NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Federal Funds

General and special funds:

HUMAN SPACE FLIGHT

For necessary expenses, not otherwise provided for, in the conduct and support of human space flight research and development activities, including research, development, operations, and services; maintenance; construction of facilities including repair, rehabilitation, and modification of real and personal property, and acquisition or condemnation of real property, as authorized by law; space flight, spacecraft control and communications activities including operations, production, and services; and purchase, lease, charter, maintenance and operation of mission and administrative aircraft, [$5,362,900,000] *$5,326,500,000*, to remain available until September 30, [1998] *1999, of which $2,121,300,000 shall be for the International Space Station.*

For necessary expenses of the International Space Station, to become available on October 1 of the fiscal year specified and remain available for that and the following fiscal year, as follows: for fiscal year 1999, $2,109,200,000; for fiscal year 2000, $1,914,600,000; for fiscal year 2001, $1,596,800,000; and for fiscal year 2002, $1,147,000,000. (Departments of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act, 1997.)

Program and Financing (in millions of dollars)

Identification code 80–0111–0–1–252		1996 actual	1997 est.	1998 est.
	Obligations by program activity:			
	Direct program:			
00.01	Space station	2,004	1,986	2,114
00.02	US/Russian cooperative program	136	150	7
00.03	Payload and utilization operations	289	293	232
00.04	Space shuttle	3,081	3,105	2,984
00.91	Subtotal, direct program	5,510	5,534	5,337
01.01	Reimbursable program	70	82	70
10.00	Total obligations	5,580	5,616	5,407
	Budgetary resources available for obligation:			
21.40	Unobligated balance available, start of year: Uninvested balance	276	221	277
22.00	New budget authority (gross)	5,527	5,622	5,397
22.22	Unobligated balance transferred from other accounts		50	
23.90	Total budgetary resources available for obligation	5,803	5,893	5,674
23.95	New obligations	–5,580	–5,616	–5,407
24.40	Unobligated balance available, end of year: Uninvested balance	221	277	266
	New budget authority (gross), detail:			
	Current:			
40.00	Appropriation	5,457	5,363	5,327
42.00	Transferred from other accounts		177	
43.00	Appropriation (total)	5,457	5,540	5,327
	Permanent:			
	Spending authority from offsetting collections:			
68.00	Offsetting collections (cash)	78	82	70
68.10	Change in orders on hand from Federal sources	–8		
68.90	Spending authority from offsetting collections (total)	70	82	70
70.00	Total new budget authority (gross)	5,527	5,622	5,397
	Change in unpaid obligations:			
	Unpaid obligations, start of year:			
72.40	Obligated balance: Appropriation	1,711	1,770	1,884
72.95	Orders on hand from Federal sources	56	48	48
72.99	Total unpaid obligations, start of year	1,767	1,818	1,932
73.10	New obligations	5,580	5,616	5,407
73.20	Total outlays (gross)	–5,530	–5,502	–5,674
	Unpaid obligations, end of year:			
74.40	Obligated balance: Appropriation	1,770	1,884	1,617
74.95	Orders on hand from Federal sources	48	48	48
74.99	Total unpaid obligations, end of year	1,818	1,932	1,665
	Outlays (gross), detail:			
86.90	Outlays from new current authority	3,558	3,954	3,857
86.93	Outlays from current balances	1,894	1,466	1,747
86.97	Outlays from new permanent authority	26	82	70
86.98	Outlays from permanent balances	52		
87.00	Total outlays (gross)	5,530	5,502	5,674
	Offsets:			
	Against gross budget authority and outlays:			
	Offsetting collections (cash) from:			
88.00	Federal sources	–42	–57	–57
88.40	Non-Federal sources	–36	–25	–13
88.90	Total, offsetting collections (cash)	–78	–82	–70
88.95	Change in orders on hand from Federal sources	8		
	Net budget authority and outlays:			
89.00	Budget authority	5,457	5,540	5,327
90.00	Outlays	5,452	5,420	5,604

This appropriation provides funding for human space flight activities, including development of the Space Station, the Space Station research program, and operation of the Space Shuttle. This includes support of planned cooperative activities with Russia, upgrades to the performance and safety of the Space Shuttle, and required construction projects in direct support of Space Station and Space Shuttle programs.

Performance Objectives

Space Station.—The Space Station will be an international laboratory in low Earth orbit on which American, Russian, Canadian, European, and Japanese astronauts will conduct unique scientific and technological investigations in a microgravity environment. The Administration continues to be strongly committed to development of the International Space Station, and the preservation of the partnerships between the United States, Russia, Europe, Japan, and Canada. The proposed budget provides multi-year funding for the complete development of the Station within the annual $2.1 billion ceiling and the $17.4 billion development constraints, with Station assembly beginning in late 1997 and finishing by 2002. The Administration continues to monitor progress through this crucial development period and will consider future funding, schedule, or content adjustments if they prove necessary to minimize program costs, maintain international participation, and ensure a Station capable of continuous scientific and technological research and permanent human presence in space. In 1996, node and laboratory module fabrication neared completion, and qualification testing of flight hardware components began. Activities are well underway to support crew training, payload processing, and hardware element processing requirements. In 1997, final fabrication of flight hardware, qualification testing, and assembly and integration will be the focus of the program. First element launch is scheduled for late 1997. The FY 1998 budget incorporates all elements of the $2.1 billion per year program into the Human Space Flight appropriation. This will allow maximum flexibility in providing a balanced program.

U.S./Russian Cooperative Program.—The United States and Russia are continuing a program of joint space missions. In 1996, three Shuttle flights to Mir took place, highlighted by the 181 day stay of Astronaut Shannon Lucid on the Mir

General and special funds—Continued

HUMAN SPACE FLIGHT—Continued

Space Station. In 1997, American astronauts will have a continuing presence aboard the Mir conducting scientific research. Flight hardware to conduct experiments has been and will continue to be placed on the Mir. These flights provide valuable opportunities to gain experience in working with our Russian partners, which will be crucial to the success of building and operating the International Space Station. These flights will continue in FY 1997, with three additional flights planned. Two additional flights are planned in FY 1998, completing phase I of this cooperative precurser to Space Station.

Payload and Utilization Operations.—These funds will support the mission planning and hardware preparation activities required to support the payload and experiment infrastructure, including the spacelab. In 1997–1998, 2 module missions (MSL–1 and Neurolab) will be flown, along with 3 pallet missions. The Spacelab program is scheduled to be terminated in 1998, following the Neurolab mission.

Activities funded by the Payload Processing budget support the technical expertise and facilities necessary to perform payload buildup, test and checkout, integration, servicing, transportation and installation into the launch vehicle. In FY 1997, over 30 major and secondary payloads will be supported; in FY 1998, more than 20 major and secondary payloads will be supported. The Advanced Projects program develops technologies to enhance crew safety for the Space Shuttle and International Space Station, implements improvements to reduce cost of space flight operations, and pursues advanced technology developments for future human space flight requirements. Under this program, the X–38 experimental vehicle is being designed to demonstrate the technology and processes required to produce a crew return vehicle for the International Space Station. The Engineering and Technical Base provides basic engineering and technical capabilities to support the NASA mission assigned to the programs carried out by the Human Space Flight Centers. These funds support a core environment dedicated to multiprogram laboratories, test facilities and associated systems, including a skill base to respond to research, testing and simulations.

Space Shuttle.—The Space Shuttle is a reusable space vehicle that provides several unique capabilities to the United States space program. These include launching spacecraft and retrieving payloads from orbit for reuse, servicing and repairing satellites in space, safely transporting humans to and from space, and operating and returning space laboratories. In 1996, eight Shuttle missions were accomplished, including the three docking missions between the Space Shuttle and the Russian Mir Space Station. Activities supporting consolidation of Shuttle contracts into one Space Flight Operations contract were completed in FY 1996. This will result in significant reductions in the cost of operating the Space Shuttle through FY 2000 and beyond, with no impact on safety, performance or schedule.

In 1997, seven shuttle flights are planned. Continued emphasis will be placed on enhancements to the safety and performance of the Space Shuttle. Upgrades to the shuttle to increase its reliability and maintainability will be continued. In FY 1998, seven shuttle flights are planned, including two assembly flights for the International Space Station. Completion and first flight of major engine upgrades will also occur.

Object Classification (in millions of dollars)

Identification code 80–0111–0–1–252		1996 actual	1997 est.	1998 est.
	Direct obligations:			
22.0	Transportation of things	5	5	5
23.3	Communications, utilities, and miscellaneous charges	48	48	46
24.0	Printing and reproduction	4	4	4
25.1	Advisory and assistance services	1,560	1,567	1,511
25.2	Other services	74	74	72
25.3	Purchases of goods and services from Government accounts	47	47	46
25.4	Operation and maintenance of facilities	119	120	115
25.5	Research and development contracts	2,876	2,889	2,784
25.7	Operation and maintenance of equipment	73	73	71
25.8	Subsistence and support of persons	412	414	399
26.0	Supplies and materials	105	105	102
31.0	Equipment	45	45	44
32.0	Land and structures	140	141	136
41.0	Grants, subsidies, and contributions	2	2	2
99.0	Subtotal, direct obligations	5,510	5,534	5,337
99.0	Reimbursable obligations	70	82	70
99.9	Total obligations	5,580	5,616	5,407

SCIENCE, AERONAUTICS AND TECHNOLOGY

For necessary expenses, not otherwise provided for, in the conduct and support of science, aeronautics and technology research and development activities, including research, development, operations, and services; maintenance; construction of facilities including repair, rehabilitation, and modification of real and personal property, and acquisition or condemnation of real property, as authorized by law; space flight, spacecraft control and communications activities including operations, production, and services; and purchase, lease, charter, maintenance and operation of mission and administrative aircraft, [$5,762,100,000] *$5,642,000,000*, to remain available until September 30, [1998] *1999*. [Chapter VII of Public Law 104–6 is amended under the heading, "National Aeronautics and Space Administration" by replacing "September 30, 1997" with "September 30, 1998" and "1996" with "1997"]. *Under the heading, "National Aeronautical Facilities," NASA, in Public Law 103–327, as amended, delete "September 30, 1998" and insert "September 30, 1999"; delete "October 1, 1997" and insert "October 1, 1998".*

For necessary expenses of certain space projects under development, to become available on October 1 of the fiscal year specified and remain available for that and the following fiscal year, as follows: for fiscal year 1999, $504,900,000; for fiscal year 2000, $253,800,000; for fiscal year 2001, $149,700,000; and for fiscal year 2002, $25,800,000. (Departments of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act, 1997.)

[For an additional amount for "Science, Aeronautics and Technology", $5,000,000, to remain available until September 30, 1998.] *(Omnibus Consolidated Appropriations Act, 1997.)*

Program and Financing (in millions of dollars)

Identification code 80–0110–0–1–999		1996 actual	1997 est.	1998 est.
	Obligations by program activity:			
	Direct program:			
00.01	Space science	1,935	2,131	2,040
00.02	Life and microgravity science	456	409	222
00.03	Mission to planet Earth	1,178	1,587	1,415
00.04	Aeronautical research and technology	877	24	.....
00.05	Space access and technology	686	84	.....
00.06	Launch services	52	.....	.....
00.07	Mission communication services	451	413	392
00.08	Academic programs	86	158	107
00.09	Aeronautics & space transportation technology	.....	1,276	1,463
00.91	Subtotal, direct program	5,721	6,082	5,639
01.01	Reimbursable program	421	692	652
10.00	Total obligations	6,142	6,774	6,291
	Budgetary resources available for obligation:			
21.40	Unobligated balance available, start of year: Uninvested balance	615	821	280
22.00	New budget authority (gross)	6,350	6,282	6,294
22.21	Unobligated balance transferred to other accounts	.....	–50	.....
22.30	Unobligated balance expiring	–1	.....	.....
23.90	Total budgetary resources available for obligation	6,964	7,053	6,574
23.95	New obligations	–6,142	–6,774	–6,291

24.40	Unobligated balance available, end of year: Uninvested balance	821	280	282
	New budget authority (gross), detail:			
	Current:			
40.00	Appropriation	5,929	5,767	5,642
41.00	Transferred to other accounts	.....	–177	.....
43.00	Appropriation (total)	5,929	5,590	5,642
	Permanent:			
	Spending authority from offsetting collections:			
68.00	Offsetting collections (cash)	377	692	652
68.10	Change in orders on hand from Federal sources	44	.....	.....
68.90	Spending authority from offsetting collections (total)	421	692	652
70.00	Total new budget authority (gross)	6,350	6,282	6,294
	Change in unpaid obligations:			
	Unpaid obligations, start of year:			
72.40	Obligated balance: Appropriation	2,576	3,281	3,973
72.95	Orders on hand from Federal sources	272	316	316
72.99	Total unpaid obligations, start of year	2,848	3,597	4,289
73.10	New obligations	6,142	6,774	6,291
73.20	Total outlays (gross)	–5,394	–6,082	–6,058
	Unpaid obligations, end of year:			
74.40	Obligated balance: Appropriation	3,281	3,973	4,206
74.95	Orders on hand from Federal sources	316	316	316
74.99	Total unpaid obligations, end of year	3,597	4,289	4,522
	Outlays (gross), detail:			
86.90	Outlays from new current authority	2,159	2,809	2,725
86.93	Outlays from current balances	2,876	2,581	2,681
86.97	Outlays from new permanent authority	96	692	652
86.98	Outlays from permanent balances	263	.....	.....
87.00	Total outlays (gross)	5,394	6,082	6,058
	Offsets:			
	Against gross budget authority and outlays:			
	Offsetting collections (cash) from:			
88.00	Federal sources	–363	–645	–631
88.40	Non-Federal sources	–14	–47	–21
88.90	Total, offsetting collections (cash)	–377	–692	–652
88.95	Change in orders on hand from Federal sources	–44	.....	.....
	Net budget authority and outlays:			
89.00	Budget authority	5,929	5,590	5,642
90.00	Outlays	5,018	5,390	5,406

This appropriation provides for the research and development activities of the National Aeronautics and Space Administration. Funds are included for the construction, maintenance, and operation of programmatic facilities.

Performance Objectives

Space Science:

The Space Science program seeks to answer fundamental questions concerning: the galaxy and the universe; the connection between 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 a base program of research and development activities, including research and flight mission activities, and major flight missions which provide major space based facilities. In 1996, several scientific discoveries rocked fundamental theories and re-opened discussion of long-held beliefs. Among the highlights were the discovery of evidence in a meteorite believed to have come from Mars that may indicate life began on Mars early in its history; the discovery of a possible subsurface ocean on Europa; and, the possible discovery of deep frozen lakes on the south pole of the Earth's moon.

To capitalize on these enormous successes during the past year, the NASA budget request for FY 1998 highlights the Origins program. The program focuses on fundamental questions regarding the creation of the universe and planetary systems, and the possibility of life beyond Earth. A strategy for addressing these questions would involve returning surface samples from Mars; visiting comets and other planetary bodies; and deploying powerful telescopes to detect Earth-like planets elsewhere in our galaxy. NASA's Origins program is responsive to the President's new civil space policy and is a vital component of the Administration's investment strategy in science and technology.

Development activities will continue in 1997–1998 on the Advanced X-ray Astrophysics Facility (AXAF) in support of a launch in late 1998. Funding was included in FY 1996 and FY 1997 to complete development of the Cassini spacecraft, scheduled for launch in October, 1997. The Global Geospace Science mission spacecraft, Wind and Polar, are currently operating and providing data on the interactions between the Sun and the Earth. Development activities continue on the Relativity (Gravity Probe-B) mission, which remains ahead of schedule for launch in 2000. Funding was also included to complete definition activity on the Space Infrared Telescope Facility (SIRTF) in 1997 and initiate development activities in FY 1998. Development activities on the Thermosphere, Ionosphere, Mesophere Energetics and Dynamics (TIMED) mission are scheduled to begin in mid-1997. Development activities on the Stratospheric Observatory for Infrared Astronomy (SOFIA) have received continued support. A commercial operator for development, modification and operation of the SOFIA aircraft was selected in December 1996. Several significant scientific discoveries were reported in 1996 based on data gathered from the Hubble Space Telescope (HST), and similar results are anticipated in the future. The second HST servicing mission in February 1997 will provide two new science instruments and other servicing requirements as needed. Galileo's highly successful, two-year tour of Jupiter and its moons will continue through 1998.

In Explorer missions, the Fast Auroral Snapshot (FAST) was launched in August 1996. Development activities continue on the Advanced Composition Explorer (ACE) for a launch in 1997, and on the Far Ultraviolet Spectroscopy Explorer (FUSE) for a launch in 1998. Definition is underway on the Microwave Anisotropy Probe (MAP) and Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) Medium-Class Explorer (MIDEX) missions. Selection of candidate missions for the Small-(SMEX) and MIDEX-class Explorer programs continues. These missions emphasize reduced mission costs and accelerated launch schedules.

The Mars Global Surveyor was launched in November 1996, and funds are requested for the development of future Mars missions in 1998 and beyond. The first two Discovery-class missions were launched in 1996: the Near-Earth Asteroid Rendezvous was launched in February 1996; and the Mars Pathfinder was launched in December 1996. The Lunar Prospector mission is scheduled for launch in 1997, and the Stardust mission is to be launched in 1999. Funding is also included for future Discovery-class missions. The New Millennium program is underway to provide flight demonstrations for critical new technologies which will greatly reduce the mass and cost of future science instruments and spacecraft subsystems, while maintaining or improving mission capabilities. Development activities continue on the Deep Space Mission-1 and -2, scheduled for launch in June 1998 and January 1999, respectively.

The Space Science program assumed most of the responsibility for Agency-wide core technology development following dissolution of the Office of Space Access and Technology. Space Science is also undertaking an aggressive technology development effort to enable new missions to the outer planets, and to search for Earth-like planets around nearby

General and special funds—Continued

SCIENCE, AERONAUTICS AND TECHNOLOGY—Continued

stars. New technologies are also being pursued to enhance our capability to explore Mars robotically, and perhaps to confirm the past or current presence of life on that planet.

Life and Microgravity Science.—This program uses the microgravity environment of space to conduct basic and applied research to understand the effect of gravity on living systems and to conduct research in the areas of fluid physics, materials science and biotechnology. In 1996, six shuttle missions involving materials and life sciences experiments were conducted, including two Spacelab missions and three NASA/Mir missions. In addition to conducting basic and applied research, these missions have provided the opportunity to refine the definition, design, and development of experiment hardware planned for use on the International Space Station. In 1997, four shuttle missions including the Materials Sciences Laboratory (MSL–1) mission and three NASA/Mir missions are planned. In 1998, the NASA/NIH Neurolab mission is planned, which will continue the agency's efforts to expand its collaborative activities with the National Institutes of Health and other Federal agencies to maximize the return on science investments. In addition to this mission, the program will be supporting the launch of the Alpha Magnetic Spectrometer (AMS). The Space Station research program and the remaining two NASA/Mir missions will be incorporated into the Human Space Flight Appropriation within the Space Station program.

Mission to Planet Earth.—The purpose of NASA's Mission to Planet Earth (MTPE) enterprise is to understand the total Earth system and the effects of natural and human-induced changes on the global environment. MTPE is pioneering the new interdisciplinary field of research called Earth system science, which recognizes that the Earth's land surface, oceans, atmosphere, ice sheets and *biota* are both dynamic and highly interactive. Earth system science is an area of research with the potential for immense benefit to the nation, yielding new knowledge and tools for weather forecasting, agriculture, urban and land use planning, and other areas of economic and environmental importance. In concert with other agencies and the global research community, MTPE is providing the scientific foundation needed for the complex policy choices that lie ahead on the road to sustainable development. MTPE has established three broad goals to fulfill its purpose: (1) expand scientific knowledge of the Earth system using NASA's unique capabilities from the vantage points of space, aircraft and *in situ* platforms; (2) disseminate information about the Earth system; and, (3) enable productive use of MTPE science and technology in the public and private sectors.

The Earth Observing System (EOS), the centerpiece of Mission to Planet Earth, is a program of multiple spacecraft missions (the AM, PM, Chemistry series, Landsat 7, and others) and interdisciplinary science investigations aimed at providing a 15 year data set of key parameters needed to understand global climate change. The first EOS satellite launches will be in 1998. Preceeding EOS are a number of individual satellite and Shuttle-based missions which are helping to reveal basic processes. The Upper Atmosphere Research Satellite, launched in 1991, collects data on atmospheric chemistry. The Total Ozone Mapping Spectrometer instrument, launched in 1978 and 1991, measures ozone distribution and depletion. Two total ozone mapping spectometer instruments were launched in 1996, one on the Japanese Advanced Earth Observing System (ADEOS) mission and the other on a dedicated U.S. Earth probe. France and the U.S. collaborated on the Ocean Topography Experiment (TOPEX/Poseidon), launched in 1992, to study ocean topography and circulation. The NASA scatterometer, also launched on the Japanese ADEOS in 1996, maps ocean winds. In 1997 the Tropical Rainfall Measuring Mission (TRMM) will measure tropical precipitation. Complementing EOS will be a series of small, rapid development Earth System Science Pathfinders (ESSP). Data from MTPE will be captured from the satellites, processed into useful data products, and broadly distributed by the EOS Data and Information System (EOSDIS). In FY 1997, NASA initiated a data purchase program designed to acquire data sets from private sources that are necessary to accomplish the broad research goals of Earth system science. MTPE assumed responsibility for the small spacecraft technology initiative (Lewis and Clark) and the commercial remote sensing program. The MTPE science program is essential to the discovery of new concepts and to the design of future missions. The MTPE research is coordinated through the U.S. Global Change Research Program (USGCRP), the Committee on the Environment and Natural Resources (CENR) Subcommittee on Global Change Research, and the various boards and committees at the National Academy of Sciences.

Aeronautics and Space Transportation Technology.—The goal of this enterprise is to pioneer high-payoff, critical technologies with effective transfer of design tools and technology products to industry and government.

Within Aeronautics, the High Speed Research Program continued to develop technologies to establish the viability of an economical and environmentally sound High Speed Civil Transport. This vehicle—if built by U.S. industry—could promote U.S. leadership in long-range commercial air travel markets of the next century. Development of this vehicle could offer returns of $200 billion in sales and 140,000 high-quality jobs for the United States. In FY 1996, a preliminary conceptual definition of a supersonic transport technology configuration was selected and efforts to develop these technologies continue. In FY 1996, in cooperation with the FAA, the Advanced Subsonics Technology program significantly expanded its efforts in critical air traffic technologies. Research will continue to emphasize aviation capacity as well as improving the environment through noise and emissions reductions. Funding is included to continue development of high payoff technologies enabling a safe, highly productive global air transportation system with reduced environmental impact.

In FY 1996, the High Performance Computing and Communications Program achieved sustained multidisciplinary application speeds never before reached by any NASA application. Funding is included to continue NASA's leadership role in this vital area. As part of the HPCC program, the President's FY 1998 budget proposes to provide $100 million each year for the next three years to support the new Next Generation Internet initiative. The programs goal is to develop a research network capable of achieving speeds of 100 to 1,000 times faster than today's Internet and yield large gains in the quality of service. This initiative will involve several Federal agencies including the Departments of Defense, Energy, and Commerce, the National Science Foundation, and NASA. NASA's contribution to this effort is $10 million annually for three years. In FY 1997, research activities within the research and technology base continue to develop innovative concepts, explore new areas of theory and create the computational models of the aeronautical principles that will lead to more efficient design and operation of advanced aerospace systems. NASA will continue to operate critical national facilities for aeronautical research in support of industry, Department of Defense and other NASA programs.

The Space Transportation Technology program is developing new technologies aimed at revitalizing access to space. The technologies targeted will reduce launch costs dramatically over the next decade, and increase safety and the reliability of current and future generation launch vehicles. New performance plateaus for in-space propulsion will be estab-

lished, while reducing the cost and weight of launch vehicles. In 1996, the Reusable Launch Vehicle (RLV) Program continued to pursue technology development and concept definition activities in support of next-generation reusable systems, focusing on the X–34 and X–33 flight demonstrators. The decision was made to proceed with Phase II of the X–33 program. Funding for the RLV program is included to continue technology development in preparation for the flight of technology demonstrators. The Advanced Space Transportation Program (ASTP) is developing key technologies to dramatically reduce space transportation costs across the mission spectrum. ASTP will focus on technological advances with the potential of reducing launch costs beyond RLV goals, as well as developing technology required to support NASA strategic needs that are not addressed by RLV.

The Commercial Technology Program's focus in FY 1996 has been to invest 10 percent of the NASA R&D budget in commercial partnerships with industry. Based on experience to date, these commercial partnerships are expected to increase the return on the government's R&D investment, allowing NASA to do more with limited funds, and strengthen the international competitiveness of key industry sectors. In FY 1997 and 1998, the program will emphasize increasing commercial partnerships with industry and continue to refine a technology and partnership database.

Mission Communication Services.—The primary goal of this operational program is to provide highly reliable, cost-effective telecommunications services in support of NASA's science and aeronautics programs. Other U.S. agencies, international space-faring agencies, and U.S. commercial enterprises are supported on a reimbursable basis. Ground network, space network, and mission systems are provided under this program in support of planetary, deep space, Earth-orbiting, aeronautics, and suborbital systems.

Academic Programs.—The goal of this program is to promote excellence in America's education system through enhancing and expanding scientific and technological competence. NASA's education programs span from the elementary through graduate levels, and are directed at students and faculty. The goal of the Minority University Research Program is to expand opportunities for talented students from underrepresented groups who are pursuing degrees in science and engineering, and to strengthen the research capabilities of minority universities and colleges. The range of activities conducted under this program will continue to capture the interest of all students in science and technology, develop talented students at the undergraduate and graduate levels, provide research opportunities for students and faculty members at NASA centers, and strengthen and enhance the research capabilities of the nation's colleges and universities.

The FY 1998 budget proposes multi-year appropriations in Science, Aeronautics, and Technology for development of a Space Infrared Telescope Facility (SIRTF), a Stratospheric Observatory for Infrared Astronomy (SOFIA), and an X–33 launch vehicle technology demonstrator. The multi-year funding will ensure the stability to manage and execute these programs within their budget and schedule commitments.

Object Classification (in millions of dollars)

Identification code 80–0110–0–1–999		1996 actual	1997 est.	1998 est.
	Direct obligations:			
22.0	Transportation of things	3	3	3
23.1	Rental payments to GSA	1	1	
23.2	Rental payments to others			1
23.3	Communications, utilities, and miscellaneous charges	69	74	68
24.0	Printing and reproduction	3	3	3
25.1	Advisory and assistance services	525	558	517
25.2	Other services	309	328	305
25.3	Purchases of goods and services from Government accounts	354	376	349
25.4	Operation and maintenance of facilities	92	98	91
25.5	Research and development contracts	3,104	3,300	3,060
25.6	Medical care			
25.7	Operation and maintenance of equipment	136	145	134
25.8	Subsistence and support of persons	363	386	357
26.0	Supplies and materials	90	96	89
31.0	Equipment	173	184	170
32.0	Land and structures	32	34	32
41.0	Grants, subsidies, and contributions	467	496	460
99.0	Subtotal, direct obligations	5,721	6,082	5,639
99.0	Reimbursable obligations	421	692	652
99.9	Total obligations	6,142	6,774	6,291

Mission Support

For necessary expenses, not otherwise provided for, in carrying out mission support for human space flight programs and science, aeronautical, and technology programs, including research operations and support; space communications activities including operations, production and services; maintenance; construction of facilities including repair, rehabilitation, and modification of facilities, minor construction of new facilities and additions to existing facilities, facility planning and design, environmental compliance and restoration, and acquisition or condemnation of real property, as authorized by law; program management; personnel and related costs, including uniforms or allowances therefor, as authorized by 5 U.S.C. 5901–5902; travel expenses; purchase, lease, charter, maintenance, and operation of mission and administrative aircraft; not to exceed $35,000 for official reception and representation expenses; and purchase (not to exceed 33 for replacement only) and hire of passenger motor vehicles; [$2,562,200,000] *$2,513,200,000*, to remain available until September 30, [1998] *1999*.

For necessary expenses of certain space projects under development, to become available on October 1 of the fiscal year specified and remain available for that and the following fiscal year, as follows: for fiscal year 1999, $120,400,000; for fiscal year 2000, $58,000,000; for fiscal year 2001, $70,000,000; for fiscal year 2002, $98,200,000; and for fiscal year 2003, $52,600,000. (Departments of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act, 1997.)

Program and Financing (in millions of dollars)

Identification code 80–0112–0–1–999		1996 actual	1997 est.	1998 est.
	Obligations by program activity:			
	Direct program:			
00.01	Safety, reliability and quality assurance	38	40	38
00.02	Space communication services	298	285	249
00.03	Research and program management	2,012	2,102	2,071
00.04	Construction of facilities	110	169	157
00.91	Subtotal, direct program	2,458	2,596	2,515
01.00	Total direct program	2,458	2,596	2,515
01.01	Reimbursable program	111	132	135
10.00	Total obligations	2,569	2,728	2,650
	Budgetary resources available for obligation:			
21.40	Unobligated balance available, start of year: Uninvested balance	128	151	115
22.00	New budget authority (gross)	2,594	2,694	2,648
22.30	Unobligated balance expiring	–1		
23.90	Total budgetary resources available for obligation	2,721	2,845	2,763
23.95	New obligations	–2,569	–2,728	–2,650
24.40	Unobligated balance available, end of year: Uninvested balance	151	115	114
	New budget authority (gross), detail:			
	Current:			
40.00	Appropriation	2,483	2,562	2,513
	Permanent:			
	Spending authority from offsetting collections:			
68.00	Offsetting collections (cash)	81	132	135
68.10	Change in orders on hand from Federal sources	30		
68.90	Spending authority from offsetting collections (total)	111	132	135
70.00	Total new budget authority (gross)	2,594	2,694	2,648

General and special funds—Continued

MISSION SUPPORT—Continued

Program and Financing (in millions of dollars)—Continued

Identification code 80–0112–0–1–999	1996 actual	1997 est.	1998 est.
Change in unpaid obligations:			
Unpaid obligations, start of year:			
72.40 Obligated balance: Appropriation	375	460	594
72.95 Orders on hand from Federal sources	49	79	79
72.99 Total unpaid obligations, start of year	424	539	673
73.10 New obligations	2,569	2,728	2,650
73.20 Total outlays (gross)	–2,454	–2,594	–2,651
Unpaid obligations, end of year:			
74.40 Obligated balance: Appropriation	460	594	593
74.95 Orders on hand from Federal sources	79	79	79
74.99 Total unpaid obligations, end of year	539	673	672
Outlays (gross), detail:			
86.90 Outlays from new current authority	1,950	2,085	2,066
86.93 Outlays from current balances	399	377	450
86.97 Outlays from new permanent authority	59	132	135
86.98 Outlays from permanent balances	46	.....	.....
87.00 Total outlays (gross)	2,454	2,594	2,651
Offsets:			
Against gross budget authority and outlays:			
Offsetting collections (cash) from:			
88.00 Federal sources	–78	–118	–123
88.40 Non-Federal sources	–3	–14	–12
88.90 Total, offsetting collections (cash)	–81	–132	–135
88.95 Change in orders on hand from Federal sources	–30	.....	.....
Net budget authority and outlays:			
89.00 Budget authority	2,483	2,562	2,513
90.00 Outlays	2,373	2,462	2,516

This appropriation provides funding for mission support and includes: safety, reliability and quality assurance activities supporting agency programs; space communication services for NASA programs; salaries and related expenses in support of research in NASA field installations; design, repair, rehabilitation and modification of institutional facilities and construction of new institutional facilities; and other operations activities supporting conduct of agency programs.

Performance Objectives

Safety, Reliability and Quality Assurance.—The goal of this program is to assure the safety and quality of NASA missions through the development, implementation and oversight of Agency-wide safety, engineering, reliability, maintainability, and quality assurance policies and procedures.

Space Communication Services.—Activities included in this program provide for the tracking, telemetry, command, data acquisition, communications and data processing required by NASA flight projects. In 1996–1998, the networks and support systems that accomplish these tasks will continue operation. Completion of the upgrade of the Tracking and Data Relay Satellite (TDRS) White Sands Complex and early development of the TDRS Replenishment Spacecraft occurred and will continue in 1997 and 1998. The FY 1998 budget proposes multi-year appropriations for development and launch of three Tracking and Data Relay Satellite (TDRS) replenishment spacecraft. The multi-year funding will support NASA's plans for the TDRS fixed price spacecraft contract with industry.

Research and Program Management.—This activity provides for the salaries, travel support, other personnel expenses of the entire NASA civil service workforce, and includes vital support to the physical plant at the Centers and at NASA Headquarters.

Construction of Facilities.—This activity provides for: facility construction activities to preserve NASA's core infrastructure; environmental compliance and restoration activities, design of facilities projects, and advanced planning related to future facilities needs. In 1996–1998, activities in support of discrete projects to repair and modernize the basic infrastructure and institutional facilities at NASA centers will be conducted, as well as activities in support of environmental compliance and restoration requirements.

Object Classification (in millions of dollars)

Identification code 80–0112–0–1–999	1996 actual	1997 est.	1998 est.
Direct obligations:			
Personnel compensation:			
11.1 Full-time permanent	1,215	1,261	1,268
11.3 Other than full-time permanent	17	10	9
11.5 Other personnel compensation	23	22	19
11.8 Special personal services payments	7	11	12
11.9 Total personnel compensation	1,262	1,304	1,308
12.1 Civilian personnel benefits	249	277	278
13.0 Benefits for former personnel	1	1	1
21.0 Travel and transportation of persons	42	46	46
22.0 Transportation of things	5	3	1
23.1 Rental payments to GSA	18	20	18
23.2 Rental payments to others	1	1	1
23.3 Communications, utilities, and miscellaneous charges	47	51	47
24.0 Printing and reproduction	6	7	6
25.1 Advisory and assistance services	34	37	34
25.2 Other services	107	116	106
25.3 Purchases of goods and services from Government accounts	23	25	23
25.4 Operation and maintenance of facilities	66	72	65
25.5 Research and development contracts	41	44	41
25.6 Medical care	3	3	3
25.7 Operation and maintenance of equipment	124	134	123
25.8 Subsistence and support of persons	275	289	262
26.0 Supplies and materials	22	24	22
31.0 Equipment	19	20	19
32.0 Land and structures	108	117	106
41.0 Grants, subsidies, and contributions	5	5	5
99.0 Subtotal, direct obligations	2,458	2,596	2,515
99.0 Reimbursable obligations	111	132	135
99.9 Total obligations	2,569	2,728	2,650

Personnel Summary

Identification code 80–0112–0–1–999	1996 actual	1997 est.	1998 est.
Direct:			
Total compensable workyears:			
1001 Full-time equivalent employment	20,828	20,411	19,469
1005 Full-time equivalent of overtime and holiday hours	180	170	170
Reimbursable:			
2001 Total compensable workyears: Full-time equivalent employment	110	90	90

Federal Funds

General and special funds:

RESEARCH AND DEVELOPMENT

Program and Financing (in millions of dollars)

Identification code 80–0108–0–1–999	1996 actual	1997 est.	1998 est.
Budgetary resources available for obligation:			
21.40 Unobligated balance available, start of year: Uninvested balance	1	1	1
22.30 Unobligated balance expiring	.....	.....	.....
23.90 Total budgetary resources available for obligation	1	1	1
23.95 New obligations	.....	.....	.....
24.40 Unobligated balance available, end of year: Uninvested balance	1	1	1
New budget authority (gross), detail:			
Spending authority from offsetting collections:			
68.00 Offsetting collections (cash)	86	60	.....
68.10 Change in orders on hand from Federal sources	–86	–60	.....

68.90	Spending authority from offsetting collections (total)			
	Change in unpaid obligations:			
	Unpaid obligations, start of year:			
72.40	Obligated balance: Appropriation	753	230	
72.95	Orders on hand from Federal sources	146	60	
72.99	Total unpaid obligations, start of year	899	290	
73.10	New obligations			
73.20	Total outlays (gross)	–596	–290	
73.40	Adjustments in expired accounts	–13		
	Unpaid obligations, end of year:			
74.40	Obligated balance: Appropriation	230		
74.95	Orders on hand from Federal sources	60		
74.99	Total unpaid obligations, end of year	290		
	Outlays (gross), detail:			
86.93	Outlays from current balances	596	290	
86.97	Outlays from new permanent authority			
86.98	Outlays from permanent balances			
87.00	Total outlays (gross)	596	290	
	Offsets:			
	Against gross budget authority and outlays:			
	Offsetting collections (cash) from:			
88.00	Federal sources	–80	–60	
88.40	Non-Federal sources	–6		
88.90	Total, offsetting collections (cash)	–86	–60	
88.95	Change in orders on hand from Federal sources	86	60	
	Net budget authority and outlays:			
89.00	Budget authority			
90.00	Outlays	511	230	

Since FY 1995 NASA's Research and Development activities have been performed in Human Space Flight; Science, Aeronautics and Technology; and Mission Support. This account shows spending from balances prior to the account restructuring.

Space Flight, Control and Data Communications

Program and Financing (in millions of dollars)

Identification code 80–0105–0–1–252		1996 actual	1997 est.	1998 est.
	Budgetary resources available for obligation:			
21.40	Unobligated balance available, start of year: Uninvested balance	1	4	4
22.10	Resources available from recoveries of prior year obligations	4		
23.90	Total budgetary resources available for obligation	5	4	4
23.95	New obligations			
24.40	Unobligated balance available, end of year: Uninvested balance	4	4	4
	New budget authority (gross), detail:			
	Spending authority from offsetting collections:			
68.00	Offsetting collections (cash)	7	5	
68.10	Change in orders on hand from Federal sources	–7	–5	
68.90	Spending authority from offsetting collections (total)			
	Change in unpaid obligations:			
	Unpaid obligations, start of year:			
72.40	Obligated balance: Appropriation	424	171	40
72.95	Orders on hand from Federal sources	12	5	
72.99	Total unpaid obligations, start of year	436	176	40
73.10	New obligations			
73.20	Total outlays (gross)	–248	–132	–10
73.40	Adjustments in expired accounts	–8	–4	
73.45	Adjustments in unexpired accounts	–4		
	Unpaid obligations, end of year:			
74.40	Obligated balance: Appropriation	171	40	30
74.95	Orders on hand from Federal sources	5		
74.99	Total unpaid obligations, end of year	176	40	30
	Outlays (gross), detail:			
86.93	Outlays from current balances	248	132	10
86.97	Outlays from new permanent authority			
86.98	Outlays from permanent balances			
87.00	Total outlays (gross)	248	132	10
	Offsets:			
	Against gross budget authority and outlays:			
	Offsetting collections (cash) from:			
88.00	Federal sources	–6	–5	
88.45	Offsetting governmental collections	–1		
88.90	Total, offsetting collections (cash)	–7	–5	
88.95	Change in orders on hand from Federal sources	7	5	
	Net budget authority and outlays:			
89.00	Budget authority			
90.00	Outlays	241	127	10

Since FY 1995 NASA's Space Flight, Control and Data Communications activities have been performed in Human Space Flight; Science, Aeronautics and Technology; and Mission Support. This account shows spending from balances prior to the account restructuring.

Construction of Facilities

Program and Financing (in millions of dollars)

Identification code 80–0107–0–1–999		1996 actual	1997 est.	1998 est.
	Obligations by program activity:			
00.01	Space transportation	27	20	
00.22	Mission to planet Earth		1	
00.41	Aeronautical research and technology	18	43	
00.42	Supporting activity	55	36	
10.00	Total obligations	100	100	
	Budgetary resources available for obligation:			
	Unobligated balance available, start of year:			
21.40	Treasury balance	197	98	
21.41	U.S. Securities: Par value	3	2	
21.99	Total unobligated balance, start of year	200	100	
23.90	Total budgetary resources available for obligation	200	100	
23.95	New obligations	–100	–100	
	Unobligated balance available, end of year:			
24.40	Uninvested balance	98		
24.41	U.S. Securities: Par value	2		
24.99	Total unobligated balance, end of year	100		
	Change in unpaid obligations:			
72.40	Unpaid obligations, start of year: Obligated balance: Appropriation	311	146	206
73.10	New obligations	100	100	
73.20	Total outlays (gross)	–265	–40	–40
74.40	Unpaid obligations, end of year: Obligated balance: Appropriation	146	206	166
	Outlays (gross), detail:			
86.93	Outlays from current balances	265	40	40
	Net budget authority and outlays:			
89.00	Budget authority			
90.00	Outlays	265	40	40

Since FY 1995 NASA's Construction of Facilities activities have been performed in Human Space Flight; Science, Aeronautics and Technology; and Mission Support. This account shows spending from balances prior to the account restructuring.

General and special funds—Continued

CONSTRUCTION OF FACILITIES—Continued

Object Classification (in millions of dollars)

Identification code 80–0107–0–1–999	1996 actual	1997 est.	1998 est.
25.1 Advisory and assistance services	1	1	
25.2 Other services	5	5	
25.4 Operation and maintenance of facilities	1	1	
32.0 Land and structures	93	93	
99.9 Total obligations	100	100	

RESEARCH AND PROGRAM MANAGEMENT

Program and Financing (in millions of dollars)

Identification code 80–0103–0–1–999	1996 actual	1997 est.	1998 est.
Change in unpaid obligations:			
72.40 Unpaid obligations, start of year: Obligated balance: Appropriation	23	10	
73.10 New obligations			
73.20 Total outlays (gross)	–6	–10	
73.40 Adjustments in expired accounts	–7		
74.40 Unpaid obligations, end of year: Obligated balance: Appropriation	10		
Outlays (gross), detail:			
86.93 Outlays from current balances	6	10	
Net budget authority and outlays:			
89.00 Budget authority			
90.00 Outlays	6	10	

Since FY 1995 NASA's Research and Program Management activities have been performed in 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, [$17,000,000] *$18,300,000. (Departments of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act, 1997.)*

Program and Financing (in millions of dollars)

Identification code 80–0109–0–1–252	1996 actual	1997 est.	1998 est.
Obligations by program activity:			
10.00 Total obligations	16	17	18
Budgetary resources available for obligation:			
22.00 New budget authority (gross)	16	17	18
23.95 New obligations	–16	–17	–18
New budget authority (gross), detail:			
40.00 Appropriation	16	17	18
Change in unpaid obligations:			
72.40 Unpaid obligations, start of year: Obligated balance: Appropriation	3	3	3
73.10 New obligations	16	17	18
73.20 Total outlays (gross)	–16	–17	–18
74.40 Unpaid obligations, end of year: Obligated balance: Appropriation	3	3	3
Outlays (gross), detail:			
86.90 Outlays from new current authority	14	14	15
86.93 Outlays from current balances	2	3	3
87.00 Total outlays (gross)	16	17	18
Net budget authority and outlays:			
89.00 Budget authority	16	17	18
90.00 Outlays	16	17	18

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	1996 actual	1997 est.	1998 est.
11.1 Personnel compensation: Full-time permanent	12	13	14
12.1 Civilian personnel benefits	2	3	3
21.0 Travel and transportation of persons	1	1	1
25.2 Other services	1		
99.9 Total obligations	16	17	18

Personnel Summary

Identification code 80–0109–0–1–252	1996 actual	1997 est.	1998 est.
Total compensable workyears:			
1001 Full-time equivalent employment	190	198	198
1005 Full-time equivalent of overtime and holiday hours	3	3	3

SCIENCE, SPACE, AND TECHNOLOGY EDUCATION TRUST FUND

Unavailable Collections (in millions of dollars)

Identification code 80–8978–0–7–503	1996 actual	1997 est.	1998 est.
Balance, start of year:			
01.99 Balance, start of year			
Receipts:			
02.01 Earnings on investments; Science, Space and Technology Education, Trust Fund	1	1	1
Appropriation:			
05.01 Science, space, and technology education trust fund	–1	–1	–1
07.99 Total balance, end of year			

Program and Financing (in millions of dollars)

Identification code 80–8978–0–7–503	1996 actual	1997 est.	1998 est.
Obligations by program activity:			
00.01 General education aids	1		
10.00 Total obligations (object class 41.0)	1		
Budgetary resources available for obligation:			
Unobligated balance available, start of year:			
U.S. Securities:			
21.41 Par value	16	16	16
21.42 Unrealized discounts			1
21.99 Total unobligated balance, start of year	16	16	17
22.00 New budget authority (gross)	1	1	1
23.90 Total budgetary resources available for obligation	17	17	18
23.95 New obligations	–1		
Unobligated balance available, end of year:			
U.S. Securities:			
24.41 Par value	16	16	17
24.42 Unrealized discounts		1	1
24.99 Total unobligated balance, end of year	16	17	18
New budget authority (gross), detail:			
60.27 Appropriation (trust fund, indefinite)	1	1	1
Change in unpaid obligations:			
73.10 New obligations	1		
73.20 Total outlays (gross)	–1	–1	–1
Outlays (gross), detail:			
86.97 Outlays from new permanent authority	1	1	1
Net budget authority and outlays:			
89.00 Budget authority	1	1	1
90.00 Outlays	1	1	1

ADMINISTRATIVE PROVISIONS

[(INCLUDING TRANSFER OF FUNDS)]

Notwithstanding the limitation on the availability of funds appropriated for "Human space flight", "Science, aeronautics and technology", or "Mission support" by this appropriations Act, when [(1)] any activity has been initiated by the incurrence of obligations for construction of facilities as authorized by law, [or (2) amounts are provided for full-funding for the Tracking and Data Relay Satellite (TDRS) replenishment program,] such amount available for such activity shall remain available until expended. This provision does not apply to the amounts appropriated in "Mission support" pursuant to the authorization for repair, rehabilitation and modification of facilities, minor construction of new facilities and additions to existing facilities, and facility planning and design.

Notwithstanding the limitation on the availability of funds appropriated for "Human space flight", "Science, aeronautics and technology", or "Mission support" by this appropriations Act, the amounts appropriated for construction of facilities shall remain available until September 30, [1999] *2000*.

Notwithstanding the limitation on the availability of funds appropriated for "Mission support" and "Office of Inspector General", amounts made available by this Act for personnel and related costs and travel expenses of the National Aeronautics and Space Administration shall remain available until September 30, [1997] *1998* and may be used to enter into contracts for training, investigations, cost associated with personnel relocation, and for other services, to be provided during the next fiscal year.

[Upon the determination by the Administrator that such action is necesssary, the Administrator may, with the approval of the Office of Management and Budget, transfer not to exceed $177,000,000 of funds made available in this Act to the National Aeronautics and Space Administration for the International Space Station between "Science, aeronautics and technology" and "Human space flight", to be merged with and to be available for the same purposes, and for the same time period, as the appropriation to which transferred: *Provided*, That such authority may not be used unless for higher priority items than those for which originally appropriated: *Provided further,* That the Administrator of the National Aeronautics and Space Administration shall notify the Congress promptly of all transfers made pursuant to this authority.] *(Departments of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act, 1997.)*