



## Testimony

Before the Committee on Science, Subcommittee on Space  
and Aeronautics, House of Representatives

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# NASA MANAGEMENT CHALLENGES

## Human Capital and Other Critical Areas Need to be Addressed

Statement of David M. Walker, Comptroller General of the United States



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Mr. Chairman and Members of the Subcommittee:

I appreciate the opportunity to discuss the major management challenges and program risks facing the National Aeronautics and Space Administration (NASA). Right now, NASA is at a critical juncture. Clearly, since its inception, NASA has advanced space exploration and scientific knowledge and accomplished unparalleled feats of engineering. But NASA is now facing difficulties, particularly in terms of maintaining a skilled workforce, controlling costs, and providing effective oversight for important projects. Such problems have been debilitating to important space missions. For example, substantial space station cost growth, which NASA became aware of in early 2001, has resulted in cutbacks in construction, the number of crew members, and scientific research, and, in turn, raised concerns about the viability of the program and has negatively impacted the agency's credibility with the Congress.

Recognizing the need for change, NASA's new Administrator, Sean O'Keefe, has recently articulated a new vision for NASA—one that is science-driven, not destination driven. To put NASA on a better footing to fulfill this vision, the agency is taking on a major transformation aimed at eliminating stovepipes, becoming more integrated and results oriented, and reducing risks while working more economically, efficiently and effectively. Although NASA is in the very early stages of this transformation, it is already undertaking initiatives to reshape and strengthen its workforce, including developing a strategic human capital plan and an agencywide workforce planning and analysis system. This subcommittee is also considering legislation proposed by NASA

that would provide the agency with an assortment of tools and authorities to facilitate its efforts to recruit and retain skilled personnel and reshape its workforce.

The subcommittee asked that we discuss the four major management challenges we identified at NASA in our latest *Performance and Accountability Series* report. These include: (1) strengthening human capital; (2) controlling International Space Station costs; (3) implementing a faster, better, cheaper approach to space exploration; and (4) correcting weaknesses in contract management. First, however, it is very important to recognize that NASA's efforts to address these challenges and undertake a transformation represent a subset of a larger need to fundamentally transform the federal government in light of recent trends and long-range fiscal challenges. In this context, I will discuss some of the essential actions that need to be taken by NASA in order to assure that this transformation will become a reality.

Successfully addressing each of the four challenges will be critical for NASA in making sure that it is equipped to achieve its vision for the future. The first challenge-- strengthening human capital--will require a concerted and sustained effort by NASA's leadership to commit to change; develop a strategy that ensures the organization has the appropriate mix of employees to meet future business needs; implement effective approaches for acquiring, developing, and retaining talent; developing and retaining talent; and create a results-oriented culture. The remaining challenges facing NASA-- controlling International Space Station costs, implementing a faster, better, cheaper approach to space exploration, and correcting weaknesses in contract management--are

equally important to address. Without better oversight and management over its most important programs and acquisitions, NASA’s transformation stands to lose credibility and support among its partners in industry, the international community, and academia as well as the support of the Congress.

## BACKGROUND

NASA’s mission encompasses human exploration and development of space, the advancement and communication of scientific knowledge, and research and development of aeronautics and space technologies. Its activities span a broad range of complex and technical endeavors—from investigating the composition, evaluation, and resources of Mars; to working with its international partners to complete and operate the International Space Station; to providing satellite and aircraft observations of Earth for scientific and weather forecasting purposes; to developing new technologies designed to improve air flight safety. In January 2001, we reported that, overall, NASA spends more than \$12 billion annually for goods and services supporting these and other activities, mostly on contracts with businesses and other organizations.<sup>1</sup>

Since 1990, we have periodically reported on government operations that we identified as “high risk”, because of their vulnerabilities to fraud, waste, abuse, and mismanagement.

Since 1999, we have provided each new Congress with a series of reports entitled

*Performance and Accountability Series: Major Management Challenges and Program*

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<sup>1</sup> U.S. General Accounting Office, *Major Management Challenges and Program Risks: National Aeronautics and Space Administration*, GAO-01-258 (Washington, D.C.: Jan. 2001).

*Risks* providing a perspective on performance and management challenges across the federal government, and updated those operations and programs that we have identified as “high risk”.

Our reports have identified a number of major management challenges at NASA. In our last report,<sup>2</sup> issued in January 2001, we identified four challenges that warrant increased NASA attention, including one area—contract management—that we continue to categorize as high risk. These four challenges are still applicable today. We plan to issue our next performance and accountability report in January 2003.

#### ESSENTIAL ELEMENTS OF MAKING A TRANSFORMATION

NASA’s recognition that it needs to make a transformation to a more integrated and results-oriented organization comes amid a period of profound transition for our government. This transition is being driven by a number of key trends, including: global interdependence; diverse, diffuse, and asymmetrical security threats; rapidly evolving science and technology; dramatic shifts in the agency and composition of the population; important quality of life issues; the changing nature of our economy; and evolving government structures and concepts. These trends present a range of challenges that have no boundaries. These trends also contribute to the huge, long-range fiscal and budget challenge facing the United States.

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<sup>2</sup> GAO-01-258.

Given these trends and long-range fiscal challenge, the federal government needs to engage in a comprehensive review, reassessment, and reprioritization of what the government does, how it does business, and who does the government's business. For their part, agencies like NASA must re-examine their policies, programs, and operations as well as their human capital policies and practices. The status quo is simply unacceptable. The long-range numbers do not add up. This re-examination will in turn require federal agencies to transform their cultures and shift their overall orientation from:

- Process to results
- Stovepipes to matrixes
- Hierarchical to flatter and more horizontal structures
- An inward focus to an external (citizen, customer, and stakeholder) focus
- Management control to employee empowerment
- Reactive behavior to proactive approaches
- Avoiding new technologies to embracing and leveraging them
- Hoarding knowledge to sharing knowledge
- Avoiding risk to managing risk
- Protecting turf to forming partnerships.

The nature and scope of the cultural transformation that needs to take place in many agencies across the federal government will take years to accomplish—easily outrunning

the tenures of most political appointees. At the same time, our work over the years has amply documented that many agencies suffer from a range of long-standing management challenges and a lack of attention to basic stewardship responsibilities, requiring concerted action and sustained top-level attention if they are to be addressed.

One option for addressing the issues agencies face is to create a Chief Operating Officer (COO) position for selected departments and agencies that would provide sustained management attention essential for addressing key stewardship responsibilities in an integrated manner while helping to facilitate the transformation process within an agency. The long-term responsibilities, professional and nonpartisan in nature, could include strategic planning, organizational alignment, core values stewardship, human capital strategy, performance management, communications and information technology management, financial management, acquisition management, risk management, knowledge management, matrix management, and change management. Ideally, the COO position should be at the Deputy level, have a term appointment of 5 to 7 years, and be subject to a performance contract.

I testified before the National Commission on Public Service, chaired by Paul Volcker, earlier this week. During my testimony, I noted that agencies that are experiencing particularly significant challenges in integrating disparate organizational cultures along with agencies engaged in major transformation efforts, like NASA, may be especially appropriate first phase candidates for a COO position.<sup>3</sup>

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<sup>3</sup>U.S. General Accounting Office, *Managing for Results: Using Strategic Human Capital Management to Drive Transformational Change*, GAO-02-940T (Washington, D.C.: July 15, 2002).

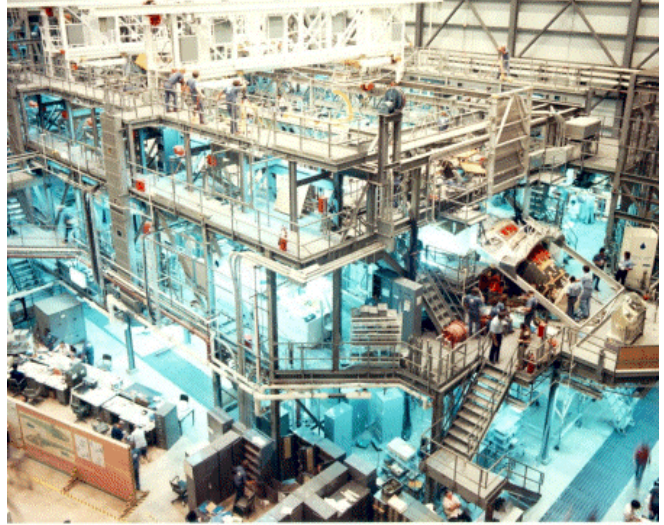


NASA is just beginning to undertake major efforts to transform itself. Mr. O’Keefe came on board as the agency’s new Administrator in January 2002 and began articulating his vision for NASA’s future this April. Concurrently, NASA is undertaking human capital and other management initiatives designed to foster better financial management, information technology management, and budget and performance integration. In view of these efforts, the Office of Management and Budget this week identified NASA as leading the government in progressing toward the implementation of five governmentwide change initiatives contained in the President’s Management Agenda. These include: strategic human capital management; competitive sourcing; improved financial performance; expanded electronic government; and budget and performance integration. While NASA’s progress is noteworthy, it is currently rated as a “red light” in each of the five key areas in the President’s Management Agenda.

## STRENGTHENING HUMAN CAPITAL

### *The Challenge*

Like many agencies, NASA is facing substantial challenges in attracting and retaining a highly skilled workforce. Left unchecked, reductions in the space shuttle workforce would have jeopardized NASA's ability to safely support the shuttle's planned flight rate. NASA is taking comprehensive steps to address this problem, but the agency needs to make sure that it can sustain its commitment to implementing a strategic approach to marshaling, managing, and maintaining human capital.



*Attracting and retaining a workforce with science, engineering, and technology skills is critical to keeping the space shuttle safe and operational.*

Leading public organizations here in the United States and abroad have found that strategic human capital management must be at the centerpiece of any serious change management initiative and efforts to transform the cultures of government agencies. People are an agency's most important organizational asset. They define its culture, drive its performance, and embody its knowledge base.

In January 2001, we designated strategic human capital management as a governmentwide high-risk area. As our January 2001 High-Risk Series and Performance and Accountability Series reports make clear, serious human capital shortfalls are eroding the ability of many agencies, and threatening the ability of others, to economically, efficiently, and effectively perform their missions. Plainly, the problem is not federal

employees. Rather, the problem is the lack of a consistent strategic approach to marshaling, managing, and maintaining the human capital needed to maximize our government performance and ensure its accountability. Our High-Risk report outlined four pervasive human capital challenges now facing the federal government.

- Leadership, continuity, and succession planning
- Strategic human capital planning and organizational alignment
- Acquiring and developing staffs whose size, skills, and deployment meet agency needs
- Creating results-oriented organizational cultures.

As we reported in January 2001, the shuttle workforce had declined significantly in recent years to the point of reducing NASA's ability to safely support the program. Many key areas were not sufficiently staffed by qualified workers, and the remaining workforce showed signs of overwork and fatigue. To the agency's credit, NASA has recognized the need to revitalize the shuttle's workforce, discontinued its downsizing plans for the shuttle program in December 1999 and initiated efforts to hire new staff. In September 2001, we testified that NASA was hiring approximately 200 full-time equivalent staff and it had focused more attention on human capital in its annual performance plan by outlining an overall strategy to attract and retain a skilled workforce. But even with these gains, there were still considerable challenges. For example, NASA's new staff would require considerable training and the agency still needed to deal with critical losses due to retirements in coming years.

NASA believes that similar workforce problems affect the entire agency. The average age of its workforce is over 45, and the agency is finding it particularly difficult to hire people with engineering, science, and information technology skills—fields critical to NASA missions. At this time, within the science and engineering workforce, the over-60 population outnumbers the under-30 population nearly 3 to 1. Currently, 15 percent of NASA’s science and engineering employees are eligible to retire; within 5 years, about 25 percent will be retirement eligible. At the same time, the pipeline of people with science and engineering skills is shrinking. According to NASA’s Inspector General, the agency is also facing the loss of significant procurement expertise through the year 2007.

NASA is taking steps to address its workforce predicament. For example, it is developing an agency-wide integrated workforce planning and analysis system as part of its new financial management system. This system is expected to track the distribution of NASA’s workforce across programs, capture critical competencies and skills, determine management and leadership depth, and facilitate gap analyses.

NASA has also developed a strategic human capital plan, which incorporates strategies, tactical actions, and metrics to support human capital goals. The plan has been submitted to the Office of Management and Budget and the Office of Personnel Management for review. The plan is based on a planning model developed by the Office of Personnel Management (OPM) as well as our own model, which we published in March 2002.<sup>4</sup>

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<sup>4</sup> U.S. General Accounting Office, *A Model of Strategic Human Capital Management*, GAO-02-373SP (Washington, D.C.: March 2002).

Our model is designed to help agency officials effectively lead and manage their people and integrate human capital considerations into their daily decision-making and the program results they seek to achieve. In doing so, the model highlights the importance of a sustained commitment by agency leaders to maximize the value of their agency's human capital and to manage related risks. Consistent with OPM's and the Office of Management and Budget's views, our model of strategic human capital management embodies an approach that is fact-based, focused on achieving strategic results, and incorporates merit principles and other national goals.

Additionally, NASA has renewed attention to hiring applicants just out of college and intends to pursue this even more aggressively in coming years. It is also undertaking a number of initiatives and activities aimed at acquiring and retaining critical needed skills, such as using the new Federal Career Intern Program to hire recent science and engineering graduates, supplementing the workforce with nonpermanent civil servants where it makes sense, and implementing a program to repay student loans to attract and retain employees in critical positions.

This subcommittee is currently considering a series of legislative proposals developed by NASA to provide it with further flexibilities and authorities for attracting and retaining a skilled workforce. These include streamlining hiring procedures; making noncompetitive conversions of term employees to permanent positions; offering larger recruitment, relocation, and retention bonuses; expanding use of early retirement; and providing authority for permanent and enhanced buyouts.

Several of the NASA issues mirror aspects of other legislative proposals such as the Federal Human Capital Act.<sup>5</sup> While we have not performed a detailed analysis of the support behind NASA's legislative proposals, several points are worthy of consideration.

- First, before agencies embark on major changes to their human capital management strategy, they must come to grips with developing a realistic picture of how they can reconcile their wants, needs, and affordabilities. This will require difficult tradeoffs.
- Second, the addition of flexibilities and authorities alone will not solve an agency's workforce problems. Agencies need to undertake a wide array of initiatives to attract, retain, and motivate a top quality workforce. These include such actions as revitalizing recruiting and college relations efforts; conducting employee feedback surveys to set priorities and assess progress; conducting employee preference surveys so employees can be given the opportunity to work in areas that interest and energize them consistent with overall institutional needs; inventorying the skills and knowledge of existing employees; initiating professional development programs for newly hired staff to help them transition and progress; implementing modern, effective, and credible performance appraisal and management systems; redesigning training programs to directly link them to core competencies; and implementing employee-friendly benefits, such as day care centers, business casual dress, flextime, and public transportation subsidies.

- Third, agencies need to make the most of current flexibilities and authorities already available. These flexibilities are identified by OPM in its guide, *Human Resource Flexibilities and Authorities in the Federal Government*. They include such things as the ability to use commercial recruiting firms to recruit for vacancies; customize merit promotion plans and performance systems; increase basic pay to attract and retain staff with unusually high or unique qualifications; and grant substantial cash incentive awards. Agencies should develop a sound business case for using these flexibilities by focusing on how a given flexibility will address human capital challenges and ultimately improve agency results. In tandem with exercising these flexibilities, agencies must learn to effectively balance its pay and incentive programs to encourage both individual and team contributions to achieving results.
- Fourth, agencies need effective succession planning. NASA's workforce profile, particularly for science and engineering workers, points to the need for this. Faced with the same problems at GAO, we reinstated our Executive Candidate Development Program, under which candidates are selected through a rigorous competitive process and are prepared for assignments at the SES level. While the potential loss of expertise through retirements will be substantial, this turnover also affords NASA's Administrator the opportunity to change culture, skill mix, deployment locations, and other agency attributes. NASA will, however, need to leverage technology and

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<sup>5</sup> We previously testified on this proposed legislation in March 2002. See U.S. General Accounting Office, *Managing for Results: Building on the Momentum for Strategic Human Capital Reform*. GAO-02-528T (Washington, D.C.: March 2002).

enhance its training efforts to help make this transition and facilitate needed knowledge sharing initiatives.

- Fifth, agencies must ensure that strategic human capital plans are results-oriented and data driven. This includes developing appropriate information on the number and location of employees and their key competencies and skills as well as data on the profile of the workforce, performance goals and measures for human capital approaches. Further, agencies must effectively use this data to develop strategies that continually ensure they have the right mix of employees to meet its future needs. A key to success in this area will be NASA's ability to implement its new financial management system, since it will encompass the new workforce planning and analysis system.

Instituting a results-oriented culture involves fostering a collaborative environment where managers, teams, and employees are empowered to accomplish programmatic goals. It also includes creating a performance management system that provides candid and constructive information to individual employees, objective and fact-based information to managers, and the information and documentation necessary to deal with poor performers.

Modernizing agency performance appraisal and management systems and linking them to strategic plans and desired outcomes should be a top priority. Leading organizations use their performance management systems as a key tool for aligning



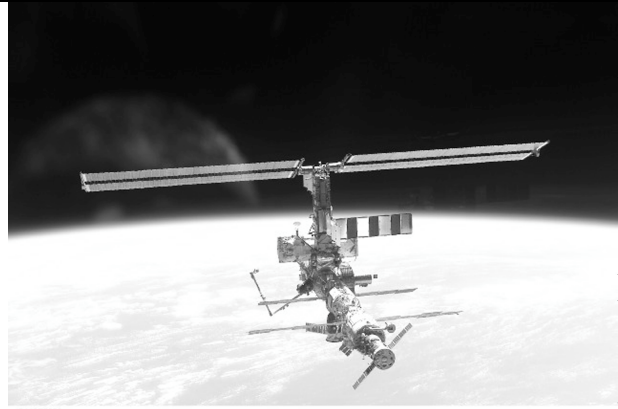
institutions, unit, and employee performance; achieving results; accelerating change; managing the organization on a day-to-day-basis; and facilitating communication through the year so that discussions about individual and organizational performance are integrated and ongoing. To be successful in doing this, the performance management system must link pay and incentive programs to individual knowledge, skills, and abilities and contributions to achieving organizational results.

- Lastly, it is critical for agencies to sustain commitment to embracing human capital management. Agency leaders need to see people as vital assets to organizational success and must invest in this valuable asset. Agencies can foster this thinking and commitment in their future leaders through efforts such as succession planning and executive development. In addition, agencies need to hold managers accountable for effectively managing people and actively supporting these concepts. In NASA's case, the importance of the Administrator's personal commitment to change the workforce as well as the way the agency does business cannot be overstated. His leadership and commitment is essential, but he will need help to be successful, particularly from managers at NASA centers in order to overcome resistance to share knowledge and new ideas.

## CONTROLLING SPACE STATION COSTS

### ***The Challenge***

Development costs for the International Space Station have soared to the point where NASA has had to make substantial cutbacks in the program. This has negatively impacted NASA's credibility with Congress and raised concern among international partners and the scientific community about the viability of the space station. NASA is taking action to keep costs in check, but its success in this area still faces considerable challenges.



*Cost overruns have hampered efforts to build and operate the International Space Station*

The International Space Station is characterized as one of the most challenging engineering feats ever attempted. It also represents an important effort to foster international cooperation in scientific research and space exploration. But NASA has been facing considerable difficulties in controlling costs and maintaining the scheduling. The cost to complete assembly has mushroomed by about \$5 billion to the current estimate of about \$30 billion, and while assembly of the station was originally expected to be completed in 2002, NASA now expects it to be done in 2006. As a result, NASA has had to make substantial cutbacks in the program, which in turn, has raised concern among NASA's international partners and the scientific community about the viability of the space station. The future of the space station program hinges on NASA's ability to stem cost growth and schedule delays and to reestablish its credibility with Congress, NASA's international partners, and the scientific community.

NASA has had difficulty predicting and controlling costs and scheduling for the space station since its inception in 1984. In September 1997, we reported that the cost and schedule performance of the space station's prime contract, which showed signs of deterioration in 1996, had continued to worsen steadily and that program financial reserves for contingencies had deteriorated, principally because of program uncertainties and cost overruns. In our January 2001 Performance and Accountability Series report, we reported that the prime contract for the space station was initially expected to cost over \$5.2 billion, and the assembly of the station was expected to be completed in June 2002. But by October 2000, the prime contractor's cost had grown to about \$9 billion, of which \$986 million was for cost overruns, and the station was not expected to be complete until April 2006. NASA's Office of Inspector General (OIG) reported the same cost overrun in a February 2000 audit report, and based on recommendations in that report, NASA agreed to take several actions, including discussing the prime contractor's cost performance at regularly scheduled meetings and preparing monthly reports to senior management on the overrun status.

Our recent work shows that the reasons for continued cost growth include inadequate definition of requirements, changes in program content, and schedule delays and inadequate program oversight.<sup>6</sup> NASA has controls in place that should have alerted management to the growing cost problem and the need for mitigation, but these were largely ignored because of NASA's focus on fiscal year budget management rather than on total program cost management.

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<sup>6</sup> U.S. General Accounting Office, *Space Station: Actions Underway to Manage Cost, but Significant Challenges Remain*, GAO-02-735 (Washington, D.C.: July 18, 2002).

The estimated cost growth is having a profound effect on the utility of the space station—with substantial cutbacks in construction, the number of crewmembers, and scientific research. As a part of the space station restructuring, further work and funding for the habitation module and crew return vehicle have been deferred, thus requiring the on-orbit crew to be reduced from 7 to 3 members. This will limit the crewmember hours that can be devoted to research. Additionally, NASA has cut back on the number of facilities available for research—from 27 to 20. This will eliminate some experiments, such as those relating to biotechnology. NASA's international partners and the scientific community are not satisfied with these and other reductions in capabilities and have raised concerns about the viability of the space station science program.

NASA is instituting a number of management and cost estimating reforms. But there are significant challenges to their successful implementation. First, NASA is now preparing a life cycle cost estimate for the program. Completing this may be difficult because NASA's financial management system has proven inadequate for tracking space station costs. Second, NASA is undertaking several studies to see how research can be maximized, but these will not be completed until September 2002, leaving NASA with a small window of opportunity to incorporate their results into the 2004 budget. Third, NASA has not yet reached an agreement with its international partners on an acceptable on-orbit configuration, sharing of research facilities, and the sharing of cost. Thus, the capacity and capabilities of the space station, the scope research that can be accomplished, and the partners' share of operating costs are unknown at this time.

IMPLEMENTING A FASTER, BETTER, CHEAPER  
APPROACH TO SPACE EXPLORATION

***The Challenge***

NASA has been following a faster-better-cheaper management philosophy to reduce costs, become more efficient, and increase scientific results by conducting more and smaller missions in less time. While NASA has had many successes, failures of two Mars probes shows that there are limits to this approach, particularly in terms of NASA's ability to learn from past mistakes. NASA has taken steps in recent years to strengthen lessons learning within the agency, but more needs to be done to overcome cultural and organizational impediments.



*The Mars Sojourner Rover was built under the faster-better-cheaper philosophy.*

Since 1992, NASA has been following a faster-better-cheaper management philosophy to reduce costs, become more efficient, and increase scientific results by conducting more and smaller missions in less time. The faster-better-cheaper approach works by focusing on building less expensive space probes much quicker than in the past. It is intended to stimulate innovative development and application of technology, streamline policies and practices, and energize and challenge a workforce to continue to safely and successfully undertake bold new missions in an era of diminishing resources.

While the approach has been successfully used for numerous missions, the failures of two missions to Mars brought increased scrutiny. The Mars Climate Orbiter, which was

intended to observe Mars' seasonal climate and daily weather from a low orbit around the planet, was lost on September 23, 1999. Then on December 3, 1999, the Mars Polar Lander, a robotic spacecraft intended to land near the South Pole of Mars for a planned 90-day mission to study the planet's layered polar terrain, was also lost.

NASA-sponsored investigative boards found that opportunities to identify and resolve problems were missed due to poor communications, budget pressures, and poor management and engineering practices. Upper management officials were not aware of the extent of the programs' problems.

In our January 2001 Performance and Accountability report, we reported that NASA still faced significant challenges to creating highly reliable missions and fostering open communications under the budget constraints of the agency's faster- better-cheaper space exploration strategy. In addition, success required an integration of lessons learned from failures on an agency-wide basis.

NASA now recognizes the importance of learning from the past to ensure future mission success and uses several mechanisms to capture and disseminate lessons learned. In January 2002, for example, we reported<sup>7</sup> that NASA had developed a Web-based lessons learned database, and used training, program reviews and periodic revisions to agency policies and guidelines to communicate lessons.

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<sup>7</sup>U.S. General Accounting Office, *NASA: Better Mechanisms Needed for Sharing Lessons Learned*, GAO-02-195 (Washington, D.C.: Jan. 30, 2002).

However, we also found that these tools were limited in their effectiveness. NASA program and project managers reported to us that they were unfamiliar with lessons generated by other centers and programs and many stated that they were dissatisfied with NASA's lessons learned processes and systems. For example, they were not using NASA's lessons learned information system partly because it was time-consuming to do so.

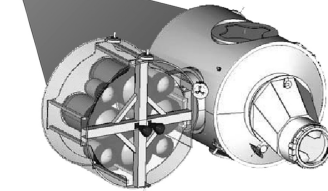
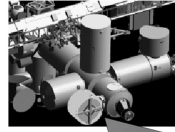
We also identified problems hampering knowledge sharing within NASA that certainly reflect a need for a significant transformation within the agency. In particular, many program and project managers told us that they believed senior management support was lacking for sharing lessons learned. There were also significant cultural barriers to knowledge sharing—beyond the difficulties associated with a stovepiped environment. For example, there were no agency-wide incentives for sharing knowledge; many managers simply lacked time to take part in knowledge-sharing activities; and the sharing of lessons learned was not highly valued across the board. Clearly, with the difficulties the agency is facing in hiring highly skilled employees, leveraging the institutional knowledge of its experienced workforce is critical.

We made several recommendations to address these underlying problems as well as recommendations to improve NASA's current knowledge sharing mechanisms. NASA generally agreed with our recommendations and plans to implement them.

## CORRECTING WEAKNESSES IN CONTRACT MANAGEMENT

### *The Challenge*

Much of NASA's success depends on the work of its contractors—on which it spends the greatest part of its funds. But for many years, NASA has not been able to effectively oversee contracts, principally because it has lacked accurate and reliable information on contract spending and it has placed little emphasis on end results, product performance, and cost control. NASA has addressed many acquisition-related weaknesses, but key tasks remain, including implementation of a new integrated financial management system.



*The initial effort to develop the Propulsion Module for the International Space Station was unsuccessful because NASA proceeded with the contractor's proposal without following fundamental contract management processes.*

Since 1990, we have identified NASA's contract management function as an area at high risk due to its ineffective systems and processes for overseeing contractor activities. Our reports and testimonies since then, have demonstrated just how debilitating contract management and oversight weaknesses can be to important space programs. Our July 2002 report on the International Space Station, for example, found that NASA did not effectively control costs as well as technical and scheduling risks, provide adequate oversight review, or effectively coordinate efforts with its partners.<sup>8</sup> In other examples, we found that NASA lacked effective systems and processes for overseeing contractor activities and did not emphasize controlling costs. NASA's accounting systems were designed prior to implementation of current federal cost accounting and financial systems that require agencies to track and maintain data for estimating and controlling costs, performance measurement, and making economic trade-off decisions.

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<sup>8</sup> GAO-02-735.



In recent years, NASA has made progress in addressing its contract management challenges. In July 1998, for example, we reported that NASA was developing systems to provide oversight and information needed to improve contract management and that it had made progress evaluating its field centers' procurement activities on the basis of international quality standards and its own procurement surveys. In January 1999, we found that NASA was implementing its new system for measuring procurement-related activities and had made progress in evaluating procurement functions in its field centers.

But much work remains to be done to strengthen contract oversight. A key task is modernizing NASA's financial management systems. According to NASA, the agency's financial management environment is comprised of decentralized, nonintegrated systems with policies, procedures, and practices that are unique to its field centers. For the most part, data formats are not standardized, automated systems are not interfaced, and on-line financial information is not readily available to program managers. Thus, it is difficult to ensure contracts are being efficiently and effectively implemented and budgets are executed as planned. In addition, NASA has pointed out that the cost to maintain these systems has been high, since both data and software are replicated at each field center.

The inadequacy of NASA's financial management system has further impact. Without a more effective financial management system, NASA will likely continue to have difficulty providing relevant, reliable, timely financial data—including cost information—that can be used on a real-time basis by program managers to monitor

costs, schedule, and performance. In March 2002, we testified<sup>9</sup> that NASA was unable to provide us with detailed support for amounts obligated against cost limits established by the fiscal year 2000 NASA Authorization Act. This was due, in large part, to NASA's lack of a modern, integrated financial management system.

To its credit, NASA is working toward implementing an integrated financial management system that it expects to be fully operational in fiscal year 2008 at an estimated cost of \$691 million. This is NASA's third attempt toward implementing a new integrated financial management system. The first two efforts were abandoned after 12 years and after spending a reported \$180 million. NASA's current approach focuses on learning from other organizations' successes in implementing similar projects, as opposed to revisiting its own failures. NASA has also abandoned the single product approach that the two prior attempts had as their basic architecture. Instead, the project will be broken down into implementable modules on the basis of the availability of proven software products.

Given the high stakes involved, it is critical that NASA's leadership provide the necessary direction, oversight, and sustained attention to ensure that this project is successful. In this regard, NASA's Administrator comes to the position with a strong management background and expertise in financial management. Based on our discussions with the Administrator, he has made clear that he plans to make financial management a top priority.

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<sup>9</sup>U.S. General Accounting Office, *National Aeronautics and Space Administration: Leadership and Systems Needed to Effect Financial Management Improvements*, GAO-02-551T (Washington,

The task ahead, however, is daunting. In a recent internal review, NASA found that the total cost estimate for deployment of the core financial module at all NASA centers had grown considerably beyond the cost initially contemplated. The review also revealed interoperability and security vulnerabilities within the current information infrastructure. To address these continuing problems, the Administrator appointed an executive to provide leadership and accountability in the direction and operation of the new system. He also recently decided that the near-term focus of the program should be to ensure a successful and rapid deployment of the core financial module—the backbone of the system—and that the schedule of the remaining modules should undergo further risks assessments before moving forward.

While modernizing NASA's financial management system is central to producing accurate and reliable financial information needed to support contract management activities, technology alone will not solve NASA's contract management problems. NASA must also ensure that the cost data collected and maintained in its financial management system are sufficiently detailed to allow comparisons of actual costs to estimates and thereby provide an early warning of cost overruns or other related difficulties. As we reported in August 2001, NASA's management practices and business processes do not always facilitate the development of this type of data. For example, we reported that NASA does not track the actual costs of completed space station components even though it often estimates the cost of these components for planning and budgeting purposes. Also, in programs such as the space station, NASA needs to

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D.C.: March 20, 2002).

effectively implement new controls planned to strengthen technical and scheduling reviews as well as risk analyses.

We are continuing to monitor NASA's progress in addressing contract management weaknesses. In response to a May 24, 2002 bi-cameral, bi-partisan request from the Senate Commerce, Science, and Transportation Committee and the House Science Committee, we are currently assessing the extent to which NASA's management of the financial management system acquisition is in accordance with effective system acquisition practices and is designed to support NASA's decisionmaking needs and external reporting requirements.

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In closing, NASA has a long and proud history, and it does many things well. But, times have changed, and NASA must change with the times in considering what it does and how it does business. Moreover, the agency is facing management challenges, which if not effectively addressed, stand to hurt NASA's credibility with the Congress and its partners and hamper important space missions. I would like to commend Mr. O'Keefe for recognizing the need to transform and making a personal commitment to the transformation effort. The steps he is taking should lay a sound foundation for change. This is reflected in OMB's recent characterization of NASA as leading the government in its progress implementing the five governmentwide initiatives identified in the President's Management Agenda. Clearly, NASA is off to a strong start on what will be

a long-term effort. The challenge ahead for NASA will be to maintain the momentum to transform, to effectively use existing and new authorities to strategically manage its people, and to quickly implement the tools needed to strengthen management and oversight.

#### CONTACTS AND ACKNOWLEDGEMENTS

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