

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Federal Funds

General and special funds:

SCIENCE, AERONAUTICS AND EXPLORATION

(INCLUDING TRANSFER OF FUNDS)

For necessary expenses, not otherwise provided for, in the conduct and support of science, aeronautics and exploration research and development activities, including research, development, operations, support and services; maintenance; construction of facilities including repair, rehabilitation, revitalization, and modification of facilities, construction of new facilities and additions to existing facilities, facility planning and design, and restoration, and acquisition or condemnation of real property, as authorized by law; environmental compliance and restoration; space flight, spacecraft control and communications activities including operations, production, and services; program management; personnel and related costs, including uniforms or allowances therefor, as authorized by 5 U.S.C. 5901-5902; travel expenses; purchase and hire of passenger motor vehicles; not to exceed \$24,000 for official reception and representation expenses; and purchase, lease, charter, maintenance and operation of mission and administrative aircraft, \$7,660,900,000, to remain available until September 30, 2005, of which amounts as determined by the Administrator for salaries and benefits; training, travel and awards; facility and related costs; information technology services; science, engineering, fabricating and testing services; and other administrative services may be transferred to "Space Flight capabilities" in accordance with section 312(b) of the National Aeronautics and Space Act of 1958, as amended by Public Law 106-377.

Note.—A regular 2003 appropriation for this account had not been enacted at the time the budget was prepared; therefore, this account is operating under a continuing resolution (P.L. 107-229, as amended). The amounts included for 2003 in this budget reflect the Administration's 2003 policy proposals.

Program and Financing (in millions of dollars)

Identification code 80-0114-0-1-999	2002 actual	2003 est.	2004 est.
Obligations by program activity:			
00.01 Space science			3,809
00.02 Earth science			1,475
00.03 Biological & physical research			924
00.04 Aeronautics			907
00.05 Education programs			161
09.01 Reimbursable program			617
10.00 Total new obligations			7,893
Budgetary resources available for obligation:			
22.00 New budget authority (gross)			8,278
23.95 Total new obligations			-7,893
24.40 Unobligated balance carried forward, end of year			385
New budget authority (gross), detail:			
Discretionary:			
40.00 Appropriation			7,661
68.00 Spending authority from offsetting collections: Offsetting collections (cash)			617
70.00 Total new budget authority (gross)			8,278
Change in obligated balances:			
73.10 Total new obligations			7,893
73.20 Total outlays (gross)			-4,602
74.40 Obligated balance, end of year			3,291
Outlays (gross), detail:			
86.90 Outlays from new discretionary authority			4,602
Offsets:			
Against gross budget authority and outlays:			
Offsetting collections (cash) from:			
88.00 Federal sources			-540
88.40 Non-Federal sources			-77

88.90	Total, offsetting collections (cash)	-617
Net budget authority and outlays:		
89.00	Budget authority	7,661
90.00	Outlays	3,985
Additional net budget authority and outlays to cover cost of fully accruing retirement:		
99.00	Budget authority	63
99.01	Outlays	63

This appropriation provides for the full costs associated with the Science, Aeronautics and Exploration (SAE) activities of the Agency, which consist of the Space Science, Earth Science, Biological and Physical Research, Aeronautics, and Education Programs. The full costs include both the direct and the indirect costs supporting these programs, and provide for all of the research; development; operations; salaries and related expenses; design, repair, rehabilitation, and modification of facilities and construction of new facilities; maintenance and operation of existing facilities; and other general and administrative activities supporting Science, Aeronautics and Exploration programs. This account includes activities that were previously funded in the Science, Aeronautics, and Technology account.

Performance Objectives

Detailed performance goals associated with the Science, Aeronautics and Exploration (SAE) activities are addressed in NASA's FY 2004 President's Budget. The SAE activities include: Space Science, Earth Science, Biological and Physical Research, Aeronautics, and Education Programs; and are described below.

Space Science.—NASA's Space Science program seeks to answer fundamental questions concerning: the galaxy and the universe; the connections among the Sun, Earth and heliosphere; the origin and evolution of planetary systems; and the origin and distribution of life in the universe. The Space Science program is comprised of many research and development activities, including flight missions, major space-based facilities, technology and mission development programs, and research and data analysis.

NASA will proceed in the development of several major missions, including the Stratospheric Observatory for Infrared Astronomy (SOFIA), the Solar Terrestrial Relations Observatory (STEREO), the Gamma-ray Large-Area Space Telescope (GLAST), the Solar Dynamics Observatory (SDO) and the final Hubble Space Telescope (HST) Servicing Mission. SOFIA development will continue in preparation for a spring 2005 first science flight. STEREO, scheduled for launch in November 2005, will advance our understanding of the Sun's corona (its outer "atmosphere"), the origin of huge eruptions of solar material known as coronal mass ejections (CMEs), and the interaction between CMEs and the Earth's environment. GLAST, which will investigate the high-energy world of black holes and neutron stars, is on track for launch in the fall of 2006. SDO will increase our understanding of the Sun's magnetic field, solar wind, energetic particles, and variations in solar irradiance. Development of SDO begins in 2004. During the final HST Servicing Mission, also scheduled for 2004, astronauts will install the Cosmic Origins Spectrograph (COS) and Wide Field Camera 3 (WFC3) to extend the telescope's operational life to 2010. Development activities supporting several key missions in the payloads program, such as Solar-B and Herschel, will also continue in 2004.

General and special funds—ContinuedSCIENCE, AERONAUTICS AND EXPLORATION—Continued
(INCLUDING TRANSFER OF FUNDS)—Continued

Support for the Explorer and New Millennium programs will continue. Small- and Medium-class Explorer missions provide frequent flight opportunities for a diverse array of world-class scientific investigations—recently selected projects will examine diffuse intergalactic radiation and ice in Earth's mesosphere. Another Small Explorers mission, the second of the Two Wide-angle Imaging Neutral-atom Spectrometers (TWINS), will be launched in 2004 to provide stereoscopic images of the Earth's magnetosphere for the first time. The New Millennium Program provides flight demonstrations of critical new technologies that will reduce the mass and cost of future science and spacecraft subsystems, while maintaining or improving mission capabilities. Several of these innovative Space Technology projects (ST-5, 6, and 7) are scheduled for launch from 2004 through 2006.

The Discovery Program provides frequent access to space for small planetary missions that will perform high-quality scientific investigations. Both Deep Impact, the first space mission to probe beneath the surface of a comet and reveal the secrets of its interior, and the Mercury Surface, Space Environment, Geochemistry and Ranging (MESSENGER) mission to orbit Mercury are scheduled for launch in 2004. The Kepler Mission to explore the structure and diversity of planetary systems, with a special emphasis on detecting Earth-size planets in the habitable zones around other stars, will be in development in 2004, as will the Dawn mission to study the asteroids 1 Ceres and 4 Vesta.

Focused technology programs are included in each of the five major Space Science themes: Astronomical Search for Origins, Structure and Evolution of the Universe, Solar System Exploration, Mars Exploration Program, and Sun-Earth Connection. Funding is provided for early technology development in support of strategic missions, such as the James Webb (formerly "Next Generation") Space Telescope and the Living With a Star Program. The goal is to retire technology risk early in a mission's lifecycle, before proceeding to full-scale development. Funds are also provided to continue ongoing operations of approximately thirty spacecraft, and to conduct robust research and analysis, data analysis, and sub-orbital research campaigns.

The budget request for 2004 features two new initiatives: Optical Communication and the Jupiter Icy Moons Tour. Optical Communication seeks to use lasers to improve by many orders of magnitude the communication data rate for deep space missions. Current limitations on data transfer using radio constrain scientific discovery and public participation in our space missions. The Jupiter Icy Moons Tour will explore the icy moons of Jupiter (Europa, Ganymede, and Callisto), providing a full characterization of the moons through orbital reconnaissance. This will set the stage for the next phase of Jovian exploration, to include surface chemical and organic investigations, and a probe to explore the sub-surface environment. This mission will be part of Project Prometheus, an effort started last year to demonstrate nuclear power and nuclear electric propulsion technology that can open the solar system to detailed research and exploration.

Earth Science.—NASA's Earth Science Program contributes to the Agency's mission to understand and protect our home planet by developing a scientific understanding of the Earth system and its response to both natural and human-induced changes to enable improved prediction of climate, weather and natural hazards for present and future generations.

The Earth Science Program seeks to answer a question of fundamental importance to science and society: How is the Earth system changing, and what are the consequences

for life on Earth? In pursuit of this question, NASA has pioneered the interdisciplinary research field of Earth System Science, which recognizes that the Earth's land surface, oceans, atmosphere, ice sheets, and life itself all interact in a highly dynamic system. Employing a constellation of over 15 Earth observing satellites routinely making measurements with over 80 remote sensing instruments, NASA has made it an Agency goal to understand the Earth system and apply Earth System Science to improve prediction of climate, weather, and natural hazards. Within this goal, we have defined two strategic objectives: (1) Science—observe, analyze, and model the Earth system to discover how it is changing and the consequences for life on Earth; and (2) Applications—expand and accelerate the realization of economic and societal benefits from Earth science information and technology; with Earth System Science and Earth Science Applications as the corresponding budget themes.

Within Earth System Science, NASA works with the science community to identify questions on the frontiers of science that have profound societal importance, and to which remote sensing of the Earth can make a defining contribution. These science questions become the foundation of a research strategy, which defines requirements for scientific observations, and a roadmap for combining the technology, observations, modeling efforts, basic research, and partnerships needed to answer the questions over time. We are responding to the scientific community's call for comprehensive observation of the Earth's major components using the Earth Observing System (EOS). NASA uses the global view from space to contribute to the U.S. Government's Global Change Research Program (USGCRP) and Climate Change Research Initiative (CCRI). We have identified key areas of investment that will enable us to do more, and do it more rapidly, with a targeted investment in observations, research, and modeling of uncertainties surrounding the forces acting on the climate system.

Within Earth Science Applications, NASA enables the application of information and knowledge gained through partnerships with other federal agencies. These partnerships focus on innovative approaches for using Earth science information and knowledge to provide decision support information. This information supports myriad operational applications, as well as policy discussions, and is used to address a variety of national priorities, including economic issues and homeland security. Through the Earth Science Applications program, NASA is working with organizations with the appropriate information infrastructure to apply NASA's Earth science results to help manage coastal environments, agriculture and water resources, and aviation safety; monitor air and water quality, forest fires, and the impacts of infectious diseases and invasive species; and conduct hurricane forecasting and disaster relief efforts. The potential socioeconomic benefits of these applications are significant.

Biological and Physical Research.—NASA's Biological and Physical Research (BPR) Enterprise addresses the opportunities and challenges of space flight through basic and applied research on the ground and in space. The program exploits the rich opportunities of space flight in pursuit of answers to a broad set of scientific questions that support NASA's goals to explore the fundamental principles of physics, chemistry and biology through research in the unique natural laboratory of space, and to extend the duration and boundaries of human space flight to create new opportunities for scientific exploration and discovery. The major outcomes of this research include fundamental scientific progress and safer more efficient space travel. BPR includes three themes: Biological Sciences Research, Physical Sciences Research, and Research Partnerships and Flight Support.

Physical Science Research supports basic and applied research that takes advantage of the unique environment of space to expand our understanding of the fundamental laws

of nature. The theme supports NASA’s mission to explore the universe and search for life both through applied research to improve safety and performance and through exploratory research on the fundamental laws of nature. The theme supports NASA’s mission to understand and protect our home planet by producing research results that have direct application to industrial products and processes.

Biological Science Research conducts basic and applied research to enable and support a safe human presence in space in support of NASA’s mission to explore the universe and search for life. This theme includes a basic biology research component that pursues fundamental biological research questions as an integral element of understanding how space affects life at all levels, from genes to cells to organisms. This theme supports research to define and control the physiological and psychological challenges to human health associated with space flight, including research on radiation risks, risks associated with microgravity, and risks associated with prolonged isolation and small group dynamics. The theme also includes research and development to improve the reliability and performance of life support systems and spacecraft crew interfaces.

The FY 2004 budget request reflects the results of the NASA Advisory Council’s Research Maximization and Prioritization (ReMaP) Task Force recommendations. The request expands planned biomedical research and countermeasures experiments, including a new Human Research Initiative; initiates a limited flight program in high priority advanced human support technology; places additional emphasis on physical science research, including applications to human space flight; and reinstates funding for plant and animal habitats for planned centrifuge research on the International Space Station (ISS).

Implementing ReMaP in the FY 2004 budget is a crucial first step in a longer running planning and prioritization process. In the near term, research and facility development are aligned with the ReMaP priorities in the FY 04 Budget. At the same time, BPR has responded to NASA’s new strategic plan by adopting a 5-year direction consistent with overall agency vision, mission and goals. This direction has identified major research thrusts, consistent with the agency strategic plan and the management changes required to support these thrusts.

Aeronautics.—Aeronautics Technology addresses the Agency’s goal to “enable a safer, more secure, efficient, and environmentally friendly air transportation system” by performing research and technology to: decrease the aircraft fatal accident rate and the vulnerability of the air transportation system to threats; protect the local and global environmental quality by reducing aircraft noise and emissions; and enable more people and goods to travel faster and farther with fewer delays. NASA works closely with the Federal Aviation Administration (FAA) in setting these goals. Additionally, in support of the Agency goal “to create a more secure world and improve the quality of life by investing in technologies and to collaborate with other agencies, industry and academia,” Aeronautics Technology supports national security through aeronautical partnerships with the Department of Defense and other government agencies. Finally, this theme enables pioneering aeronautical concepts to support earth and space science missions and new commercial markets in support of the Agency goal to “enable revolutionary capabilities through new technology.”

Three research and technology programs compose the Aeronautics Technology theme. The Aviation Safety and Security Program develops and demonstrates technologies and strategies for the prevention, intervention, and mitigation of factors contributing to aviation accidents. This theme gives highest priority to the factors that are most strongly tied to accident and fatality rates, as well as those that address multiple

classes of hazards, including hazardous weather, controlled flight into terrain, accidents and incidents caused by human error, and mechanical or software malfunctions. The program develops and integrates technologies needed to build a safer aviation system, to support pilots and air traffic controllers, and to provide information to assess situations and trends that might indicate unsafe conditions before accidents occur. NASA develops, validates and transfers these advanced concepts, technologies and procedures through a partnership with the Federal Aviation Administration (FAA) and in cooperation with the U.S. aeronautics industry.

To enable increased capacity and mobility of the nation’s air transportation system, the Airspace Systems program develops and demonstrates technology for revolutionary improvements to, and modernization of, the air traffic management (ATM) system. The technology enables new ATM decision support tools and airspace concepts as well as new systems for aircraft whose operation can take advantage of the improved, modern ATM system. The resultant benefit to the traveling public will be reduced flight delays and shorter door-step-to-destination times. Users of the technologies that result from this program include: the FAA, state and local airport authorities and their systems suppliers, existing and new commercial and personal aviation operators, and the aircraft developers and their system suppliers. This program directly supports the FAA’s “Free Flight” activities and the Operational Evolution Plan (OEP) and maintains pace with a continually evolving technical environment.

The Vehicle Systems program develops breakthrough technologies to enable new capability and functionality in future aircraft. Technologies from this program are then further developed in the Aviation Safety and Security Program and the Airspace Systems program to reduce aircraft emissions and noise, enable more people and goods to travel faster and farther, and to increase air system safety and security. The Vehicle Systems program also supports development of common advanced air vehicle technologies with the DOD.

Education.—Since its establishment, NASA has served the Nation’s educational interests by sharing its unique mission, facilities, personnel, and research results with inquisitive minds throughout the United States and around the globe. The results have opened the minds of people of all ages, races and background to the universe, new technologies and expanded possibilities. As the 21st century begins, and new national challenges are before us, it is appropriate that NASA re-examine and re-energize the Agency’s education mission and organization. To that end, a NASA Education Office has been established as a new, mission-focused organization that will aggregate NASA’s education programs, management and staff. This Office will position NASA to more effectively leverage its resources to encourage student interest in math, science, and technology education—to inspire the next generation of explorers, as only NASA can.

The NASA Education Office will work toward achieving four priorities: (1) motivating K–16+ students to pursue careers in science, math and engineering; (2) providing educators with unique teaching tools and compelling teaching experiences; (3) seeking to ensure that we are investing the taxpayer’s resources wisely; and (4) engaging minority and underrepresented students, educators and researchers in NASA’s education program. An important and visible component of the NASA Education Office is the Minority University Research and Education Program, insuring that minority education programs are a high priority for the Agency.

Object Classification (in millions of dollars)

Identification code 80–0114–0–1–999	2002 actual	2003 est.	2004 est.
Direct obligations:			
Personnel compensation:			
11.1 Full-time permanent			789

General and special funds—Continued

SCIENCE, AERONAUTICS AND EXPLORATION—Continued

(INCLUDING TRANSFER OF FUNDS)—Continued

Object Classification (in millions of dollars)—Continued

Identification code 80-0114-0-1-999	2002 actual	2003 est.	2004 est.
11.3 Other than full-time permanent			16
11.5 Other personnel compensation			15
11.8 Special personal services payments			8
11.9 Total personnel compensation			828
12.1 Civilian personnel benefits			199
21.0 Travel and transportation of persons			32
22.0 Transportation of things			6
23.1 Rental payments to GSA			14
23.3 Communications, utilities, and miscellaneous charges			73
24.0 Printing and reproduction			4
25.1 Advisory and assistance services			134
25.2 Other services			671
25.3 Other purchases of goods and services from Government accounts			261
25.4 Operation and maintenance of facilities			238
25.5 Research and development contracts		3,209	
25.7 Operation and maintenance of equipment			81
26.0 Supplies and materials			154
31.0 Equipment			101
32.0 Land and structures			186
41.0 Grants, subsidies, and contributions			1,085
99.0 Direct obligations			7,276
99.0 Reimbursable obligations			617
99.9 Total new obligations			7,893

Personnel Summary

Identification code 80-0114-0-1-999	2002 actual	2003 est.	2004 est.
Direct:			
Total compensable workyears:			
1001 Civilian full-time equivalent employment			9,184
Reimbursable:			
2001 Total compensable workyears: Civilian full-time equivalent employment			63

SPACE FLIGHT CAPABILITIES

(INCLUDING TRANSFER OF FUNDS)

For necessary expenses, not otherwise provided for, in the conduct and support of space flight capabilities research and development activities, including research, development, operations, support and services; maintenance; construction of facilities including repair, rehabilitation, revitalization and modification of facilities, construction of new facilities and additions to existing facilities, facility planning and design, and acquisition or condemnation of real property, as authorized by law; environmental compliance and restoration; space flight, spacecraft control and communications activities including operations, production, and services; program management; personnel and related costs, including uniforms or allowances therefor, as authorized by 5 U.S.C. 5901-5902; travel expenses; purchase and hire of passenger motor vehicles; not to exceed \$24,000 for official reception and representation expenses; and purchase, lease, charter, maintenance and operation of mission and administrative aircraft, \$7,782,100,000, to remain available until September 30, 2005, of which amounts as determined by the Administrator for salaries and benefits; training, travel and awards; facility and related costs; information technology services; science, engineering, fabricating and testing services; and other administrative services may be transferred to "Science, aeronautics and exploration" in accordance with section 312(b) of the National Aeronautics and Space Act of 1958, as amended by Public Law 106-377.

Note.—A regular 2003 appropriation for this account had not been enacted at the time the budget was prepared; therefore, this account is operating under a continuing resolution (P.L. 107-229, as amended). The amounts included for 2003 in this budget reflect the Administration's 2003 policy proposals.

Program and Financing (in millions of dollars)

Identification code 80-0115-0-1-252	2002 actual	2003 est.	2004 est.
Obligations by program activity:			
00.01 Space flight			5,804
00.02 Crosscutting technology			1,591
09.01 Reimbursable program			328
10.00 Total new obligations			7,723
Budgetary resources available for obligation:			
22.00 New budget authority (gross)			8,110
23.95 Total new obligations			-7,723
24.40 Unobligated balance carried forward, end of year			387
New budget authority (gross), detail:			
Discretionary:			
40.00 Appropriation			7,782
68.00 Spending authority from offsetting collections: Offsetting collections (cash)			328
70.00 Total new budget authority (gross)			8,110
Change in obligated balances:			
73.10 Total new obligations			7,723
73.20 Total outlays (gross)			-5,613
74.40 Obligated balance, end of year			2,110
Outlays (gross), detail:			
86.90 Outlays from new discretionary authority			5,613
Offsets:			
Against gross budget authority and outlays:			
Offsetting collections (cash) from:			
88.00 Federal sources			-272
88.40 Non-Federal sources			-56
88.90 Total, offsetting collections (cash)			-328
Net budget authority and outlays:			
89.00 Budget authority			7,782
90.00 Outlays			5,285
Additional net budget authority and outlays to cover cost of fully accruing retirement:			
99.00 Budget authority			63
99.01 Outlays			63

This appropriation provides for the full costs associated with the capabilities that support Agency research, which consist of the Space Flight and Crosscutting Technology Programs. The full costs include both the direct and the indirect costs supporting these programs, and provide for all of the research; development; operations; salaries and related expenses; design, repair, rehabilitation, and modification of facilities and construction of new facilities; maintenance and operation of existing facilities; and other general and administrative activities supporting Science, Aeronautics and Exploration programs. This account includes activities that were previously funded in the Human Space Flight and Science, Aeronautics, and Technology accounts.

Performance Objectives

Detailed performance goals associated with the Enabling Capabilities activities are addressed in NASA's FY 2004 President's Budget. The Enabling Capabilities activities include Space Flight and Crosscutting Technology, and are described below.

Space Flight.—Space Flight encompasses the following themes: International Space Station (ISS), Space Shuttle Program, and Space and Flight Support.

The ISS is a complex of research laboratories in low Earth orbit (LEO) in which American, Russian, Canadian, European, and Japanese astronauts are conducting unique scientific and technological investigations in a micro-gravity environment. The objectives of the Station are to support scientific research and other activities requiring the unique attributes of humans in space, and establish a permanent

human presence in Earth orbit. Program estimates have been determined to be credible by independent assessment teams, however, concerns were raised in regard to the sufficiency of funding levels to cover risks to program performance and to expand research. To this end, the FY 2004 Budget request provides increased funding for continued development of the vehicle and for operations in support of continued assembly, logistics re-supply, crew exchange, research operations and other utilization. With fourteen U.S. assembly and logistic missions successfully completed, the budget includes funding to keep subsequent assembly missions on schedule through U.S. Core Complete (Flight 10A), currently planned for calendar year 2004, and to continue to expand research opportunities commensurate with the build-up of on-orbit utilization capabilities and resources.

The Space Shuttle Program plays a vital role in NASA's strategic goal to advance human exploration, use, and development of space by providing safe, routine access to space in support of permanent human operations in Low Earth Orbit. NASA planning assumes the Space Shuttle will need to be capable of supporting assembly and operation of the Space Station for at least this decade. Specific program investments are required in order to maintain this human transport capability through this decade. These investments are consistent with NASA's strategy of ensuring the Space Shuttle remains viable until a new transportation system is operational. The FY 2004 budget request will allow NASA to meet the intended flight rates, provide appropriate contingency planning to assure transportation and assembly support to the ISS program and include high priority projects for safety and supportability. These projects will combat obsolescence of vehicles, ground systems, and facilities, in order to maintain the program's safety and viability through this decade.

Space and Flight Support is comprised of separate "enabling capabilities" programs that provide on-going customer support for a wide range of services including environmental activities, space communications, Space Shuttle payloads processing, expendable launch vehicles, and rocket propulsion systems testing. These services are critical for the conduct of space exploration, aeronautical research and physiological research. They are provided to a wide range of customers including NASA, other U.S. federal agencies, foreign governments and commercial interests. Space and Flight Support also includes the Advanced Systems program, which will enable NASA to take a "stepping stone" approach to future NASA missions through by advanced research and technology development.

Crosscutting Technology.—The Aerospace Technology Enterprise includes three themes in Crosscutting Technology: Space Launch Initiative, Mission & Science Measurement Technology, and Innovative Technology Partnerships.

The Space Launch Initiative (SLI) will develop the Orbital Space Plan (OSP) to help assure safe, affordable, and reliable U.S.-based crew access and return from the Space Station. The OSP will start as a crew return vehicle, launched on an Evolved Expendable Launch Vehicle (EELV). Initially, the OSP will provide crew return capability by 2010. By 2012, the Orbital Space Plane will evolve to be flown on a human-rated EELV and will transfer crew, and possibly limited cargo, to and from the International Space Station. This capability will serve as a complement and backup to the Space Shuttle for taking crew into space. Later, the Orbital Space Plane could become the basis for a crew transfer vehicle on a new reusable launch vehicle. Funds for the OSP will support an aggressive effort to assess options and complete a preliminary design by 2005. If the Orbital Space Plane is approved for full-scale development, the program will be managed in a streamlined approach to reduce the cost of development and maintain an aggressive schedule. The Next Genera-

tion Launch Technology (NGLT) program will be responsible for making the investments relating to the next SLI goal, that focuses on making future space transportation systems safer, more affordable, and more reliable. NASA will make focused, strategic investments in key technology areas—including propulsion, structures and operations—to be applied to both reusable and expendable launch systems. The NGLT program will enable future development decisions on launch systems that support NASA's space transportation needs for the upcoming decades.

The Mission and Science Measurement Technology (MSM) theme enables revolutionary capabilities through new technology. MSM objectives are to develop science-driven architectures and technology, to create knowledge from scientific data, and to develop capabilities for assessing and managing mission risk. The advanced system concepts, fundamental technologies, and engineering tools developed by MSM are unique to NASA needs, and are applicable across many classes of missions in multiple Enterprises. These products may require many years to progress from initial concept definition to mission infusion. Three programs have been formulated to accomplish MSM objectives: the Computing, Information, and Communications Technologies (CICT) Program, that develops breakthrough information and communication systems to increase our understanding of scientific data and phenomena; the Engineering for Complex Systems (ECS) Program, that develops the capabilities to assess and manage risk in the synthesis of complex systems; and the Enabling Concepts and Technologies (ECT) Program, that defines new system concepts, and develops new technologies to enable new science measurements for the NASA Enterprises.

NASA's Innovative Technology Partnership activities consist of: Commercial Programs, Technology Transfer agents, the Enterprise Engine, and the Small Business Research programs. In FY 2004, NASA will initiate an orderly phase-out of the existing Commercial Technology Program, and a new concept—the Enterprise Engine—will be introduced. The Enterprise Engine will create partnerships between NASA, industrial firms and the venture capital community to address NASA's new technology mission needs through innovative technology development partnerships. NASA's Small Business Research programs will continue. They include the Small Business Innovation Research (SBIR) and the Small Business Technology Transfer (STTR) programs, which were created by Congress, and promote awards of NASA research contracts to the small business community and promote commercialization of the products of this research by the small business community. These programs help NASA develop innovative technologies by providing competitive research contracts to U.S. owned small businesses.

Object Classification (in millions of dollars)

Identification code 80-0115-0-1-252	2002 actual	2003 est.	2004 est.
Direct obligations:			
Personnel compensation:			
11.1			780
11.3			16
11.5			15
11.8			7
11.9			818
12.1			196
21.0			31
22.0			6
23.1			1
23.3			59
24.0			5
25.1			39
25.2			360
25.3			
			102
25.4			2,499

General and special funds—Continued

SPACE FLIGHT CAPABILITIES—Continued
(INCLUDING TRANSFER OF FUNDS)—Continued

Object Classification (in millions of dollars)—Continued

Identification code 80-0115-0-1-252	2002 actual	2003 est.	2004 est.
25.5 Research and development contracts			2,848
25.7 Operation and maintenance of equipment			46
26.0 Supplies and materials			169
31.0 Equipment			96
32.0 Land and structures			100
41.0 Grants, subsidies, and contributions			20
99.0 Direct obligations			7,395
99.0 Reimbursable obligations			328
99.9 Total new obligations			7,723

Personnel Summary

Identification code 80-0115-0-1-252	2002 actual	2003 est.	2004 est.
Direct:			
Total compensable workyears:			
1001 Civilian full-time equivalent employment			9,422
Reimbursable:			
2001 Total compensable workyears: Civilian full-time equivalent employment			24

HUMAN SPACE FLIGHT

Program and Financing (in millions of dollars)

Identification code 80-0111-0-1-252	2002 actual	2003 est.	2004 est.
Obligations by program activity:			
Direct program:			
00.01 Space station	1,752	1,573	75
00.02 Payload and ELV support	96	92	4
00.03 Investments and support	1,001	1,233	31
00.04 Space shuttle	3,290	3,117	160
00.05 Space communications and data systems	444	162	6
00.07 Safety, mission assurance & engineering	46	49	2
09.01 Reimbursable program	277	346	
10.00 Total new obligations	6,906	6,572	278

Budgetary resources available for obligation:

21.40 Unobligated balance carried forward, start of year	171	373	278
22.00 New budget authority (gross)	7,063	6,477	
22.10 Resources available from recoveries of prior year obligations	45		
23.90 Total budgetary resources available for obligation	7,279	6,850	278
23.95 Total new obligations	-6,906	-6,572	-278
24.40 Unobligated balance carried forward, end of year	373	278	

New budget authority (gross), detail:

40.00 Discretionary:			
Appropriation	6,988	6,131	
40.73 Reduction pursuant to P.L. 107-206	-5		
41.00 Transferred to other accounts	-210		
43.00 Appropriation (total discretionary)	6,773	6,131	
Spending authority from offsetting collections:			
68.00 Offsetting collections (cash)	267	346	
68.10 Change in uncollected customer payments from Federal sources (unexpired)	23		
68.90 Spending authority from offsetting collections (total discretionary)	290	346	
70.00 Total new budget authority (gross)	7,063	6,477	

Change in obligated balances:

72.40 Obligated balance, start of year	1,468	1,697	1,773
73.10 Total new obligations	6,906	6,572	278
73.20 Total outlays (gross)	-6,608	-6,496	-1,821
73.40 Adjustments in expired accounts (net)	-1		
73.45 Recoveries of prior year obligations	-45		
74.00 Change in uncollected customer payments from Federal sources (unexpired)	-23		

74.10 Change in uncollected customer payments from Federal sources (expired)	-1		
74.40 Obligated balance, end of year	1,697	1,773	230

Outlays (gross), detail:

86.90 Outlays from new discretionary authority	5,086	4,515	
86.93 Outlays from discretionary balances	1,522	1,981	1,821
87.00 Total outlays (gross)	6,608	6,496	1,821

Offsets:

Against gross budget authority and outlays:			
Offsetting collections (cash) from:			
88.00 Federal sources	-244	-312	
88.40 Non-Federal sources	-27	-34	
88.90 Total, offsetting collections (cash)	-271	-346	
Against gross budget authority only:			
88.95 Change in uncollected customer payments from Federal sources (unexpired)	-23		
88.96 Portion of offsetting collections (cash) credited to expired accounts	4		

Net budget authority and outlays:

89.00 Budget authority	6,773	6,131	
90.00 Outlays	6,336	6,150	1,821

Additional net budget authority and outlays to cover cost of fully accruing retirement:

99.00 Budget authority	39	44	
99.01 Outlays	39	44	

NASA's "Human Space Flight" (HSF) account included the International Space Station; Space Shuttle; Payload and ELV Support; Human Exploration and Development of Space (HEDS) Investments and Support; Space Communications and Data Systems; and Safety, Mission Assurance and Engineering (SMA&E). With the exception of SMA&E, these activities, along with the Crosscutting portion of Aerospace Technology, will be included under the "Enabling Capabilities" account. Beginning in FY 2004, SMA&E is allocated as an indirect charge to all programs. This account shows spending from balances prior to the account restructuring.

Object Classification (in millions of dollars)

Identification code 80-0111-0-1-252	2002 actual	2003 est.	2004 est.
Direct obligations:			
Personnel compensation:			
11.1 Full-time permanent	500	569	
11.3 Other than full-time permanent	8	5	
11.5 Other personnel compensation	12	16	
11.8 Special personal services payments	8	13	
11.9 Total personnel compensation	528	603	
12.1 Civilian personnel benefits	125	131	
21.0 Travel and transportation of persons	21	23	
22.0 Transportation of things	6	6	
23.1 Rental payments to GSA	1	1	
23.3 Communications, utilities, and miscellaneous charges	56	51	3
24.0 Printing and reproduction	5	5	
25.1 Advisory and assistance services	37	34	2
25.2 Other services	340	312	16
25.3 Other purchases of goods and services from Government accounts	96	88	4
25.4 Operation and maintenance of facilities	2,357	2,170	110
25.5 Research and development contracts	2,646	2,430	125
25.6 Medical care	5		
25.7 Operation and maintenance of equipment	43	39	2
26.0 Supplies and materials	159	146	7
31.0 Equipment	91	84	4
32.0 Land and structures	94	86	4
41.0 Grants, subsidies, and contributions	19	17	1
99.0 Direct obligations	6,629	6,226	278
99.0 Reimbursable obligations	277	346	
99.9 Total new obligations	6,906	6,572	278

Personnel Summary

Identification code 80-0111-0-1-252	2002 actual	2003 est.	2004 est.
Direct:			
Total compensable workyears:			
1001 Civilian full-time equivalent employment	6,531	6,912	.....
Reimbursable:			
2001 Total compensable workyears: Civilian full-time equivalent employment	26	30	.....

SCIENCE, AERONAUTICS AND TECHNOLOGY

Program and Financing (in millions of dollars)

Identification code 80-0110-0-1-999	2002 actual	2003 est.	2004 est.
Obligations by program activity:			
Direct program:			
00.01 Space science	2,863	3,428	161
00.02 Biological and physical research	816	882	37
00.03 Earth science	1,616	1,734	74
00.04 Aerospace technology	2,539	2,803	118
00.06 Academic programs	212	176	24
09.01 Reimbursable program	455	642	.....
10.00 Total new obligations	8,501	9,665	414
Budgetary resources available for obligation:			
21.40 Unobligated balance carried forward, start of year	448	593	414
22.00 New budget authority (gross)	8,616	9,486	.....
22.10 Resources available from recoveries of prior year obligations	30	.....	.....
23.90 Total budgetary resources available for obligation	9,094	10,079	414
23.95 Total new obligations	-8,501	-9,665	-414
24.40 Unobligated balance carried forward, end of year	593	414	.....
New budget authority (gross), detail:			
Discretionary:			
40.00 Appropriation	7,890	8,844	.....
40.76 Reduction pursuant to P.L. 107-206	-5	.....	.....
42.00 Transferred from other accounts	210	.....	.....
43.00 Appropriation (total discretionary)	8,095	8,844	.....
Spending authority from offsetting collections:			
68.00 Offsetting collections (cash)	587	642	.....
68.10 Change in uncollected customer payments from Federal sources (unexpired)	-66	.....	.....
68.90 Spending authority from offsetting collections (total discretionary)	521	642	.....
70.00 Total new budget authority (gross)	8,616	9,486	.....
Change in obligated balances:			
72.40 Obligated balance, start of year	3,360	3,748	4,494
73.10 Total new obligations	8,501	9,665	414
73.20 Total outlays (gross)	-8,130	-8,917	-4,048
73.40 Adjustments in expired accounts (net)	-37	.....	.....
73.45 Recoveries of prior year obligations	-30	.....	.....
74.00 Change in uncollected customer payments from Federal sources (unexpired)	66	.....	.....
74.10 Change in uncollected customer payments from Federal sources (expired)	18	.....	.....
74.40 Obligated balance, end of year	3,748	4,494	861

Outlays (gross), detail:			
86.90 Outlays from new discretionary authority	4,805	5,241	.....
86.93 Outlays from discretionary balances	3,325	3,676	4,048
87.00 Total outlays (gross)	8,130	8,917	4,048

Offsets:			
Against gross budget authority and outlays:			
Offsetting collections (cash) from:			
88.00 Federal sources	-562	-551	.....
88.40 Non-Federal sources	-36	-91	.....
88.90 Total, offsetting collections (cash)	-598	-642	.....
Against gross budget authority only:			
88.95 Change in uncollected customer payments from Federal sources (unexpired)	66	.....	.....
88.96 Portion of offsetting collections (cash) credited to expired accounts	11	.....	.....

Net budget authority and outlays:

89.00 Budget authority	8,095	8,844	.....
90.00 Outlays	7,532	8,275	4,048

Additional net budget authority and outlays to cover cost of fully accruing retirement:

99.00 Budget authority	72	75	.....
99.01 Outlays	72	75	.....

NASA's "Science, Aeronautics and Technology" (SAT) account included Space Science, Biological and Physical Research, Earth Science, Aerospace Technology, and Academic Programs. Beginning in 2004, Space Science, Biological and Physical Research, Earth Science, the Aeronautics portion of Aerospace Technology, and Academic Programs (which, beginning in FY 2004, is renamed Education Programs), will be included under the "Science, Aeronautics and Exploration" (SAE) account. This account shows spending from balances prior to the account restructuring.

Object Classification (in millions of dollars)

Identification code 80-0110-0-1-999	2002 actual	2003 est.	2004 est.
Direct obligations:			
Personnel compensation:			
11.1 Full-time permanent	921	949	.....
11.3 Other than full-time permanent	18	17	.....
11.5 Other personnel compensation	20	26	.....
11.8 Special personal services payments	1	2	.....
11.9 Total personnel compensation	960	994	.....
12.1 Civilian personnel benefits	212	219	.....
21.0 Travel and transportation of persons	33	36	.....
22.0 Transportation of things	7	8	.....
23.1 Rental payments to GSA	15	17	.....
23.3 Communications, utilities, and miscellaneous charges	80	91	5
24.0 Printing and reproduction	5	6	.....
25.1 Advisory and assistance services	147	167	9
25.2 Other services	734	834	44
25.3 Other purchases of goods and services from Government accounts	286	325	17
25.4 Operation and maintenance of facilities	260	295	16
25.5 Research and development contracts	3,551	4,035	216
25.7 Operation and maintenance of equipment	89	101	5
26.0 Supplies and materials	169	192	10
31.0 Equipment	111	126	7
32.0 Land and structures	203	231	12
41.0 Grants, subsidies, and contributions	1,184	1,346	73
99.0 Direct obligations	8,046	9,023	414
99.0 Reimbursable obligations	455	642	.....
99.9 Total new obligations	8,501	9,665	414

Personnel Summary

Identification code 80-0110-0-1-999	2002 actual	2003 est.	2004 est.
Direct:			
Total compensable workyears:			
1001 Civilian full-time equivalent employment	11,835	11,832	.....
Reimbursable:			
2001 Total compensable workyears: Civilian full-time equivalent employment	79	63	.....

MISSION SUPPORT

Program and Financing (in millions of dollars)

Identification code 80-0112-0-1-999	2002 actual	2003 est.	2004 est.
Obligations by program activity:			
Direct program:			
00.01 Safety, mission assurance, engineering, and advanced concepts	5	.....	.....
00.02 Research and program management	41	.....	.....
00.03 Construction of facilities	70	47	.....
01.00 Total direct program	116	47	.....
09.01 Reimbursable program	4	.....	.....
10.00 Total new obligations	120	47	.....

General and special funds—Continued

MISSION SUPPORT—Continued

Program and Financing (in millions of dollars)—Continued

Identification code 80-0112-0-1-999	2002 actual	2003 est.	2004 est.
Budgetary resources available for obligation:			
21.40 Unobligated balance carried forward, start of year	146	47	
22.00 New budget authority (gross)	5		
22.10 Resources available from recoveries of prior year obligations	7		
22.22 Unobligated balance transferred from other accounts	10		
23.90 Total budgetary resources available for obligation	168	47	
23.95 Total new obligations	-120	-47	
23.98 Unobligated balance expiring or withdrawn	-1		
24.40 Unobligated balance carried forward, end of year	47		

New budget authority (gross), detail:

Spending authority from offsetting collections:			
Discretionary:			
68.00 Offsetting collections (cash)	15		
68.10 Change in uncollected customer payments from Federal sources (unexpired)	-10		
68.90 Spending authority from offsetting collections (total discretionary)	5		

Change in obligated balances:

72.40 Obligated balance, start of year	623	187	89
73.10 Total new obligations	120	47	
73.20 Total outlays (gross)	-556	-145	-89
73.40 Adjustments in expired accounts (net)	-10		
73.45 Recoveries of prior year obligations	-7		
74.00 Change in uncollected customer payments from Federal sources (unexpired)	10		
74.10 Change in uncollected customer payments from Federal sources (expired)	8		
74.40 Obligated balance, end of year	187	89	

Outlays (gross), detail:

86.90 Outlays from new discretionary authority	5		
86.93 Outlays from discretionary balances	551	145	89
87.00 Total outlays (gross)	556	145	89

Offsets:

Against gross budget authority and outlays:			
Offsetting collections (cash) from:			
88.00 Federal sources	-15		
88.40 Non-Federal sources	-7		
88.90 Total, offsetting collections (cash)	-22		
Against gross budget authority only:			
88.95 Change in uncollected customer payments from Federal sources (unexpired)	10		
88.96 Portion of offsetting collections (cash) credited to expired accounts	7		

Net budget authority and outlays:

89.00 Budget authority			
90.00 Outlays	534	145	89

NASA's "Mission Support" account included Research and Program Management (R&PM) and Construction of Facilities (CoF), which have not been included in a separate appropriation since 2001. Instead, those "Mission Support" activities are budgeted as part of the full costs associated with projects in the Science, Aeronautics and Exploration account or the Enabling Capabilities account (except for environmental activities, which had previously been included in CoF, and is now budgeted separately under Enabling Capabilities). This account shows spending from balances prior to the account restructuring.

Object Classification (in millions of dollars)

Identification code 80-0112-0-1-999	2002 actual	2003 est.	2004 est.
Direct obligations:			
23.1 Rental payments to GSA	4		
24.0 Printing and reproduction	1		

25.1 Advisory and assistance services	1		
25.2 Other services	28		
25.3 Other purchases of goods and services from Government accounts	5		
25.4 Operation and maintenance of facilities	6		
25.5 Research and development contracts	8		
25.7 Operation and maintenance of equipment	5		
26.0 Supplies and materials	3		
31.0 Equipment	2		
32.0 Land and structures	52	47	
41.0 Grants, subsidies, and contributions	1		
99.0 Direct obligations	116	47	
99.0 Reimbursable obligations	4		
99.9 Total new obligations	120	47	

CONSTRUCTION OF FACILITIES

Program and Financing (in millions of dollars)

Identification code 80-0107-0-1-999	2002 actual	2003 est.	2004 est.
Obligations by program activity:			
00.01 Construction of facilities	-5		
10.00 Total new obligations (object class 32.0)	-5		

Budgetary resources available for obligation:

21.40 Unobligated balance carried forward, start of year	5		
22.21 Unobligated balance transferred from other accounts	-10		
23.90 Total budgetary resources available for obligation	-5		
23.95 Total new obligations	5		

Change in obligated balances:

72.40 Obligated balance, start of year	6		
73.10 Total new obligations	-5		
73.20 Total outlays (gross)	-2		

Outlays (gross), detail:

86.93 Outlays from discretionary balances	2		
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Net budget authority and outlays:

89.00 Budget authority			
90.00 Outlays	2		

Beginning in 2004, NASA's Construction of Facilities (CoF) activities will be performed in the Science, Aeronautics and Exploration or Enabling Capabilities accounts. From 1995 to 2003, CoF facilities activities were included in Human Space Flight; Science, Aeronautics and Technology; and Mission Support. This account shows spending from balances prior to the account restructuring.

OFFICE OF INSPECTOR GENERAL

For necessary expenses of the Office of Inspector General in carrying out the Inspector General Act of 1978, as amended, \$26,300,000.

Note.—A regular 2003 appropriation for this account had not been enacted at the time the budget was prepared; therefore, this account is operating under a continuing resolution (P.L. 107-229, as amended). The amounts included for 2003 in this budget reflect the Administration's 2003 policy proposals.

Program and Financing (in millions of dollars)

Identification code 80-0109-0-1-252	2002 actual	2003 est.	2004 est.
Obligations by program activity:			
00.01 Direct program activity	23	25	26
10.00 Total new obligations	23	25	26

Budgetary resources available for obligation:

22.00 New budget authority (gross)	24	25	26
23.95 Total new obligations	-23	-25	-26

New budget authority (gross), detail:

Discretionary:			
40.00 Appropriation	24	25	26

Change in obligated balances:				
72.40	Obligated balance, start of year	3	3	3
73.10	Total new obligations	23	25	26
73.20	Total outlays (gross)	-24	-25	-26
74.40	Obligated balance, end of year	3	3	3
Outlays (gross), detail:				
86.90	Outlays from new discretionary authority	21	22	23
86.93	Outlays from discretionary balances	3	3	3
87.00	Total outlays (gross)	24	25	26
Net budget authority and outlays:				
89.00	Budget authority	24	25	26
90.00	Outlays	24	25	26
Additional net budget authority and outlays to cover cost of fully accruing retirement:				
99.00	Budget authority	1	1	1
99.01	Outlays	1	1	1

The mission of the Office of Inspector General is to conduct audits and investigations of agency activities. The Inspector General keeps the Administrator informed of problems and deficiencies in agency programs and operations.

Object Classification (in millions of dollars)

Identification code 80-0109-0-1-252	2002 actual	2003 est.	2004 est.
11.1 Personnel compensation: Full-time permanent	16	18	19
12.1 Civilian personnel benefits	5	5	5
21.0 Travel and transportation of persons	1	1	1
26.0 Supplies and materials	1	1	1
99.9 Total new obligations	23	25	26

Personnel Summary

Identification code 80-0109-0-1-252	2002 actual	2003 est.	2004 est.
Direct:			
Total compensable workyears:			
1001 Civilian full-time equivalent employment	200	213	213

Trust Funds

SCIENCE, SPACE, AND TECHNOLOGY EDUCATION TRUST FUND

Unavailable Collections (in millions of dollars)

Identification code 80-8978-0-7-503	2002 actual	2003 est.	2004 est.
01.99 Balance, start of year			
Receipts:			
02.40 Earnings on investments; Science, Space and Technology Education, Trust Fu	1	1	1
Appropriations:			
05.00 Science, space, and technology education trust fund	-1	-1	-1
07.99 Balance, end of year			

Program and Financing (in millions of dollars)

Identification code 80-8978-0-7-503	2002 actual	2003 est.	2004 est.
Obligations by program activity:			
00.01 Direct program activity	1	1	1
10.00 Total new obligations (object class 41.0)	1	1	1
Budgetary resources available for obligation:			
21.40 Unobligated balance carried forward, start of year	15	15	15
22.00 New budget authority (gross)	1	1	1
23.90 Total budgetary resources available for obligation	16	16	16
23.95 Total new obligations	-1	-1	-1
24.40 Unobligated balance carried forward, end of year	15	15	15
New budget authority (gross), detail:			
Mandatory:			
60.26 Appropriation (trust fund)	1	1	1

Identification code 80-8977-0-7-252	2002 actual	2003 est.	2004 est.
Change in obligated balances:			
73.10 Total new obligations	1	1	1
73.20 Total outlays (gross)	-1	-1	-1
Outlays (gross), detail:			
86.97 Outlays from new mandatory authority	1	1	1
Net budget authority and outlays:			
89.00 Budget authority	1	1	1
90.00 Outlays	1	1	1
Memorandum (non-add) entries:			
92.01 Total investments, start of year: Federal securities:			
Par value	14	14	15
92.02 Total investments, end of year: Federal securities:			
Par value	14	15	15

NATIONAL SPACE GRANT PROGRAM

Program and Financing (in millions of dollars)

Identification code 80-8977-0-7-252	2002 actual	2003 est.	2004 est.
Obligations by program activity:			
00.01 Direct program activity		3	
10.00 Total new obligations (object class 41.0)		3	
Budgetary resources available for obligation:			
21.40 Unobligated balance carried forward, start of year	3	3	
23.95 Total new obligations		-3	
24.40 Unobligated balance carried forward, end of year	3		
Change in obligated balances:			
73.10 Total new obligations		3	
73.20 Total outlays (gross)		-3	
Outlays (gross), detail:			
86.98 Outlays from mandatory balances		3	
Net budget authority and outlays:			
89.00 Budget authority			
90.00 Outlays		3	

ADMINISTRATIVE PROVISIONS

Notwithstanding the limitation on the availability of funds appropriated for "Science, aeronautics and exploration", or "Space flight capabilities" by this appropriations Act, when any activity has been initiated by the incurrence of obligations for construction of facilities as authorized by law, such amount available for such activity shall remain available until expended. This provision does not apply to the amounts appropriated for institutional minor revitalization and construction of facilities, and institutional facility planning and design.

Notwithstanding the limitation on the availability of funds appropriated for "Science, aeronautics and exploration", or "Space flight capabilities" by this appropriations Act, the amounts appropriated for construction of facilities shall remain available until September 30, 2006.

From amounts made available in this Act for these activities, the Administration may transfer amounts between aeronautics of the "Science, Aeronautics and Exploration" account and crosscutting technologies of the "Space flight capabilities" account.

Funds for announced prizes otherwise authorized shall remain available, without fiscal year limitation, until the prize is claimed or the offer is withdrawn.

The unexpired balances of prior appropriations to NASA for activities for which funds are provided under this Act may be transferred to the new account established for the appropriation that provides such activity under this Act. Balances so transferred may be merged with funds in the newly established account and thereafter may be accounted for as one fund under the same terms and conditions.