NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

The President's Proposal:

- Realigns science programs to focus on high priority planetary exploration, climate change research, and biological sciences;
- Enables new technologies for more effective access to space, and accomplishing more capable planetary missions;
- Gets the massive cost overruns in NASA's Human Space Flight development programs under control while maintaining the U.S. core Space Station and the necessary Space Shuttle flights to safely assemble it;
- Reduces NASA's operational and institutional burdens by pursuing activities like Space Shuttle competitive sourcing, while furthering research goals in areas like Space Station-related research and development; and
- Promotes cost management reforms to ensure ongoing projects meet performance, cost, and schedule plans.

National Aeronautics and Space Administration

Sean O'Keefe, Administrator

www.nasa.gov 202–358–0000

Number of Employees: 19,005 Federal and 140,000 Contractor

2002 Spending: $14.5 billion

Field Offices: Nine federal centers and one federally funded research and development center.

The National Aeronautics and Space Administration (NASA) pushes the frontiers of discovery in space and aeronautics. It supports science, technology, and exploration in four areas: 1) Space Science to better understand the origin and evolution of the universe; 2) Earth Science to better comprehend environmental forces including the Earth's climate; 3) Biological and Physical Research that studies living and physical systems in the environment of space; and 4) Aeronautics Technology to improve aviation safety, reduce air traffic congestion, and enable breakthrough aircraft design.

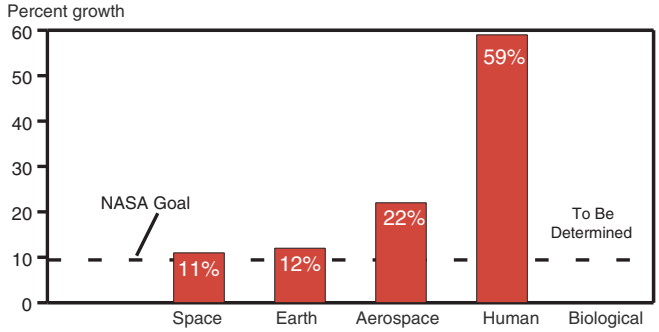
NASA's work in science, technology, and exploration would not be possible without its pursuit of supporting capabilities such as space launch vehicles (e.g., the Space Shuttle) and orbiting platforms (e.g., the Space Station). Supporting capabilities currently consume about two-thirds of NASA's $15 billion budget.

Status Report on Select Programs

The Administration is reviewing programs throughout the federal government to identify strong and weak performers. The budget seeks to redirect funds where appropriate from lesser performing programs to higher priority or more effective programs. Particularly, when low performing programs are in priority areas, deficiencies will be addressed through reforms to improve performance. The following table presents the ratings of selected programs for illustrative purposes. Some of these programs will be improved by proposals described in this chapter.

Program	Assessment	Explanation
Discovery and Explorer Programs	**Effective**	Space science missions competitively selected from researcher proposals. Successful cost/risk management and science results.
Mars Exploration Program	**Moderately Effective**	Robotic exploration of Mars. Completed major restructuring in wake of spacecraft failures. Recovery from failures successful so far.
Space Launch Initiative	**Moderately Effective**	Preparation for competition to replace the Space Shuttle with lower cost vehicles. Need to better understand key requirements and manage risks.
Earth Observing System Program	**Moderately Effective**	Satellite remote sensing to understand global climate change. Need improved integration with federal climate change and applications efforts.
Aeronautics Research	**Moderately Effective**	Technology research to improve the nation's aviation system and for breakthrough aircraft. Need to better transfer technology to users.
Outer Planets Program	**Ineffective**	Major planetary science missions. Large cost increases and schedule delays. Budget proposes program restructuring.
Space Shuttle Safety Upgrades	**Ineffective**	Need to address large cost overruns and schedule delays to improve shuttle safety through effective investments.
International Space Station	**Ineffective**	Supports space-based biological and physical research. Effective technically, but need much better management controls to eliminate huge cost overruns.

NASA Development Projects Experience a Range of Cost Growth

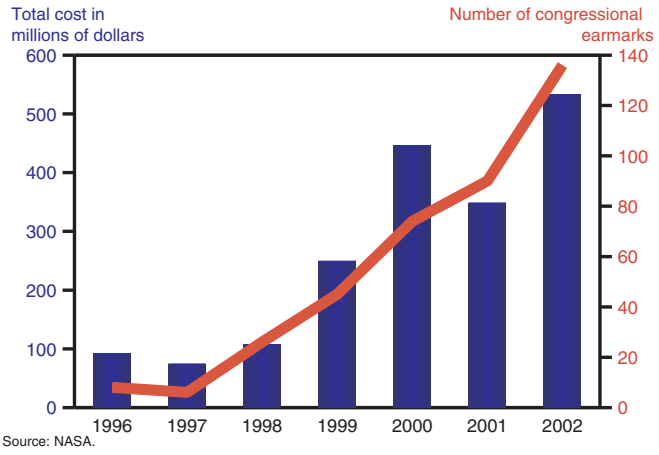


The accompanying chart shows total cost growth for ongoing development programs in each of NASA's five enterprises or organizational divisions. Although ideally no NASA enterprise would demonstrate any cost growth, a goal of not exceeding 10 percent cost growth across all development programs within an enterprise would be realistic. NASA's Space Science and Earth Science enterprises nearly meet this goal. Through management reforms and cost-saving initiatives, NASA will increase the proportion of its budget that goes directly towards science, technology, and exploration activities as described in the following section.

Science, Technology, and Exploration

In making investments in the nation's future, NASA must set priorities and establish an integrated portfolio of research and technology investments. One foundation of ensuring quality science is the competitive selection of merit-reviewed research. In most areas NASA does this well. Its three science enterprises will competitively award in excess of 80 percent of their research in 2002—with Space Science at 99 percent. The integrity of NASA's merit-based research is seriously eroded by the practice of congressionally directed spending known as earmarks. NASA has suffered from a surge in both the number and cost of earmarks.

NASA Earmarks Have Risen Dramatically



Earmarks Disrupt NASA's Science Activities

Many earmarks in NASA's budget have little to do with the agency's mission in scientific research, technology development, and exploration. For example, the Congress earmarked NASA's current budget to fund corporate jets, college dormitories, libraries, and museums. Some especially damaging earmarks divert funds from critical NASA needs and reverse good cost management decisions at NASA. For example, after costs had doubled, NASA cancelled its Pluto-Kuiper Belt mission last year, but the Congress earmarked funds to put the mission back in NASA's budget. However, the Congress only provided $30 million, while over $400 million more is needed to finish the mission. Congress also redirected $40 million from the Space Station 2002 budget to an unaffordable space test vehicle at a time when NASA is trying to get Station costs under control. Finally, the Congress earmarked funds for a low priority propulsion lab by cutting the very research the lab it is meant to support.

While the Congress adds partial funding to pay for some earmarks, funding often must be diverted from higher priority activities. Unfortunately, the number and cost of earmarks have increased more than fivefold in recent years (see accompanying chart). This detracts from the important science, technology, and exploration activities described below.

Space Science

NASA is the sole federal agency that conducts planetary exploration, and is a major contributor to studying the universe beyond our solar system. NASA develops and operates a wide array of space probes and telescopes to answer fundamental questions about the evolution and structure of the universe, galaxies, and stars including: how our own star—the sun—affects our planet; the origins and development of planets and life; and the existence and distribution of life beyond Earth.

Overall Performance. NASA now routinely launches multiple missions in place of the once-a-decade, multi-billion dollar missions that previously dominated Space Science research. NASA currently has over 30 Space Science missions in operation, over 20 missions under development, over 40 missions under study, and participates in many other international missions. For Space Science missions under development, total cost overruns average 11 percent, and 60 percent of missions are within 10 percent of their planned development schedule.

In recent years, research sponsored by NASA and the National Science Foundation identified approximately 80 new planets outside our solar system, and last year the Hubble Space Telescope obtained the first chemical data on the atmosphere of one of these planets. Future NASA space telescopes will search for smaller planets, with the intent of eventually finding and characterizing planets similar to Earth. NASA planetary probes have also found that water, a key ingredient in the development of life: existed on Mars in the distant past; may still be present under the surface of Mars (see accompanying image); and may exist as underground oceans on one or more moons of Jupiter. Future planetary missions will attempt to confirm these water-bearing environments and search for evidence of life.

Images of gullies on Mars taken by NASA's Mars Global Surveyor mission indicate that large amounts of liquid water may be erupting from the surface today. This image shows an area of nearly seven square miles.

Despite these successes, NASA's largest and most technically challenging Space Science missions still suffer from poor cost and schedule estimates. The Outer Planets program, whose goal was to uncover clues about the origins of and potential for life on Jupiter's moons and beyond, cannot be implemented as planned because some mission cost and schedule estimates have nearly doubled. For example, NASA proposed to cancel the Pluto-Kuiper Belt mission because of its skyrocketing costs. The Outer Planets program is also seriously hindered by the long time needed to travel to key targets in the outer solar system and by a lack of adequate power sources.

Improving Performance. The Administration proposes to improve Space Science by:

- *Improving Planetary Exploration*. Given continued growth in cost and schedule estimates, the President's 2003 Budget redirects funding to a reformulated New Frontiers program driven by

four key principles: clear science prioritization; frequent and affordable missions; competitive innovation; and advanced technology. The budget redirects funds to this program by canceling NASA's existing Outer Planets Program. The revamped program will set science priorities that support key goals for understanding the origins and existence of life beyond Earth. These priorities will be flexible enough to allow NASA to maintain regular and affordable missions. NASA will also select missions through open competitions instead of assigning development to a NASA field center. NASA's highly successful Discovery program will serve as the model for this competitive selection process.

- *Greatly Expanding the Science Capability of Future Missions*. The budget proposes investments in safe and reliable nuclear-electric propulsion and nuclear power technologies that will enable much faster and more frequent planetary investigations with greater science capabilities. In this decade, nuclear power technology will enable NASA to land a rover on Mars to conduct experiments over several years, instead of several months, thereby expanding scientific returns many fold. With nuclear-electric propulsion, affordable planetary missions: could reach targets in half the time it would take now; would not be limited by the power and mass constraints of today's spacecraft; and could conduct long-term observations of multiple planets or moons.

Why Study the Stars?

Astrophysical research sponsored by NASA and other federal research agencies tells a lot about where we come from, whether we're alone in the universe, how the fundamental laws of the universe work, and how events beyond Earth may influence our future.

NASA's Chandra X-ray Telescope mission, launched in 1999, can observe neutron stars, black holes, and quasars, allowing physicists to see how the physical laws of the universe operate under conditions that cannot be replicated on Earth. Another recently launched mission will create a baseline for observing how future changes in the Sun's energy output work as a major driver of change in the Earth's climate. Other space telescopes to be launched later this decade will be capable of detecting Earth-like planets that may harbor life around other stars, and seeing how the earliest stars and galaxies formed in our universe.

Earth Science

NASA's Earth Science program seeks better scientific understanding of Earth's environmental system, thus enabling improved prediction of climate, weather, and natural hazards.

Overall performance. In the past three years, Earth Science has successfully launched 11 missions. Current missions under development have cost overruns averaging 12 percent and most are experiencing launch delays, as only 15 percent of missions are within 10 percent of their planned development schedule.

Earth Science funds and performs the scientific inquiries to explain satellite observations and improve climate predictions. For example, NASA's Earth observing satellites and research: provided advance warning of the last El Nino; aided control of major forest fires in the Western states by providing near-real time data to the U.S. Forest Service; improved NOAA's marine weather

forecasting; and collected the first high resolution data on global land cover and topography for both basic research and applications such as agriculture and civil engineering. NASA has improved climate-modeling speed tenfold since 2000, matching the best capabilities in Europe, and expects another fourfold improvement by the end of 2002. Such improvements permit Earth scientists to dramatically improve climate projections.

Nonetheless, significant challenges confront NASA's Earth Science enterprise. Several of its Earth Observing System missions now in development are facing costly delays in completion. Also, NASA must demonstrate the ability to transfer responsibility for data collection from research satellites at NASA to the operational satellites at the agencies that use them. NASA will be undertaking two such demonstrations—the National Polar-orbiting Operational Environmental Satellite System Preparatory Project and the Jason follow-on—which will measure key variables that are needed to provide long-term, quality data to understand how the Earth's climate is changing.

Improving Performance. The Administration proposes to improve Earth Science by:

- *Focusing Science*. The President's Budget proposes a multi-agency Climate Change Research Initiative (CCRI), which will focus on providing useful information and understandable climate products in the near term (two to five years). In 2003, NASA will participate in CCRI but will not initiate development of new follow-on satellite missions until a government-wide review of the interagency United States Global Change Research Program determines the best means for achieving CCRI goals.
- *More Science at Less Cost.* NASA has traditionally owned and operated the satellites it needs to provide scientific data. However, with the development of commercial satellites that sell Earth images to customers, NASA will now purchase data from commercial sources to sustain the 30-year set of images of the Earth's surface, rather than building and flying an eighth Landsat satellite. NASA will share its remote sensing capabilities with other federal agencies, as well as state and local governments seeking to achieve their own objectives.

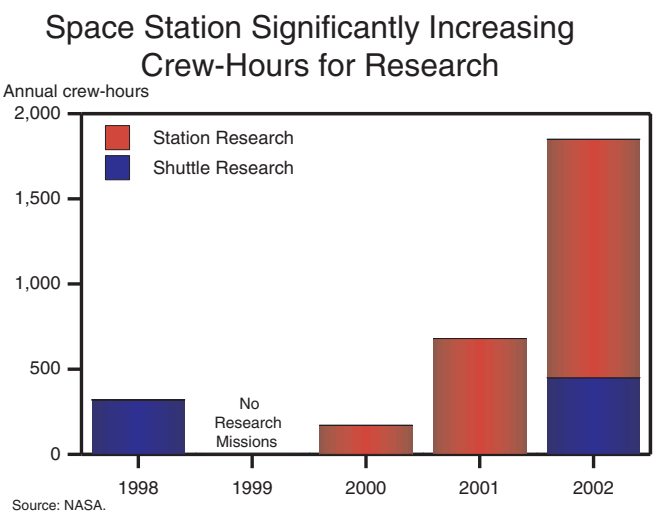
Why the Increasing Uncertainty About Global Change?

Although increased knowledge usually reduces uncertainties, sometimes the opposite can be true. Take the question of global climate change. Since 1990, many billions of dollars has been devoted to research on climate change, yet predictions regarding the range of possible changes in temperature due to increasing carbon dioxide concentrations has become broader, rather than narrower. This is not a failure of the research community. Scientists have gained a great deal of knowledge over the past decade. A big part of that new knowledge has been that the Earth's atmosphere is much more complex – and unpredictable – than originally thought.

Biological and Physical Research

NASA uses space to accelerate scientific progress and to understand and control the health risks to humans in space. Space provides a unique environment to focus on the fundamental biological processes that are masked by the presence of gravity here on Earth.

Overall Performance. The Space Station is the primary means to conduct high-quality biological and physical research for the foreseeable future. The accompanying chart illustrates how the Space Station has significantly expanded the number of hours that astronauts spend conducting research in orbit. Forty-seven distinct experiments have already begun on the Space Station. One discovery revealed growth patterns in microscopic crystals that could lead to improved manufacturing for pharmaceuticals and other materials. However, NASA's science strategy does not adequately prioritize among the many disciplines interested in the Space Station and their multiple objectives, thus impeding significant progress. Moreover, the development of research equipment for the Space Station has suffered from multiple design changes, repeated delays, and insufficient oversight. Poor cost controls have been the result.



Improving Performance. The Administration proposes to improve Biological and Physical Research by:

- *Establishing and Pursuing Science Priorities.* This year, NASA will be working with the White House Office of Science and Technology Policy (OSTP) to engage the scientific community and establish clear high-priority, affordable science objectives with near-term focus on improving scientific productivity. The results of this review will help set the science agenda for Biological and Physical Research that will in turn drive how the Space Station is used. It should increase the efficiency and output of research at the Station, and realign NASA's research portfolio to reflect current priorities.
- *Diversifying Research Platforms.* While the Space Station will be the focus of biological and physical research, alternative space platforms are needed to fill gaps in research the Station cannot do. Examples include conducting radiation experiments on probes beyond the Van Allen belts—where the near-Earth environment no longer provides shielding from solar and galactic cosmic radiation. This budget provides increased funding for the Space Radiation and Space Biology Generations programs to launch multigenerational research both in low-Earth orbit and beyond the Van Allen belts, that could uncover the effects of those environments on evolutionary processes.

Aeronautics Technology

NASA develops aeronautics technologies to address long-term issues in the nation's air system. NASA works with the Federal Aviation Administration (FAA) to advance technologies that can improve aircraft safety, alleviate airport congestion, and reduce air and noise pollution from aircraft.

Overall Performance. NASA assesses its progress in aeronautics research by measuring the potential impact of new technology developments on the aviation system. For example, NASA

investments in engine technology have the potential by 2005 to reduce the pollution from jet engines to half of what they were in 1999.

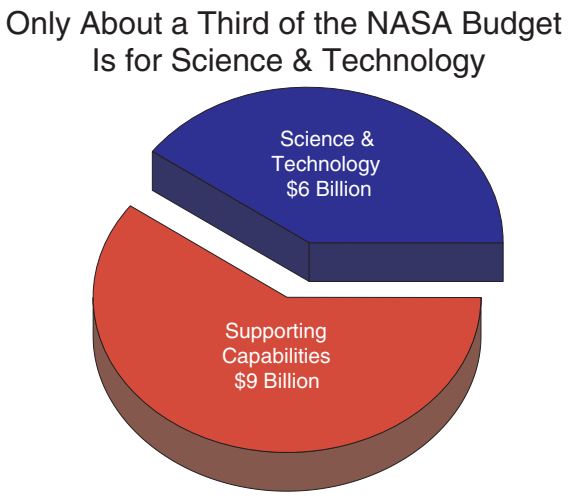
Although NASA's aeronautics programs generally demonstrate good progress, there is no way to ensure that NASA is developing technology that will actually be incorporated into the national air system. NASA also conducts the majority of its aeronautics research itself, rather than opening up competition that could take advantage of skills and innovation in the private sector and academia.

Improving Performance. The Administration proposes to improve Aeronautics Technology by:

- *Improving the Likelihood Technology Gets Used.* To ensure that NASA technology investments are incorporated into the national air system, NASA will strengthen its ties with the FAA. Also, OMB and OSTP will be working with major research agencies to develop new criteria for evaluating applied research, like NASA's aeronautics research, in preparation for the 2004 Budget.
- *Expanding Quality Reviews and Competitive Opportunities.* NASA will have the National Academy of Sciences undertake reviews of its aeronautics technology program (as well as space transportation and fundamental technology) every three years. These reviews will provide independent quality assessments of NASA's technology research and program planning, whether the research can be performed by universities or corporations outside NASA, and how well NASA's technology research integrates with customer needs. NASA will also seek to reduce institutional costs at its field centers so more funds can be invested in technology research through openly competed NASA research announcements and through university and industry partnerships.

Supporting Capabilities

NASA has had many technical successes, but is hampered by the high cost of access to space—nearly a third of its budget—and struggles to achieve a management capability that matches its technical capability. There has been significant cost growth in several areas, and a lack of competition to help spark innovation. Needed reforms are beginning to improve NASA's ability to manage its long-term, complex and challenging programs within cost and schedule plans. NASA will build a new foundation to prepare its capabilities for the future, while reducing the cost of supporting capabilities—now nearly two-thirds of the agency budget.



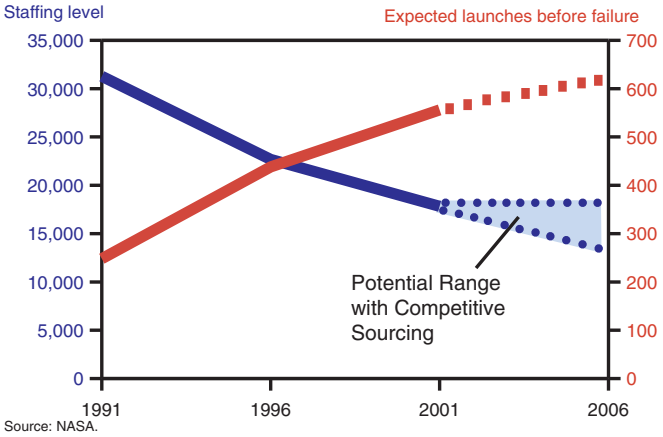
Space Launch

NASA provides transportation to and from space for humans and cargo using the Space Shuttle, and uses commercial expendable rockets for the launch of many science spacecraft.

Overall Performance. The Space Shuttle is the only U.S. vehicle that can launch humans into space and return experiments from orbit. Since the Challenger tragedy, NASA has been improving the safety of the Space Shuttle, from an estimated risk of catastrophic failure during launch for each mission of one in 78 in 1986 to one in 556 now. This improvement took place even as staffing for the Space Shuttle has dropped significantly (see chart on Space Shuttle reliability). NASA continues to invest in improving Shuttle safety, but some of the planned investments are experiencing significant problems (see chart on cost overruns). For example, the electric auxiliary power unit was the highest priority safety upgrade last year, but delays, technical difficulties, decreasing safety benefits, and a tripling of its projected cost led NASA, with the support of its advisory committee, to cancel the project.

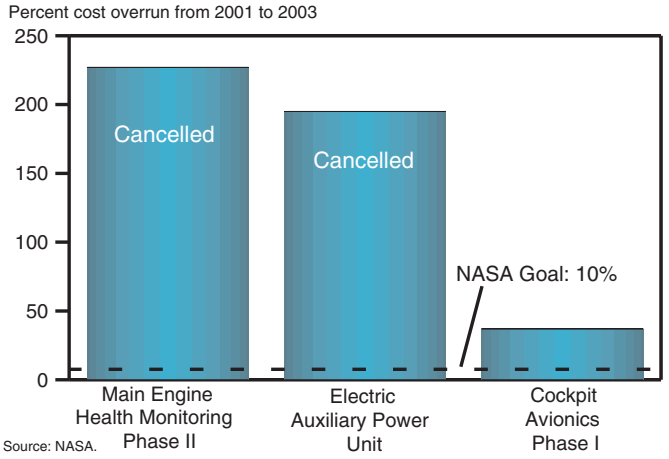
While the safety and schedule record of Shuttle operations has been very good, and costs have come down considerably in the last decade, the Shuttle remains a very expensive vehicle to operate. Moreover, in the last few years, Shuttle costs have been rising considerably, due to personnel costs, aging infrastructure, growing vehicle obsolescence, and a shrinking industrial base. A comparison of the cost to orbit for the Shuttle relative to other space launch systems is provided in the accompanying chart, which underscores the need to quickly develop a new system for space launch.

Space Shuttle Reliability Improved while Staffing Levels Decreased



Source: NASA.

Cost Overruns of Shuttle Safety Upgrades



Source: NASA.

Improving Performance. The Administration proposes to improve space launch by:

- *Improving Shuttle Safety.* This budget continues to invest in safety improvements for the Space Shuttle and increases investment in repairing aging Shuttle infrastructure. Planned safety upgrades will enhance safety during launch by 12 percent, to a one in 620 risk of catastrophic failure. Delays in the planned implementation of these upgrades continue to be a concern, so funding will be set aside specifically to accelerate the availability of planned upgrades.
- *Pursuing Shuttle Competitive Sourcing*. Competitive sourcing will enable the full transfer of Shuttle operations and possibly some portion of infrastructure ownership to a private entity, based on criteria in the accompanying box. The benefits of pursuing competitive sourcing are:

1) greater flexibility to recruit and retain the skilled personnel necessary to safely operate the Shuttle; 2) avoiding potential continued cost growth for Shuttle operations by moving to a private organization that has greater flexibility to make business decisions that increase efficiency; and 3) significant culture change in Human Space Flight at NASA by making it a purchaser of services rather than an operator of infrastructure. Adapting such an approach will let NASA focus on advancing the state of science, technology, and exploration. NASA will release competitive sourcing plans this year that will address important issues such as how to effectively transfer critical skills from the federal workforce to a private entity.

Shuttle Competitive Sourcing Criteria

1) *Safety*. Maintain safety over operating life for at least the next 10 years. Provide for appropriate government role to ensure essential safety features.

2) *Competitive Sourcing*. Transfer appropriate NASA personnel, assets, and facilities needed for Space Shuttle operations to a private entity. Enable NASA to focus on advancing the state of science, technology, and exploration.

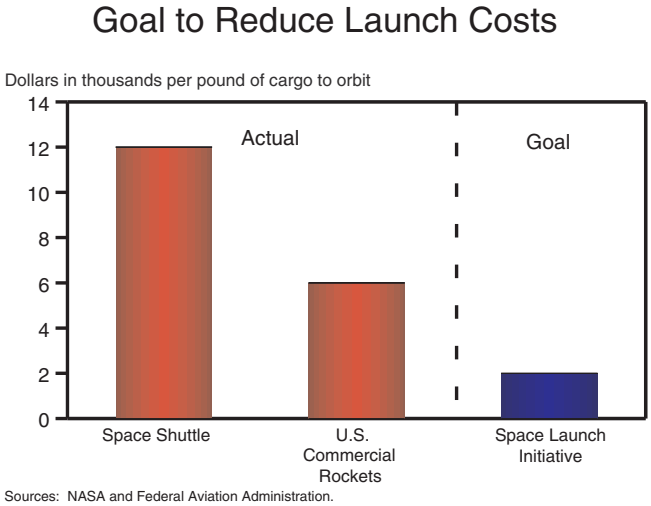
3) *Competition*. Ensure a competitive environment to satisfy government space launch requirements and maintain a robust U.S. space launch industry.

4) *Cost*. Establish a baseline and conduct cost comparisons based on the full cost (operations, maintenance, upgrades, infrastructure, personnel) of the Shuttle program, not to exceed the President's 2003 five-year budget for the Shuttle.

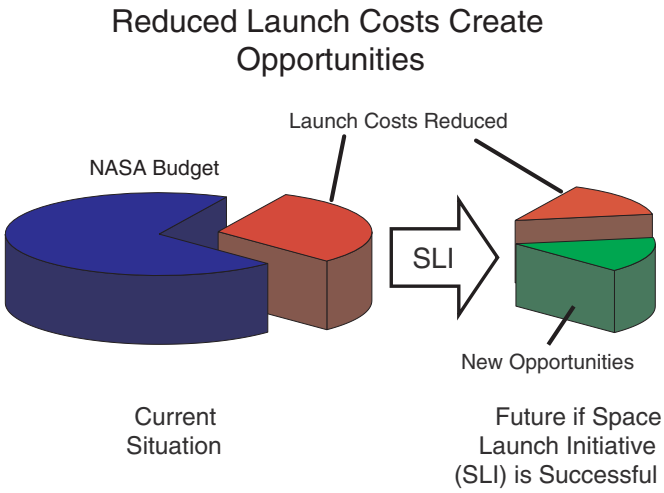
5) *Business Base*. Enable pursuit of other government and commercial business opportunities consistent with principles of a level playing field and international trade policy. Business risks from dependence on outside business will be borne by a private entity, not the government.

6) *Future Plans*. Ensure consistency of Shuttle launch commitments, upgrades and infrastructure investments with future decisions on development of new launch systems.

- *Controlling Shuttle Cost Growth*. As recommended by the International Space Station Management and Cost Evaluation task force, reducing Space Shuttle flights to four per year appears sufficient to meet Station needs. However, NASA will be reviewing this decision to determine whether any additional flights are necessary. Other adjustments are being pursued as well, such as the size of the astronaut corps and the period of time between Shuttle overhauls.



- *Pursuing Space Launch Initiative.* Another major investment in space transportation is the Space Launch Initiative (SLI) which could pave the way for replacing the Space Shuttle early in the next decade with much safer and less costly vehicles. Investments in SLI will reduce the huge burden on NASA's budget from the high cost of access to space. Reducing the nearly $5 billion annually that NASA spends on access to space will free up billions for future opportunities (see accompanying chart). To minimize costs across NASA's programs, NASA will coordinate and potentially integrate emergency crew return capabilities for the Space Station with SLI vehicle design efforts. To most efficiently use government resources, NASA will also increase coordination with the Department of Defense on launch technologies, and improve cost and risk management capabilities.



Space Station

NASA is building the International Space Station to create a laboratory for scientific research in the unique environment of space.

Overall Performance. With the second phase of Space Station construction now complete, a fully functioning orbital research laboratory circles the Earth every 90 minutes. Astronaut crews aboard the Station have been exceeding expectations by devoting an increasing amount of time to science activities.

In spite of these technical successes, the Space Station has not succeeded at staying within planned costs. Last year, NASA determined that it needed a 50 percent funding increase to its remaining $8.3 billion budget to finish the planned Space Station. The request marked the latest chapter in a history of cost growth. To keep the Station within planned budgets, the Administration scaled it down to a core Station. The Space Station's Management and Cost Evaluation (IMCE) task force called on the space agency to undertake management changes to achieve the core Station's goals.

Research on the Space Station has already made important discoveries that could improve manufacturing processes for pharmaceuticals and other materials on Earth.

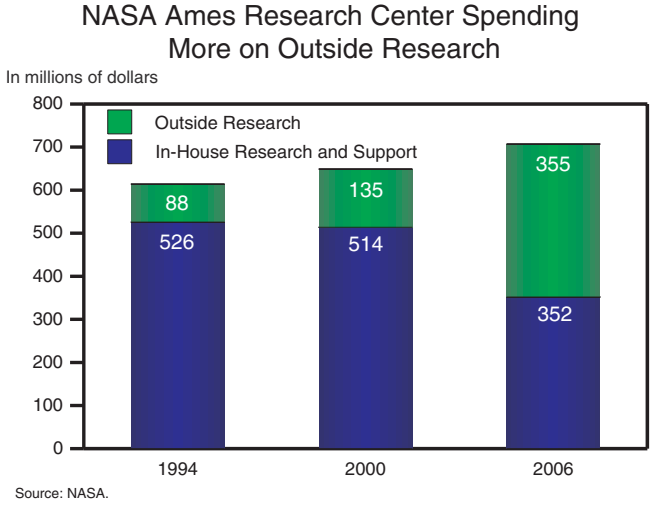
Improving Performance. The budget adopts many of the key recommendations of the IMCE task force, including:

- *Improving Science Efficiency*. NASA is exploring how to increase the amount of time available for research, to achieve the maximum scientific benefit from the investment in the Space Station. One option involves creating a non-governmental organization (NGO) as soon as possible to more efficiently manage research aboard the Space Station. NASA created a similar organization in 1981 to support the Hubble Space Telescope, and the availability for research time rose by a factor of two. NASA is exploring many other options to increase science efficiency such as easing the maintenance burden on the orbiting crew and increasing automation of research facilities.
- *Demonstrating Needed Reforms within Two Years*. NASA must demonstrate over the next two years that it has made the necessary management reforms and changes in the human space flight program to get the Space Station costs under control. For example, NASA must give the Station program more authority over contractors and civil servants working on the Space Station. Less than half the Space Station's contractors and only a sixth of the civil servants working on it report directly to the program. The Administration is developing criteria to judge NASA's success. If NASA is successful, the Administration will address the resource requirements to expand the capability of the Station, based on research priorities. If NASA is not successful, U.S. assembly of the Space Station will end with the completion of the core Station, expected sometime in 2004.

Field Centers

NASA relies on nine field centers and one federally funded R&D center for implementation and day-to-day management of its programs.

Overall Performance. Although all NASA field centers have room for improvement, performance varies widely. Lean field centers unburdened by institutional needs are more agile and thus more capable of pursuing future directions in science, technology, and exploration. The accompanying chart shows that NASA's Ames Research Center in California has begun to reduce institutional and in-house activities to expand opportunities for competitive, external research. Such dedication to institutional reform ensures that research per federal dollar is maximized.



Source: NASA.

Improving Performance. To improve program and institutional management, NASA will take the following actions this year:

- *Strategic Resources Review*. NASA will begin outsourcing and consolidation efforts to improve the ability of its field centers to respond to future challenges in science, technology, and exploration. One pathfinder effort would transfer a portion of NASA's Ames Research Center activities to a University-Affiliated Research Center organization, in order to greatly improve

the flexibility of its workforce and facilities and ensure access to world-class researchers. Other pathfinder efforts may include consolidating some NASA facilities with military installations.

- *Improving Cost Management*. Huge cost growth on the Space Station has highlighted the need for improved cost estimating capability in Human Space Flight, but this capability needs to be strengthened across the agency. NASA will implement a plan of action to: 1) generate independent cost estimates, particularly in Human Space Flight, and improve the capability of program offices to credibly estimate costs; 2) strengthen and use the capabilities of the chief financial officer and system management offices at all NASA centers; 3) strengthen NASA headquarters capabilities for cost assessment and tracking program execution; and 4) increase NASA's use of outside experts to conduct rigorous independent cost and risk estimates of major programs.

Strengthening Management

Apart from the specific performance improvements discussed above, the Administration seeks to improve the management of NASA in a number of areas that will benefit all activities. Five specific problem areas slated for improvement are part of the government-wide President's Management Agenda.

Initiative	2001 Status
Human Capital—NASA is pursuing management reforms that will alter its workforce. NASA needs to continue to attract and retain employees with critical skills while depending on outside organizations for most others. Two obstacles complicate resolution. NASA has skill shortages in some key areas and excesses in others. NASA also has limited capability for personnel tracking and planning. To address these challenges, NASA will develop and implement an overall human capital strategic plan complete with needed reforms.	
Competitive Sourcing—NASA has identified 4,333 of its 19,005 positions as engaging in commercial activities, but has yet to develop a plan to achieve the competition goals for its commercial positions (15 percent by 2003 and 50 percent long-term). NASA also needs to significantly increase the portion of its functions classified as commercial, and to exempt fewer of them from cost comparisons. NASA will incorporate the three major outsourcing efforts for Space Shuttle competitive sourcing, Space Station non-government organization, and Strategic Resources Review initiatives in its next analysis. NASA will present an integrated competitive sourcing plan in 2002 to achieve the 50 percent long term goal including, for each year, specific targets, costs, schedules and explanations of competitive sourcing mechanisms.	
Financial Management—NASA financial management systems allow the agency to track resources, but the agency lacks systems to support day-to-day operations and track task completion. Implementation of NASA's Integrated Financial Management System (IFMS) in 2004 will provide support in the future and implement full cost management with NASA's 2004 Budget. NASA will proceed with IFMS implementation and seek to accelerate it where justified.	

Initiative	2001 Status
E-Government—NASA has failed to adequately justify its information technology (IT) investments. NASA will continue to improve its Enterprise Architecture, and the Chief Information Officer will ensure that the IT planning process is integrated into agency decision-making processes.	
Budget/Performance Integration—NASA has had difficulty in identifying appropriate annual R&D measures for multi-year programs. NASA will prepare multi-year program-level performance measures for all programs for its next performance plan. These performance measures will originate with the program and project managers.	

National Aeronautics and Space Administration

(In millions of dollars)

	2001 Actual	Estimate 2002	Estimate 2003
Spending:			
Discretionary Budget Authority:			
Human Space Flight	*7,198*	*6,797*	*6,173*
Space Shuttle	3,119	3,273	3,208
Space Station	2,128	1,722	1,492
Other Programs	1,951	1,802	1,473
Science, Aeronautics and Technology	*7,135*	*8,082*	*8,918*
Space Science	2,618	2,873	3,428
Earth Science	1,771	1,631	1,639
Biological and Physical Research	365	823	851
Aero-Space Technology	2,248	2,528	2,856
Other Programs	133	227	144
Inspector General	24	25	26
Subtotal, Discretionary budget authority adjusted [1]	14,357	14,904	15,117
Remove contingent adjustments	–104	–111	–117
Total, Discretionary budget authority	14,253	14,793	15,000
Emergency Response Fund, Budgetary resources	—	108	—

[1] Adjusted to include the full share of accruing employee pensions and annuitants health benefits. For more information, see Chapter 14, "Preview Report," in *Analytical Perspectives*.