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NASA

Major Challenges for Management

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Mr. Chairman and Members of the Subcommittee:

I appreciate the opportunity to testify before the Subcommittee today on management challenges facing the National Aeronautics and Space Administration (NASA). On the basis of our work at NASA over the last 5 years, we believe the major problems confronting NASA today can be seen in terms of challenges to NASA management. Specifically, the agency faces challenges in:

-- bringing plans in line with likely budgets,

-- managing systems development efforts more efficiently,

-- improving operations and oversight, and

-- preserving U.S. aeronautical leadership.

We initially identified these management challenges in our December 1992 Transition Report on NASA Issues. The last 9 months have strengthened our view that they indeed represent the primary challenges the agency faces.

BRINGING PLANS IN LINE WITH LIKELY BUDGETS

Since the late 1980s, we have encouraged NASA to develop a strategic plan that realistically matches its program plans to its likely budgets. NASA's efforts to do so have been fitful at best, and no adequate plan has yet been prepared.

In 1991, the Senate Committee on Appropriations directed NASA to develop a strategic plan. Among other things, the plan was supposed to establish priorities for NASA's programs, especially in view of the likelihood of more modest budgets in the future. However, NASA's January 1992 plan--Vision 21--was not responsive to the Committee's direction. The plan failed to indicate the relative priority of NASA's key missions and large programs and provided no balance between planning and budgeting.

Shortly after the plan was issued, we reported that this lack of balance was a serious concern because NASA, at that time, was planning budgets that called for up to about $20 billion more funding through fiscal year 1997 than the Congress was likely to provide. As shown on attachment I, this represents the difference between NASA's program plan for fiscal years 1992-1997 and level budgets of $14.3 billion which was the enacted NASA budget for fiscal year 1992. Consequently, NASA would be forced to make significant program adjustments each year to make up for lower-than-anticipated funding levels.

Some of NASA's largest programs have already required such adjustments. About a year ago we reported on 11 major programs in NASA which, at that time, had 5-year funding requirements that would account for most of the agency's likely budgets. (See attachment II.) A number of these--including space shuttle

operations, the space station, the Advanced X-Ray Astrophysics Facility, the Earth Observing System, and the National Aero-Space Plane--have been or are currently being restructured, primarily because they were not affordable. I will discuss shuttle operating costs a little later in summarizing NASA's challenge to improve operations and oversight. The other programs are discussed briefly below to illustrate the effects of oversubscribed budgets.

Space Station

The space station provides the most telling illustration of problems in a program resulting from funding instability. The space station is currently undergoing its sixth redesign in 8 years. When we testified on the station in May 1991, we pointed out the instability that had surrounded the program, and we raised questions about the limited scope of NASA's cost estimate, the station's utility as a research facility, and some of the future risks in the program. Since that time, the space station's situation has not improved. Its most recent redesign was ordered because the station was not affordable as then planned. Whether this latest attempt to design an affordable and useful space station is successful remains to be seen. We are just beginning to review the details of the new design, especially its cost estimate.

Advanced X-Ray Astrophysics Facility

The Advanced X-Ray Astrophysics Facility was also recently redesigned because of budget reductions and the need to control costs in future years. It was divided into two missions to be flown on separate satellites. One mission will be designed, developed, and built by a contractor to provide high-resolution x-ray imaging; the other will be done by NASA personnel to provide high-energy, high-resolution spectroscopy.

The restructuring of the astrophysics facility into two missions reduces the program's estimated development and operating costs by almost 60 percent--from $5.5 billion to $2.3 billion. The lower operating costs result primarily from flying the twin satellites for 5 rather than 15 years. This reduced operating time should not sacrifice much of the intended science because the necessary data can be gathered more efficiently at the new orbits planned for the twin satellites. However, these orbits increase the risk because the redesigned satellites cannot be reached by the shuttle, so they cannot be repaired if they malfunction. Such repair capability was intended under the previous single satellite design. We reported on the Advanced X-Ray Astrophysics Facility early last year, before it was split into two parts. We have since revisited the program and will be reporting on its status shortly.

Earth Observing System

The Earth Observing System is linked to U.S. and international efforts to study the Earth. It is intended to obtain space-based observations to improve scientists' understanding of the environment and to provide policymakers with some of the information they will need to develop sound environmental policy. In its short life, the Earth Observing System has been restructured twice because of questions about the long-term affordability of NASA's space research program.

The Earth Observing System program was barely underway when the Congress directed NASA to reduce its funding requirements from about $16 billion to $11 billion through fiscal year 2000. In response, NASA restructured the program in late 1991. The changes made included using a larger number of smaller satellites in lieu of a few large platforms and delaying the start of operations for most instruments by about 2 years. Even with these changes, achieving all of the restructured program's scientific objectives depended on NASA's ability to arrange development and flight opportunities for some planned instruments that were not accommodated by the program's new $11 billion funding profile.

In July 1992, we reported on the changes made to the program's scope, schedule, and estimated cost due to its restructuring. At that time NASA was still searching for ways to develop and fly some of the planned instruments it could not afford. However, shortly after our report was issued, the Congress directed NASA to restructure the program again--this time from an $11 billion to an $8 billion effort through fiscal year 2000. We expect to review the effects of this second restructuring when we next review the program later this year.

National Aero-Space Plane

The National Aero-Space Plane program has significant budget problems, but they are not solely NASA's problem because the program is jointly operated by the Department of Defense (DOD) and NASA. In fact, most of the program is DOD's responsibility. The program's goal is to provide the technological basis for future space launch and hypersonic flight vehicles. The concept involves developing a vehicle that can take off horizontally from a runway; reach hypersonic speeds of up to 25 times the speed of sound (Mach 25); attain low earth orbit without using external booster rockets or propellant tanks; and return for a runway landing.

Last year, we reported that the National Aero-Space Plane program's 7-year history has been characterized by turmoil, changes in focus, and unmet expectations. Projected costs were increasing, technical progress was behind schedule, and funds were insufficient to implement the program as planned. At the request of this and other subcommittees, we reported a few months ago on the status of

efforts to resolve these problems. We noted that while the contractor team had made progress in resolving propulsion and weight-related problems, significant challenges remained. The contractor team reported earlier this year that 17 of the 38 milestones used to measure progress toward completing the program's development phase will not be fully satisfied by the end of 1994, the latest estimated development completion date. Consequently, the decision to design, test, and build the experimental flight vehicle has been deferred.

Our most recent report also noted that unstable funding and the lack of top-level direction had hindered efforts to develop an affordable, executable program. Neither the Office of Science and Technology Policy, the National Aero-Space Plane Steering Group, nor DOD had provided clear direction on what the program's future efforts and objectives should be. Additionally, DOD and NASA had not achieved consensus on the current and future funding needs for the program. In late August, the Director of the Office of Science and Technology Policy told us that interagency working groups were being established to address the future of the National Aero-Space Plane and the funding requirements for a robust research program on hypersonic flight and advanced materials.

NASA's Corrective Actions

Vision 21, NASA's strategic plan, was developed before the current NASA Administrator was appointed. He has acknowledged the shortcomings of this plan and has promised a new NASA strategic plan that matches specific program goals with realistic budgets. That plan is still under development. In addition, the NASA Administrator said earlier this year that NASA's program reassessments have eliminated about half of the gap between its plans and likely budgets. We will be shortly following up on our original work to determine the extent the agency has been able to bring its plans in line with likely budgets.

MANAGING SYSTEMS DEVELOPMENT MORE EFFICIENTLY

Project management in NASA starts even before congressional new start authority is requested, when requirements are being developed and the initial components of cost and schedule estimates are being pulled together. Once a project is authorized, management of progress towards its cost, schedule, and performance goals involves the interaction of program, technical, and budget/accounting personnel until the project is completed or, on rare occasions, terminated. To effectively manage projects, NASA must establish realistic cost, schedule, and technical performance goals and then work to identify and mitigate problems that can significantly increase costs, disrupt schedules, and impair performance.

NASA projects often cost substantially more than initially estimated, frequently do not meet schedules, and sometimes perform

at lower levels than originally forecast. Last year we reported on changes in cost estimates on 29 major NASA programs spanning the last 15 years. Cost estimates for about half of these programs increased by 77 percent or more. The median cost estimate increase would have been even higher except that the planned capability was reduced for a number of programs.

Reasons for the cost estimate changes included insufficient requirements determinations, budget constraints, project redesigns, overoptimistic cost and schedule goals, unanticipated technical complexity, incomplete initial cost estimates, and shuttle launch delays. We believe that NASA must be more willing to set priorities, identify and pursue cost-effective alternatives, and terminate low-priority projects when warranted. To do this effectively, NASA needs current, complete, and accurate information about projects, especially about their likely cost. All too often, NASA does not have this information. For many years, NASA has not paid adequate attention to costs, even though its world has changed. Today, NASA needs to deal with a more critical audience than the one it faced during the Cold War decades. The collapse of the Soviet Union, shortcomings in major NASA projects, the overall budget deficit, and needs in other federally funded areas, have combined to focus a critical eye on the agency. Learning to live with more restricted budgets, while at the same time, continuing to perform its science and engineering roles, will require NASA managers to elevate the importance of project cost and to better appreciate the full cost of the projects they design, develop, and operate.

The current NASA Administrator has acknowledged that successful program management requires an accurate understanding of the program's total resource requirements. We agree. Indeed, for at least the last 20 years we have pointed out that NASA's project cost estimates have been incomplete, noting in report after report the elements that NASA routinely excluded from them. Recently, we repeated our concerns that the space station cost estimate was incomplete. In March of this year, program officials testified that the cost to achieve permanent human capability on the space station would be $31.3 billion. About 2 months later, a cost estimating team independent of the NASA space station program reported that a more realistic estimate was about $34 billion to $36 billion. In a report about the same time, we concluded that the cost estimate should be about $43 billion. Our estimate includes $7.6 billion in shuttle costs not included by NASA in its estimate.

Independent cost estimating has been the subject of a number of recommendations made to NASA in recent years. The need for NASA to have an independent cost estimating capability was addressed several years ago by an external review group--the Augustine Commission. The Commission recommended that NASA establish an independent cost analysis group to advise the Administrator on

estimates provided to the Congress and the Office of Management and Budget. However, last year we reported that NASA's initial actions to establish such a group did not meet the intent of the recommendation because

-- results of formal cost reviews were not directly reported to the Administrator,

-- advice provided to the Administrator on cost estimates was informal and undocumented,

-- cost estimates were not reviewed at all major program milestones, and

-- the cost analysis group did not have adequate staff to perform independent estimates at all major milestones.

NASA's Corrective Actions

The Administrator responded to our work by announcing that he intended to establish a new independent cost assessment group with sufficient resources to carry out the functions envisioned by the Augustine Commission.

NASA's efforts to improve its cost estimating is only one of a series of recently announced program and project management reforms. These other reforms include improving NASA's understanding of a project's technical requirements at its inception, committing program managers to meeting those requirements within agreed cost and schedule goals, and providing early identification and resolution of development problems.

This last reform involves the use of the new Senior Program Management Council to provide Administrator-level attention to the progress, or the lack of progress, in a project's development. The Council process provides for a continuous review of programs and may ultimately lead to termination of a project. That possibility currently confronts the Advanced Solid Rocket Motor because of budgetary pressures and the absence of a firm, near-term requirement.

The Advanced Solid Rocket Motor was intended to enhance the space shuttle's safety and reliability and to provide an additional 12,000 pounds of payload capacity. To date, the new motor's estimated development cost has more than doubled--to $3.8 billion--and its first flight has slipped by about 6-1/2 years--to the end of 2000, at the earliest.

NASA advisory groups have questioned the need to develop the new motor because the current motor has proven safe and reliable since being redesigned after the Challenger accident. Moreover, the only two payloads that would require the new motor's added lift are the

Advanced X-Ray Astrophysics Facility and the space station's laboratory modules. As noted previously, the astrophysics facility has been redesigned into two smaller payloads, and the smaller of the two will be launched by an expendable rocket.

The space station is also being redesigned, and it does not appear that it will need the Advanced Solid Rocket Motor either. According to the report of the Advisory Committee on the Redesign of the Space Station, the new motor will not be required to launch the redesigned station. The Committee noted that even if NASA decides to put the station in the type of orbit that requires more shuttle capability, that capability can be obtained in a number of ways that do not require the new motor.

The House-Senate conference committee on NASA's fiscal year 1994 appropriations provided about half of the funding requested for the new motor's development. The committee also gave NASA until November 15, 1993, to determine whether it wants to continue the program and identify the source of the program's additional funding.

IMPROVING OPERATIONS AND OVERSIGHT

NASA can improve its efficiency and effectiveness by improving oversight of its program offices, field centers, and contractors, thereby reducing the risk of inconsistent and substandard performance. Specifically, NASA

-- needs a Chief Financial Officer to provide the strong and sustained leadership needed to correct the agency's substantial and long-standing accounting and financial management weaknesses;

-- must find ways to operate its most expensive program--the space shuttle--more efficiently, since the shuttle will have to continue as NASA's major means of access to space well into the early part of the 21st century;

-- needs to improve its procurement policies and procedures to help make its contracting activities more efficient and better protect the government's interest; and

-- should provide the budgetary support needed to correct weaknesses in the testing of space projects, in the storing and archiving of space science data, in maintaining its facilities, and in establishing and operating adequate environmental protection programs.

Reporting Under the Financial Integrity Act and Need for a Chief Financial Officer

Recently we reported that NASA's annual report, required by the Federal Managers' Financial Integrity Act, did not accurately characterize or fully disclose the weaknesses in NASA's internal management controls or the failure of its accounting systems to conform to the Comptroller General's accounting principles and standards. Almost 90 percent of NASA's budget is spent on procuring goods and services, and sound procurement decisions in NASA are largely dependent on sound financial management systems. However, NASA's accounting and financial management systems have serious material weaknesses that hamper NASA's ability to safeguard, manage, and control its budget authority. For example:

-- Contractors' periodic cost reports, which are a key source of data for program, project, and contract management information systems, were often late, insufficiently detailed, and sometimes not received at all.

-- NASA had not performed required reconciliations between subsidiary and general ledger accounts as required by the Comptroller General's accounting standards.

-- NASA's internal financial controls did not ensure that the type and value of government property held by contractors were accurately reported.

NASA needs to comply with the Chief Financial Officers Act of 1990 and, through its Chief Financial Officer, ensure the correction of deficiencies in its accounting and financial management systems. The NASA Administrator recently assured the Comptroller General of his commitment to correct the agency's deficiencies within the intent of both the financial integrity and chief financial officers acts. He also acknowledged the urgency of having a Chief Financial Officer to establish broad financial management leadership.

Improving Shuttle Operating Efficiency

NASA has recognized the need to reduce the cost of its most expensive program--the space shuttle. Currently costing at least $4 billion a year, operating the shuttle system consumes over 30 percent of NASA's total budget. NASA wants to lower this proportion and has established a goal to reduce shuttle operating costs by 25 percent by fiscal year 1997. Accomplishing a reduction of this magnitude will require the streamlining or elimination of many flight processing procedures and related documentation requirements. In doing so, special care will be required to see that these efforts do not compromise safety, either on the ground or in flight.

Because the shuttle is the only U.S. vehicle for carrying humans into space, and it is likely to remain so well into the first two decades of the 21st century, NASA must continue to upgrade shuttle components and subsystems to prevent obsolescence and maintain or enhance the shuttle's safety margins.

Improving Procurement and Contract Management

Since the late 1980s, primarily on the basis of reviews performed by the NASA Inspector General and its own internal management studies, NASA has recognized contract and subcontract management as a material weakness under the financial integrity act. NASA contract management also has been identified as a high-risk area by the Comptroller General, and our work in this area over the last several years has addressed major contract management activities in NASA, including its management of contract changes and its coordination and oversight of contract administration services it requests DOD to perform. Our work confirms NASA's view that it has serious contract management problems.

NASA has been working to improve its management of contracts. At the same time, the agency is attempting to increase the efficiency of its procurement activity. For example, NASA has taken, or is considering a variety of steps to improve procurement efficiency and contractor accountability, including

-- simplifying procedures on procurements valued between $25,000 and $500,000,

-- increasing contractor liability for correction of defects in material or workmanship,

-- changing its award fee policy to emphasize performance of the finished product rather than progress in meeting interim goals,

-- reporting semiannually to senior NASA management on contractors' performance on key contracts,

-- awarding 8 percent of NASA's contract dollars to small businesses and other organizations owned or controlled by socially and economically disadvantaged individuals, and

-- reducing the number and value of the agency's unpriced contract changes.

We are currently reviewing NASA's progress in implementing these initiatives at the request of the House Committee on Government Operations. We expect to report on the results of our work in early 1994. Also at the Committee's request, we are examining another area of contractor oversight--reviews of contractors' overhead cost submissions on NASA contracts. NASA relies on other organizations, principally the Defense Contract Audit Agency, and

the Defense Contract Management Command to review the cost submissions and to determine whether overhead costs are allowable under the Federal Acquisition Regulation. At the Committee's request, we are currently examining the extent to which unallowable or questionable overhead costs were submitted for reimbursement by two major NASA contractors. The preliminary results of our work at the first contractor shows that the overhead cost submissions included some unallowable and questionable costs because (1) the contractor's internal controls for screening them out were inadequate and (2) the Defense Contract Audit Agency's transaction testing was inadequate to assess the effectiveness of such controls. For example, we found unallowable costs for expenses relating to lobbying activities. Our work at the first NASA contractor is currently being finalized, and we will be reporting to you shortly. Our work at the second contractor has only recently begun.

Other Operations and Oversight Improvement Opportunities

On the basis of our work over the past several years, we believe there are some other areas which need to continue to receive management attention. Specifically we are concerned about long-standing weaknesses in the area of testing space projects, storing and cataloging space science data, maintaining facilities, and establishing and operating adequate environmental protection programs. We do not believe that the budgetary pressures within the agency should be allowed to impede efforts to improve these activities. We plan to follow up on them to determine whether the recommended corrective actions have been fully implemented throughout the agency.

Space Project Testing

The recent failure of the Mars Observer spacecraft has renewed interest in NASA's space project testing policies and practices and the agency's oversight of contractor testing. Two years ago we reported that NASA's testing practices were varied because the agency had no uniform policies governing testing. Testing guidance was fragmented, not well defined, and differed from one NASA field center to another. We noted that all NASA centers had oversight controls to help ensure that contractors properly planned and conducted tests and reported their results. Controls at some centers, however, could be further strengthened if NASA (1) approved contractor-prepared plans and procedures for all critical tests, (2) conducted independent reviews of testing on major programs, and (3) provided adequate staff with the requisite skills to monitor contractor testing. In response to our report, NASA agreed that it needs an overall testing policy. The policy is scheduled to be issued early this fiscal year.

Science Data Management

NASA's programs over the years have generated enormous amounts of space science and engineering data, some of it potentially useful to future missions--the Earth Observing System for example. All this data makes NASA an archivist--a role the agency has not performed especially well. In 1990, we reported that NASA was not retaining data from some important missions and was not requiring missions to have data management plans. We also found widely varying and potentially harmful physical storage conditions throughout NASA. In response to a request from a House subcommittee, we recently reviewed NASA's efforts to respond to our past recommendations to establish more effective management controls for properly storing space science data and for identifying and cataloging data having potential long-term scientific value. We expect to report later this fall on the status of NASA's efforts.

Facilities Maintenance

In 1990, we reported that many of NASA's facilities had not been adequately maintained, were in degraded condition, and needed significant repair. Several serious incidents had been caused by the facilities' deterioration, including a fire and steam line explosion. Deferred or insufficient maintenance increased the likelihood of such events, as well as the cost of maintenance over the long run.

For the most part, the responsibility for maintaining NASA's facilities had been left to the discretion of the field centers. Historically, NASA had not conducted annual surveys to determine maintenance requirements and had allocated far fewer funds than the 2 to 4 percent of facilities' replacement value that generally accepted maintenance guidelines dictated. We made a series of recommendations to NASA that were designed to help establish an agencywide facilities maintenance program. Since our report, NASA has completed action on our recommendations. We will revisit this area this year to determine if NASA is reversing the deterioration of its facilities.

Environmental Protection Activities

Several years ago, we reported on the absence of a systematic, agencywide program for environmental protection. NASA knew that it had a variety of environmental problems at its field centers due to both its own activities and those of previous military owners, and it had undertaken or planned many cleanup projects. However, the costs of these projects were unknown, and the extent of the needed cleanup was unclear because studies of many contaminated sites were not completed.

As with facilities maintenance, NASA delegated the responsibility for environmental protection to the field centers without having an agencywide strategy and an effective monitoring and management system. We made a series of recommendations designed to develop standards, guidelines, reporting requirements, and information-sharing arrangements that would foster an agencywide approach to identifying and correcting environmental problems. NASA has implemented most of our recommendations and is currently completing action on the rest. We will review NASA's efforts to correct its environmental problems this year.

PRESERVING U.S. AERONAUTICS LEADERSHIP

Foreign companies have been making significant gains in the global market for aeronautics products at the expense of U.S. manufacturers. This is especially disturbing because the aerospace industry provided a $29 billion positive contribution to the U.S. trade balance in 1991.

The National Aeronautics and Space Act of 1958 charged NASA with preserving the role of the United States as a leader in aeronautical science and technology. In testimony last year we noted that funding for NASA's aeronautics program had been limited and, over the past 20 years, it had declined as a percentage of the overall NASA budget. Also, we noted that (1) the program was weighted heavily towards fundamental research that was not especially supportive of the aircraft industry's near-term competitiveness needs, and (2) NASA was having difficulties supporting the wind tunnel test requirements of major U.S. aircraft companies. After our testimony, and the issuance of a subsequent National Academy of Science report with similar findings, NASA's aeronautics program began to receive increased attention. The President's fiscal year 1994 budget proposed increased aeronautics research funding, especially for large subsonic transport jets--the market area with the greatest near-term sales potential. The budget proposal also would upgrade and revitalize NASA's aeronautic testing facilities including wind tunnels.

In continuing our focus on the aeronautics area, we recently completed work related to NASA's responsibility to transfer technology to the U.S. aeronautics industry--reviewing NASA's management of both its aeronautical technology transfer and technology protection responsibilities.

We found that in managing its transfer activities, NASA does not have an adequate system to comprehensively monitor and measure the ultimate applications of the technologies it develops. Without this information, the agency is not in a position to focus its resources on preserving the international competitiveness of the U.S. civil aeronautics industry and cannot readily determine the impact of its technology transfer activities on the industry's competitiveness. NASA recognized this problem, and late last year

the Administrator issued a directive giving technology transfer an increased emphasis within NASA. The directive endorsed the need for NASA's field centers to be responsible for, and to be evaluated on, their technology transfer performance and provided an initial approach for systematically gathering information on both the process and effectiveness of technology transfer.

Along with its enabling legislative mandate to provide the "widest practicable and appropriate dissemination of information," NASA recognizes a concurrent responsibility to protect competitively sensitive research results from inappropriate disclosure. NASA believes that, as a leader in the development of key aerospace technologies, it is vulnerable to economic espionage. This belief, coupled with a change in global economic competition, has made NASA cautious about sharing technical information internationally.

However, NASA's caution is potentially affected by the requirements of the Freedom of Information Act, which requires federal agencies to promptly make agency records available to anyone who requests them, including representatives of foreign governments or companies. NASA records that contain competitively sensitive information are not necessarily covered by any of the nine exemptions from disclosure under the act.

To help control the potential for inappropriate dissemination of competitively sensitive information, NASA sometimes strictly interprets a Freedom of Information Act requirement for a reasonable description of an agency record in order to deny requests. NASA also interprets the concept of national security under the Arms Export Control Act as covering competitive sensitivity when it reviews and recommends amendments or denials to export license applications.

In our review at two of NASA's three aeronautical centers we did not find that NASA was transferring competitively sensitive aeronautical information to U.S. industry's foreign competitors. However, NASA remains concerned about its potential vulnerability and, earlier this year, the Associate Administrator for Aeronautics initiated a process to develop a new policy addressing the identification, handling, measurement, and tracking of competitively sensitive information. NASA expects to have the new policy in place this fiscal year.

OBSERVATIONS

Given the risky nature of its business, NASA will likely have failures along with its successes. The key requirement is to do everything that reasonably can be done to ensure success under an affordable program. Unfortunately, this requirement is not currently being met, as amply demonstrated by our work and that of the NASA Inspector General, other external review groups, and the agency's own internal management review groups. Clearly, NASA has

significant management problems that it needs to vigorously address.

The issues included in my testimony today are largely known to NASA management and, in varying degrees, are currently being addressed within the agency. The most hopeful sign we see for the future of NASA is a somewhat intangible one--NASA as an agency determined to identify and confront its problems. However, the challenges facing NASA's management are not easy ones to surmount. Their significance has been slowly building over a long period--in some cases, for decades--and many are deeply embedded in the way NASA has traditionally done business. Indeed, when viewing these challenges, we must bear in mind that NASA operates largely in a decentralized fashion, with its field centers having considerable operating latitude in many areas, including the award and administration of almost all of the agency's contracts. For this approach to be effective, headquarters must establish clear expectations and carefully monitor and measure the centers' management of their own activities, as well as those of NASA's contractors.

While NASA's senior management's commitment to improvement is promising, delivering on it will require development and maintenance of new and improved management systems and demand perseverance and strong leadership to overcome long-standing attitudes and practices that uncritically extol tradition and resist change. Continued vigorous oversight will be required to ensure an affordable and effective NASA.

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Mr. Chairman, this concludes my statement. I will be pleased to answer any questions you or the members of the subcommittee may have.

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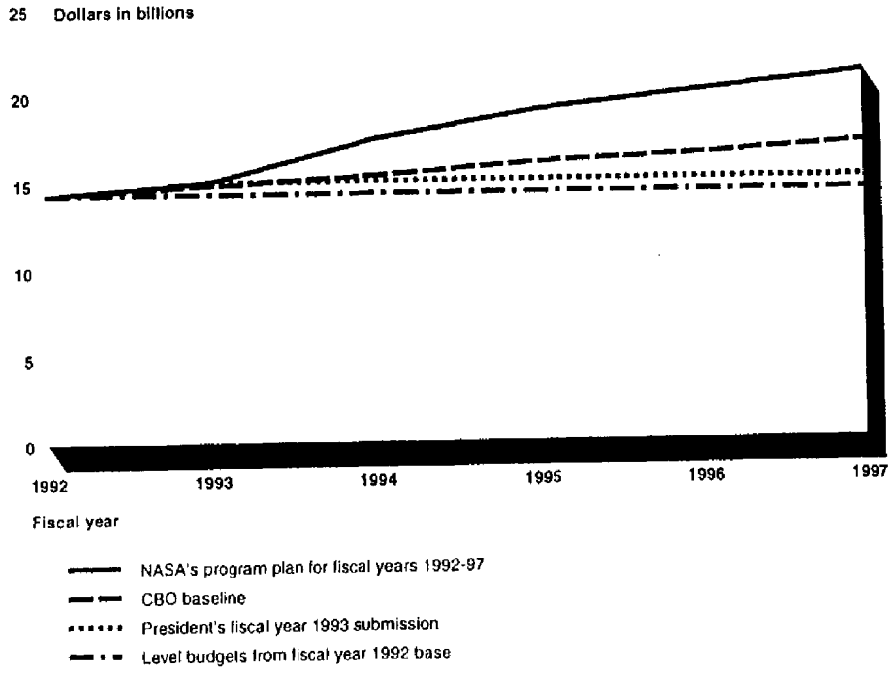
Potential Shortfalls in Funding NASA's 5-year Plan



ATTACHMENT 1

ATTACHMENT II

Funding for NASA's Programs Reduce Resources for Other Programs

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