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Statement of
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before the

Subcommittee on Science, Technology, and Space
Committee on Commerce, Science, and Transportation
United States Senate

I appreciate the opportunity to appear before the Subcommittee today in my new capacity as NASA Administrator. My objective throughout my stewardship of this storied Agency is to ensure that the Congress and the public are fully aware of our accomplishments, our current efforts and our plans for the future. My job as Administrator is to remind everyone of what NASA does and what we are capable of doing. It's a responsibility I take very seriously. I believe we are at a crossroads in NASA's history. We have an opportunity here and now to reinvigorate the Agency's agenda and renew the entrepreneurial spirit present at NASA's beginning—a continued characteristic of American culture.

The President's FY 2003 budget proposal for NASA of $15.1 billion reflects the Administration's commitment to NASA's core research efforts and its fundamental mandate to advance aeronautics and aerospace science and technology. This budget initiates exciting new efforts in the realms of space transportation and propulsion. It builds upon our abilities to measure and understand our home planet and the natural – and unnatural – forces that shape our environment. I believe it is a well-balanced and progressive budget that allows us to set the stage for the future. Enclosure 1 displays NASA's FY 2003 budget request.

In the four months since my confirmation, I have traveled across the country to visit each of our 10 Centers to meet NASA's dynamic workforce and have seen firsthand the remarkable science and technology efforts that are the underpinning of our endeavors. In this relatively short period of time, the Agency has taken a fresh look at the long-term management, resource, and technical challenges while continuing to expertly carry out highly complex day-to-day operations. Together we have charted a vision and mission that I look forward to sharing with

you this morning.

My testimony today will focus on the talent and technology that is embedded in the NASA organization, the challenges we face, and, more importantly, the steps we will take as an Agency to chart a clear course for the future. We are intent on continuing the gains made over 44 years while pushing the edge of the envelope of what appears today to be impossible. NASA today is working together, as one Agency, committed to a clear vision and refined mission that will serve as the blueprint for service to America.

What NASA needs now is a roadmap to continue our work in a more efficient, collaborative manner. I first outlined this roadmap for NASA on April 12 at the Maxwell School of Citizenship and Public Affairs, Syracuse University. NASA's imperative is not only for the sake of knowledge—it is for our future and our security. I have introduced a new strategic framework and vision for NASA. It is a blueprint for the future of exploration. It is a roadmap for achievement that we hope will improve the lives of everyone in this country and everyone on this planet.

That is a bold statement, I know. But, I am confident in saying this because the unique work that NASA does truly touches all of our lives.

This is NASA's vision for the future. Our mandate is:

- To improve life here;
- To extend life to there; and,
- To find life beyond.

This vision is much more than carefully arranged words; it frames all that we do and how we do it.

So, how do we get to that impressive picture of the future? The answer is by executing NASA's mission:

- To understand and protect our home planet;
- To explore the Universe and search for life; and,
- To inspire the next generation of explorers
  …as only NASA can.

To understand and protect our home planet, NASA develops satellites to study the Earth form space, and uses their observations to create models of the Earth system to enable prediction of climate, weather and natural hazards. We are well along in the deployment of the Earth Observing System to provide the first holistic view of the major interactions of the key components of the Earth system. On May 4, we successfully launched the Aqua mission. As

its name implies, Aqua will observe Earth's water in all its phases (liquid, solid, and gas) and how it cycles through the Earth's oceans, atmosphere, and land, distributing energy in the form of weather and climate events. We believe that, working with NOAA, we can use Aqua and other EOS instruments to enable the extension of reliable weather prediction from the current 3-5 days to7 days by the end of the decade.

In March, we launched the GRACE mission, which will map the Earth's gravity field and its variations with a precision never before accomplished—a precision that will help measure the effect of these variations on Earth's climate. GRACE data will be combined with sea surface topography data from Jason to enable more precise measurement of changes in sea level, and thus assessment of vulnerability of coastal regions to natural hazards. At the end of this calendar year, we will launch SORCE to help us understand the influences of solar variability on Earth's climate, and ICEsat to measure changes in the topography and mass of Earth's ice sheets. We are operating and distributing data from the EOS missions already in orbit with the EOS Data and Information System, which delivered over 11 million data products in response to 2.3 million user requests.

NASA's contribution to security comes from increased cooperation and the sharing of imagery and unique technology with the federal agencies charged with the defense of our homeland. Aerospace innovations developed at our centers prevent civilian aircraft from being used as weapons. Improved air traffic control safety systems and engineering that will make future airplanes more efficient and environmentally sound are clear examples of our role in the changing nature of transportation and our Nation's security. Hypersonics and quiet aircraft are efforts to speed transport and, in doing so, bolster the economy.

Our mission's second theme is to explore the Universe and search for life. NASA will exploit advanced technology, robotics, and will eventually use humans to explore and seek the answers and the science behind our most fundamental inquiries: How did we get here? Where are we going? Are we alone? If we are to achieve our ambitious objective of exploring the universe and the searching for life beyond our Earth, be it through flights to Mars or observing faraway planets, we must continue to learn about and overcome the technical hurdles that remain in our quest to answer our most probing questions.

NASA's recent achievements are only the beginning of the Agency's role in rewriting tomorrow's textbooks for America's children, as well as for today's astronomers and astrophysicists alike. Just last week, NASA released the first images received from the newest science instrument on the Hubble Space Telescope, the Advanced Camera for Surveys (ACS). The new ACS was part of the recent and highly successful STS-109 servicing mission, during which astronauts helped take Hubble to the next level of excellence. This new and improved camera now offers us 10 times the discovery power than the camera it replaced. With the ACS, our view into the depths of our Universe has been taken to a new level.

Later this month, we will launch the GALEX, Galaxy Evolution Explorer, which will use

ultraviolet light to conduct an all-sky ultraviolet survey and detect millions of galaxies located billions of light years from our earth. Next year, we will travel further into our own solar system with the launch of the Mars Exploration Rovers and Mars Express missions. The Mars Rovers will take us beyond the success of the Mars Pathfinder mission in 1997 and allow us to analyze rock and soil samples on the Martian surface at a microscopic level. Mars Express, a mission planned by the European and Italian space agencies, will be the result of international collaborative efforts with NASA. This mission will take us another step closer to our search for evidence of past or present life on Mars. In January 2003, we will launch the last of NASA's great observatories, the Space InfraRed Telescope Facility, destined to be a cornerstone in our Astronomical Search for Origins Program and allowing us to peer into regions of space currently hidden from our view.

If we are to achieve the mission of exploring the universe and searching for life, there is much we must still learn and many technical challenges that must be conquered. Today's chemical energy rockets that have been the engine of exploration since the inception of space travel are today at the limit of what they can deliver. Using current technology, if we were to embark to explore Pluto in 2006, the earliest we could arrive there is 2014-2016; and then, upon our arrival, we would only be able to obtain meaningful research for 4-6 weeks. That is an 8-10 year travel period for 4-6 weeks of science. NASA's FY 2003 budget includes nearly $1 billion for a nuclear systems initiative as a first step in addressing this challenge. Nuclear propulsion is a mature technology that has been used safely by the U.S. Navy since 1955. Since that time, the Navy has sailed over 120 million miles encompassing 5,000 reactor years without incident. This technology may hold the key to overcoming the time/distance challenge, and its application to space travel has great potential.

Propulsion is only one of the challenges facing further human exploration of space. Still unknown are the long-term effects of radiation and exposure to a microgravity environment on humans. The FY 2003 budget includes funding for a new initiative for space radiation research.

Our third mission objective is to inspire the next generation of explorers. America looks to NASA to build an unequalled scientific base of knowledge and motivate our youth to embrace math, science and engineering. While opportunities in the technology sector are expected to quadruple this decade, the pool of college students enrolled in science and engineering courses continues to decline. NASA has an obligation to the nation and its own workforce to reverse this trend.

NASA faces similar challenges with its scientific and engineering workforce. During one of my recent Center visits, I found that only 62 engineers out of a 3,000-person workforce were less than 30 years old. In fact, as an Agency, our over-60 population is three times larger than the under-30 workforce. Inspiring the next generation of explorers to enter fields of science and engineering is integral to NASA's success in reconstituting our workforce for the 21st Century challenges.

Students are only part of the education equation at NASA. Our Nation's educators are also a critical component of NASA's revitalized education focus. Teachers at all levels already possess the skills to inspire and plant the seeds necessary for this Nation to grow the next generation of science and technology leaders. NASA can best introduce itself and the science that it represents into the classroom by teaming up with educators, especially at the younger grade levels.

Inspiring future generations works in synergy with NASA's mission to protect our home planet. The U.S. Commission on National Security for the 21st Century (the Hart-Rudman Commission) concluded that advances in technology and changing economies mandate an increase in the level of technology literacy across society. It is clear that technological human capital is an essential component of our national security equation.

Our mission concludes with the statement, "as only NASA can." Our Agency is one of the Nation's leading research and technology Federal agencies with unique tools, capabilities and expertise that represent a National asset. The Agency contributes to America in a broad spectrum of areas. Medical technologies, aerospace innovations, spin-offs, nano-technologies, and countless commercial applications are rooted in NASA discovery. Our commitment to the American taxpayer is to continue providing a direct and very tangible means of improving life on our planet. Extending life beyond the reaches of our earth is not a process driven by any particular destination, but by science that will contribute to the social, economic, and intellectual growth of our society.

NASA provides a constant return on taxpayer dollars with each new discovery, telescope picture, launch, patent, and newly inspired child or adult. That being said, none of the ambitious plans that I have detailed for the Agency will take root if we fail to improve the management of our resources, commit to fiscal responsibility, and establish a clear set of priorities. A clear vision and integrated mission are important foundations for NASA's future success, but success requires that we embrace a wide variety of tools to move us forward.

At NASA, and at other departments and agencies across the Federal government, we are vigorously implementing the President's Management Agenda as a powerful management initiative. Each of the five items included in the Agenda applies directly to NASA.

First on the Agenda is the strategic management of human capital. As I mentioned previously, we face challenging times as we reconstitute and reshape our workforce for the 21st century. Today we have an extremely experienced workforce in terms of overall capability. The downside, however, is that almost one-third of the workforce will be eligible to retire within the next 3-5 years. We must aggressively deal with this leadership and workforce challenge. I have recently forwarded a series of legislative provisions to the Office of Management and Budget, which address this challenge head-on. These provisions will complement the Administration's Managerial Flexibility Act, and I look forward to working with the Congress to ensure that these essential tools are enacted into law.

The second element of the Agenda is competitive sourcing. We are thoroughly examining the best ways to motivate a competitive sense in all we do. By focusing on results and outcomes, we will find the most efficient means to accomplish our goals.

The third element of the Agenda is expanded electronic government. We must pay specific attention to information technology and ensure that the information technology process is integrated into Agency decision-making.

The fourth element of the Agenda is improved financial management. I am pleased to report that we are aggressively implementing our integrated financial improvement program, which is now in the third year of its implementation schedule. I have tasked the staff to explore all options to determine whether we can accelerate implementation throughout the Agency.

The fifth element of the Agenda involves budget and performance integration. We must become results-oriented and link our budgets to performance. We will breathe new life into the Government Performance and Results Act. We in NASA are spending a great deal of effort into developing metrics to measure performance.

I would now like to provide a status of two of our major programs.

International Space Station

The International Space Station (ISS) is without precedent in the history of the U.S. space program. The ISS Program has had a year of spectacular technical achievements, which include ground preparation and checkout, launch integration, and on-orbit assembly and operations. To date, the ISS program has achieved remarkable technical successes; however, it has not been equally successful in controlling cost growth. Last year, NASA projected an overrun in the amount it needed to complete the space station, as then planned, of up to $4.8 billion. While some of that growth may be attributable to such factors as inadequate initial requirements definition, added content, late delivery, and development problems leading to cost variance, there are clearly areas of fiscal management and program control that need improvement.

The President's Budget Blueprint for FY 2002 laid the groundwork for attaining cost control and regaining credibility for the program to reach its full potential. As a result, a course of action was prescribed to get cost growth under control and restore confidence in NASA's cost management, and to achieve the science priorities for which the Nation has made a large investment. We are continuing with the reassessment and review activities that we began last year that followed the Blueprint, but did not eliminate the cost challenge. The President's FY2003 budget projections include about $600 million of savings that NASA will realize through the implementation of identified program initiatives, and a process that continues to seek additional savings while containing the threats to further ISS cost growth. While steps taken last

year were designed to contain cost growth and to gain better understanding of its source and nature, this year will be one of corrective action—putting in place the right processes, tools, management controls, and measures to improve and evaluate the ISS program.

Thanks to the efforts of the ISS Management and Cost Evaluation (IMCE) Task Force, led by Mr. Thomas Young, we are well along in effecting proper controls and regaining credibility. I have reviewed the Young team's recommendations and have endorsed them as a roadmap to improve the ISS Program management. As a result, the ISS management has already taken actions to develop implementation strategies.

The following five points are guiding our efforts at reform and revitalization of the ISS program:

1. Research Priorities-Establishing an integrated portfolio of science and technology priorities that maximize the benefits of space-based research within available resources. In addition to addressing the cost challenges of the ISS, we must make a renewed determination of the research goals and on-orbit capabilities that we want the ISS to achieve. Our priority should not be to simply build an ISS to a specific hardware complement and then seek research and experiments to make use of the hardware. The ISS Program should be driven by high-priority research objectives. NASA has recently established a Research Maximization and Prioritization (ReMaP) Task Force to assess how high-priority research objectives can be best met by ISS within available resources, and how the resulting research strategy might evolve, given the possibility of research-driven enhancement to the ISS beyond U.S. Core Complete.

2. Engineering Development/Deployment-Development of a program road map that focuses on successfully achieving a "core complete" configuration within budget. This will not be easy, but we are dedicated to making it happen. Therefore, it is imperative that Congress provide us with the requested funds so that we can meet our commitment to achieving a core Station. Should NASA demonstrate that reforms are implemented and cost credibility is regained, this will enable future decisions towards a requirements-driven "end state" that will, defined in terms of science priorities, allow an expanded research potential for us and our international partners.

3. Cost Estimation and Analysis-The ISS is the largest and most complex engineering development program ever pursued by the United States. Implementation of improved methodologies, tools and controls are underway and will allow us to regain credibility and improve our ability in financial forecasting and strategic planning capabilities. An independent cost review is underway to better understand our costs. These projects will also be beneficial to the Agency at large.

4. International Partnerships- An important challenge is maintaining the ISS international partnerships. Our partners have expressed their concerns stemming from NASA working to get the fundamentals right to achieve U.S. core complete; and then to

identify options beyond U.S. core complete to realize the full potential of the ISS. Although the configuration of the ISS has been modified to meet the cost challenges we face, the fundamental purposes remain—research and international cooperation. To reaffirm NASA's strong commitment to its international partnerships, I have formed a team to meet with representatives of all our partners to understand their concerns and to work with them in the spirit of cooperation.

6. Mission and Science Operations-Advanced planning for Space Shuttle and ISS operations to maximize the productivity of on-orbit research and ensure the safety of real time operations.

Space Shuttle

NASA is proud of its historic record of 106 Shuttle missions and, in particular, the accomplishments of the last year in support of the ISS. Last year, seven Shuttle missions were flown with five of those missions launched during a six-month period.

This budget continues to invest in safety and supportability improvements for the Space Shuttle and increases the investment in repairing aging Shuttle infrastructure. These investments, totaling $1.35 billion over the next five years, will ensure that the Space Shuttle can meet NASA's space transportation needs for at least the next decade. NASA seeks to implement these upgrades as quickly as possible, and is working to accelerate the availability of planned upgrades. These investments are an integral part of NASA's Integrated Space Transportation Plan (ISTP), which also includes investments in the Space Launch Initiative (SLI) for NASA's next-generation reusable space transportation system.

As recommended by the IMCE Task Force, reducing the Space Shuttle flights to four per year appears to be sufficient to meet ISS needs. However, we are reviewing this decision to determine whether any additional flights are necessary.

The President's budget also provides for the continued pursuit of Shuttle competitive sourcing. The anticipated benefits of competitive sourcing include: 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.

Mr. Chairman, I believe the vision, mission, programs, initiatives and budget I have described represent a strong commitment to a healthy and forward-moving NASA. I believe it is deserving of the Subcommittee's strong support and I look forward to working with the

Subcommittee to achieve an appropriation that supports the President's budget request.

I have mentioned the opportunity I have had to meet the men and women of NASA, working in our installations across this land. We have a diverse and resilient workforce, and they are proud and excited about the work they are doing. They are our greatest assets and I believe our greatest hope for the future of this Agency. They have shown me their desire to be a part of the work contributing to even greater meaning in the larger dreams represented by this Agency. Their eagerness and dedication and the strength of their resolve tell me that, together with the support of Congress and this Subcommittee, we can achieve what we have set out in this budget to accomplish—and more.

Thank you.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
FISCAL YEAR 2003 ESTIMATES
(IN MILLIONS OF REAL YEAR DOLLAR)

	FY 2001* OP PLAN REVISED	FY 2002 INITIAL OP PLAN	FY 2003 PRES BUDGET
HUMAN SPACE FLIGHT	**7,153.5**	**6,830.1**	**6,130.9**
INTERNATIONAL SPACE STATION	2,127.8	1,721.7	1,492.1
SPACE SHUTTLE	3,118.8	3,272.8	3,208.0
PAYLOAD & ELV SUPPORT	90.0	91.3	87.5
HEDS INVESTMENTS AND SUPPORT	1,247.8	1,214.5	1,178.2
SPACE COMMUNICATIONS & DATA SYSTEMS	521.7	482.2	117.5
SAFETY, MISSION ASSURANCE & ENGINEERING	47.4	47.6	47.6
SCIENCE, AERONAUTICS & TECHNOLOGY	**7,076.5**	**8,047.8**	**8,844.5**
SPACE SCIENCE	2,606.6	2,867.1	3,414.3
BIOLOGICAL & PHYSICAL RESEARCH	362.2	820.0	842.3
EARTH SCIENCE	1,762.2	1,625.7	1,628.4
AEROSPACE TECHNOLOGY	2,212.8	2,507.7	2,815.8
ACADEMIC PROGRAMS	132.7	227.3	143.7
INSPECTOR GENERAL	**22.9**	**23.7**	**24.6**
TOTAL AGENCY	**14,253.2**	**14,901.7**	**15,000.0**

*FY 2001 restructured to reflect two-appropriation structure