inferential analysis and modeling of the whole system, will suffice. In addition, program management officials stated that the costs were too high to justify integrated test firings, given the test results and analyses that would be available without integrated tests.

NASA Has Not Chartered an Independent Review of Enhancement Integration

Independent assessments provide objective overviews of complex development programs and space missions and can create an incentive for more rigorous internal review of the program. In establishing an independent group to oversee space station program safety, for example, NASA noted that "engineering products are improved by independent technical peer review," and that such reviews do not "reflect on the competence, motivations, or integrity" of those responsible for implementing a program. NASA's recently completed laboratory review also endorsed the concept of independent review in situations where the need has been identified. The report, issued in February 1995, cited the value of being in a position to take a more objective view of issues and details. It also noted that the process of independent assessment requires managers to "review their efforts from a perspective that is hard to maintain in the day-to-day sequence of events."

In the past, NASA has sometimes chartered independent assessments of complex development programs and missions, including assessments of some parts of the performance enhancement program such as the main engine improvement program and the super lightweight tank development. However, NASA has not requested an independent assessment of the integrated shuttle performance enhancement program, even though the integration program is complex—consisting of over 200 scheduled events, involving uncertainties such as characterization of the aerodynamic environments the enhanced shuttle will operate in, and containing departures from previous programmatic strategies.

Recommendation

We recommend that the Administrator of NASA establish an independent review team to (1) assess NASA's systems integration plan for the lift-increasing enhancements, (2) identify the associated technical and programmatic risks, and (3) weigh the costs and benefits of NASA's tight scheduling of shuttle flights to assemble the space station.

Agency Comments

In commenting on a draft of this report, NASA concurred with our recommendation and stated that it had initiated implementation. The Aerospace Safety Advisory Panel has agreed to perform the independent reviews. According to NASA, the panel will use expert outside consultants to review the benefits and the technical and scheduling risks considering the current and projected NASA budgets. NASA noted that although the space station assembly schedule was demanding and funding was tight, it was currently on schedule and within budget. NASA's comments are presented in their entirety in appendix I, along with our evaluation of them.

Scope and Methodology

We conducted our review at NASA Headquarters, Marshall Space Flight Center, Johnson Space Center, and Kennedy Space Center. We examined (1) shuttle enhancement documentation, (2) budgetary data, (3) internal and external analyses regarding the shuttle program, (4) shuttle manifests, (5) shuttle processing data, and (6) space station assembly schedules. In addition, we interviewed officials from NASA Headquarters, the shuttle program, and the space station program regarding issues related to NASA's plan to support space station assembly. These interviews included discussions with representatives of the Astronaut Office at Johnson Space Center.

We performed our work between November 1994 and May 1995 in accordance with generally accepted government auditing standards.

Unless you publicly announce the contents of this report earlier, we plan no further distribution of it until 15 days from its issue date. At that time, we will send copies of it to the Administrator, NASA; the Director, Office of Management and Budget; and other appropriate congressional committees. We will also provide copies to others upon request.

Please contact me on (202) 512-8412 if you or your staff have any questions concerning this report. Major contributors to this report were Lee Edwards, John Gilchrist, and Reginia Grider.

Sincerely yours,

David R. Warren

David R. Warren
Director, Defense Management
and NASA Issues

Comments From the National Aeronautics and Space Administration

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

National Aeronautics and
Space Administration
Office of the Administrator
Washington, DC 20546-0001

JUN 23 1995

Mr. Henry L. Hinton, Jr.
Assistant Comptroller General
General Accounting Office
Washington, DC 20548

Dear Mr. Hinton:

We have reviewed the GAO Draft Report, "SPACE SHUTTLE: Declining Budget and Tight Schedule Could Jeopardize Space Station Support." NASA concurs with the three- part recommendation and has already initiated implementation. Although our Space Station assembly schedule is demanding and funding is tight, we are currently on schedule and within budget. We are committed to achieving the Space Shuttle enhancements and launches required to assemble a productive Station on time for ourselves and our international partners. NASA will keep the Congress fully informed of our progress as we meet the technical, scheduling, and budgetary challenges.

We have informally discussed a number of items with regard to the Draft Report with the GAO staff and hope they will include our comments in the final report. In addition, I have enclosed further comments for your consideration. If we can be of further assistance, you may call Howard Roseman at 358-4451.

Sincerely,

J. R. Dailey
Acting Deputy Administrator

Enclosure

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

See comment 1.

SUBJECT: Draft GAO Report "SPACE SHUTTLE: Declining Budget and Tight Schedule Could Jeopardize Space Station Support," Dated June 1995 (GAO/NSIAD-95-171)

Now on p. 2.

1. Reference: Page 4, partial sentence at top of page

See comment 2.

Please add the following sentence: "However, all such activities are going well at this time with adequate technical, scheduling, and budgetary margin to meet the first element launch; in fact, the program has recently cancelled two of the higher cost hardware modifications (light-weight booster and extended nozzle) due to efficient performance.

Now on p. 2.

2. Reference: Paragraph 2 on Page 4

Modify the last sentence to read: "Given the magnitude and complexity of the Shuttle's enhancement program, NASA intends, through an appropriate combination of Super Lightweight Tank tanking tests, component tests, and systems analyses, to ensure that (1) the implications of integrating numerous individual design changes are fully understood and (2) safety is not compromised."

Now on p. 6.

3. Reference: Paragraph 1 on Page 11

It would be better to use the word "standard" at the end of the first sentence rather than "normal." "Standard" would apply only if ideal time and resources conditions existed. However, KSC's "normal" method of operations is to process orbiters in 20 to 30 days less than the standard flow. The GAO sentence implies that KSC will have to do things differently from their usual operation which is not true.

Now on p. 7.

4. Reference: At the end of first paragraph on Page 12

Please add to the end of the paragraph: "NASA continues to review all elements of Shuttle operations to improve processes and increase efficiency and believes that these savings are achievable.

Now on p. 7.

5. Reference: Paragraph 2 on Page 12

It is not true that the Shuttle achieved one less flight than planned every year. Please replace the last sentence with: "Their estimate is based on the fact that in the past 4 fiscal years, the Shuttle achieved one less flight than planned in 2 of those years. The planned flight rate of seven per year is realistic, as demonstrated by the fact that NASA has flown seven or more flights per year since 1991.

2

Now on p. 7.

6. Reference: Last Paragraph on Page 12

See comment 3.

This paragraph addresses the conclusions reached in a quick-look study performed by the Aerospace Corporation for the NASA Independent Assessment (IA) Team. A probabilistic assessment model designed for the Air Force was used. This model was developed to perform parametric trade studies on the effects of possible engineering and logistic options on program outcome. Such "sensitivity" models provide trend data to uncover preferred paths and, as such, are not intended to define programmatic completion dates.

The results of this study, along with recommended mitigation options, were presented to the Space Shuttle and Space Station program offices. At the time, both organizations agreed with the general recommendations; however, Space Station managers detected a number of deficiencies in the input data used. Like all models, this one is highly affected by the initial assumptions. In this case, the conversion from workdays to calendar days was incorrect, the gains from the use of available overtime were not included, and most importantly the model's input data were based on historical Shuttle program experience. These historical data reflected timelines exhibited since return-to flight and took no consideration of the streamline payload checkout and orbiter-processing approaches that will be in place, beginning in 1998. These factors resulted in estimated completion dates dramatically different from previous Station and Shuttle studies.

In conclusion, NASA believes that these sensitivity studies are beneficial and will continue to utilize them to evaluate programmatic and engineering options leading to the development of mitigation strategies against threats to the scheduled manifest. NASA agrees that assembly of the Space Station in a timely manner will be a challenge. NASA will use its various forecasting tools and models to optimize its strategic and tactical planning.

Now on p. 10.

7. Reference: Page 16, RECOMMENDATION

NASA agrees with the GAO to obtain an independent review for the three parts of this recommendation. The Aerospace Safety Advisory Panel has agreed to perform these three tasks, using their current members, and to add expert outside consultants to review the benefits and the technical and scheduling risks considering the current and projected NASA budgets.

It should be noted that a significant function of the NASA Headquarters Office of Safety and Mission Assurance is independent oversight of NASA programs. Their critical assessment is particularly relevant for both the Space Shuttle program and the international Space Station. In the performance of this oversight, they participate in all major program review boards and continually keep abreast of day-to-day activities of potential consequence to mission success and supply the Program Directors with their recommendations and advice.

The following are our comments on the National Aeronautics and Space Administration's (NASA) letter dated June 23, 1995.

GAO Comments

1. We have incorporated NASA officials informal comments in the text where appropriate.

2. Although the development programs have not experienced significant schedule slips to date, the programs have experienced some early development problems and an independent management review team concluded in February 1995 that the largest of these programs—the super lightweight tank—had the potential for further problems during development and manufacture. As we note on page 5, NASA deleted two expensive hardware programs by substituting operational changes that substantially reduced weight but increased the risk of mission failure.

3. The April 1995 study was intended to identify the shuttle program's challenge in supporting the station assembly schedule and provide an indication of the possible magnitude of schedule slips. Study officials told us that the conversion from workdays to calendar days or use of available overtime would not substantially change the study results. The study was based on actual timelines experienced since the shuttle returned to flight after the Challenger accident. NASA has not defined the streamlined payload checkout and orbiter processing approaches that it says will be in place beginning in 1998. The impact of streamlining on the shuttle's launch schedule cannot be determined at this time.

Subsequent to commenting on the report, officials ran the study model again, using processing times for only those missions launched in fiscal years 1992 and subsequent, and omitting the two flights with the longest processing times. In this scenario, the model predicted a slip of over 1 year in the station assembly complete milestone, assuming 100 percent reliability and an inflexible assembly sequence.

Ordering Information

The first copy of each GAO report and testimony is free. Additional copies are $2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

Orders by mail:

U.S. General Accounting Office
P.O. Box 6015
Gaithersburg, MD 20884-6015

or visit:

Room 1100
700 4th St. NW (corner of 4th and G Sts. NW)
U.S. General Accounting Office
Washington, DC

Orders may also be placed by calling (202) 512-6000
or by using fax number (301) 258-4066, or TDD (301) 413-0006.

Each day, GAO issues a list of newly available reports and testimony. To receive facsimile copies of the daily list or any list from the past 30 days, please call (301) 258-4097 using a touchtone phone. A recorded menu will provide information on how to obtain these lists.

United States
General Accounting Office
Washington, D.C. 20548-0001

Bulk Mail
Postage & Fees Paid
GAO
Permit No. G100

Official Business
Penalty for Private Use $300

Address Correction Requested