

MISSION SUPPORT

FY 2000 ESTIMATES

RESEARCH AND PROGRAM MANAGEMENT

PROGRAM GOALS

To acquire and maintain a civil service workforce which reflects the cultural diversity of the Nation, which is properly sized and which possesses the right set of human resource skills in the right locations to accomplish NASA's research, development, and operational missions with innovation, excellence, and efficiency.

STRATEGY FOR ACHIEVING GOALS

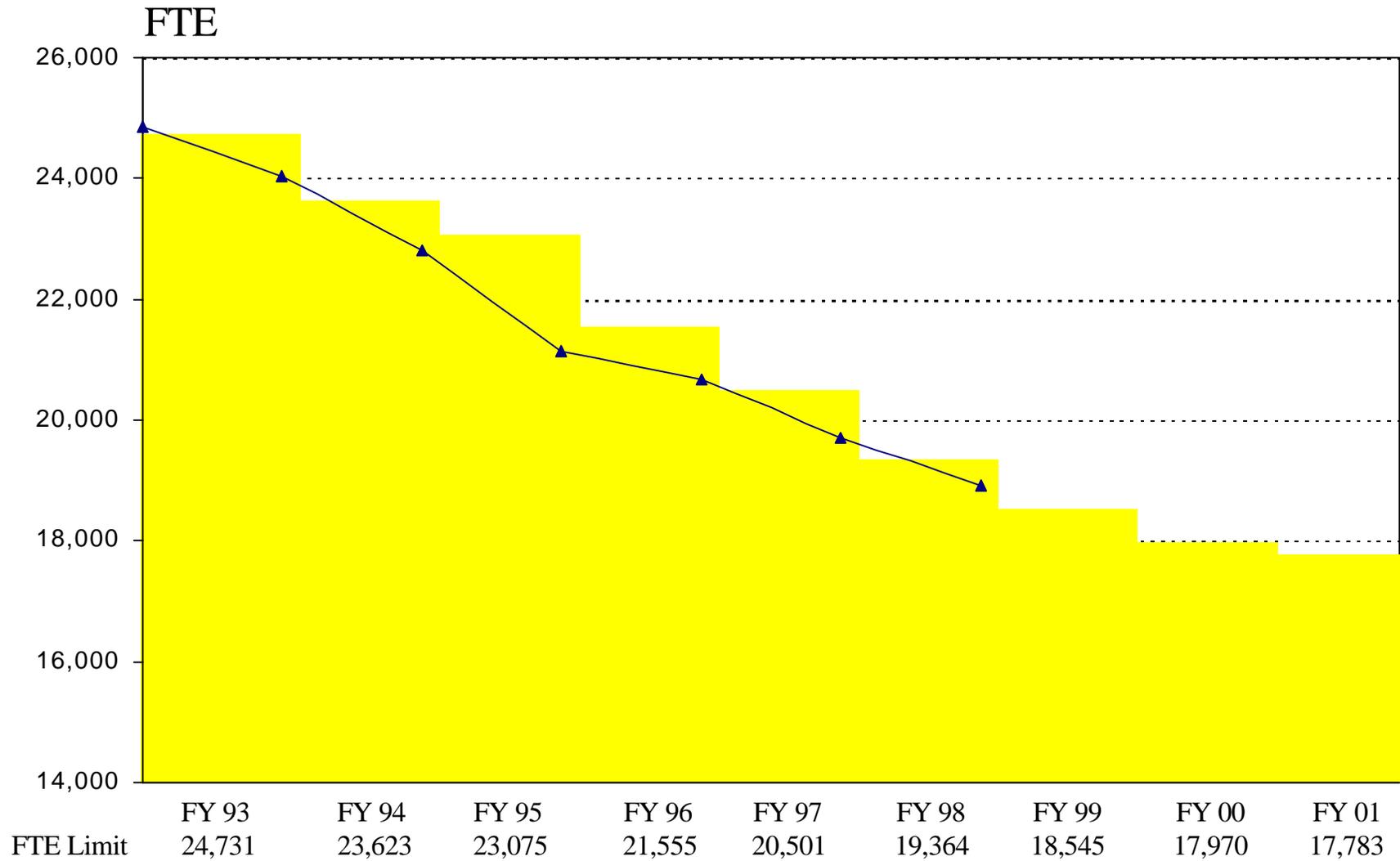
This civil service workforce is the underpinning for the successful accomplishment of the Nation's civil aeronautics and space programs. These are the people who plan the programs; conduct and oversee the research; select and monitor the contractors; manage the various research, development, and test activities; and oversee all of NASA's operations. A key dimension of the reinvention of NASA has been the restructuring of the civil service workforce to deliver a space and aeronautics program that is balanced, relevant, and at the forefront of technology development. By the end of FY 2000, NASA plans to have restructured the size and composition of the workforce to fewer than 18,000 civil servants, nearly a 30 percent reduction from the authorized FY 1992 levels of just over 25,000. Despite the fact that such reductions far exceed expected natural attrition; the Agency will achieve these reductions without resorting to a disruptive reduction in force. The primary strategies involved include reduced, extensive but managed use of the Agency's buyout authority, geographic relocations, and the provision of outplacement services.

The Research and Program Management (R&PM) program provides the salaries, other personnel and related costs, travel and the necessary support for all of NASA's administrative functions and other basic services in support of research and development activities at NASA Installations. The salaries, benefits, and supporting costs of this workforce comprise approximately 75% of the requested funding. Administrative and other support is 23% of the request. The remaining 2% of the request is required to fund travel necessary to manage NASA and its programs.

ACCOMPLISHMENTS AND PLANS

Once again NASA has achieved the full-time equivalent (FTE) targets included in the NASA Workforce Restructuring plan for FY 1998 ahead of schedule. The Agency continued to make progress towards specific workforce goals established by the National Performance Review (NPR). These goals were met ahead of schedule through the implementation of a restrictive hiring policy and the buyout conducted in FY 1998. The successful buyout used early in FY 1998 resulted in more than double the normal annual attrition. As a result, the Agency used only 18,924 FTE compared to its original plan of 19,364. A particularly noteworthy achievement is the completion of the reduction to the infrastructure at Headquarters through the

NASA FTE Civil Service Reduction Plan



Does not include the NASA Office of Inspector General

aggressive redeployment of Headquarters personnel to the Field Installations and losses through attrition. As a result, the Agency has reached the NPR goal of a reduction by 50% at Headquarters more than 4 years ahead of schedule, and did it without resorting to a reduction in force. At the Field Installations, operational activities continue to be transferred to commercial operators or to other Federal agencies where feasible. Civilian employment at the end of FY 1997 was about 18,650, a reduction of about 6,400 or 25% since 1993.

The Agency also successfully met the other goals for FY 1998 established as part of the NPR:

- The supervisory span of control has gone from 1:5 in FY 1993 to 1:10 in FY 1998.
- Targeted administrative staffs have declined more than 29% from FY 1993 levels.
- Headquarters employment has been reduced by more than 1,140 or 55% from FY 1993.

The NASA workforce target for FY 2000 is still fewer than 18,000 FTE. Achieving the remaining reduction of more than 1,000 civil servants from the FY 1998 level represents a formidable objective. NASA has stressed, and will continue to stress, the need to minimize adverse impacts on the workforce. The plan is to aggressively use all available voluntary approaches to reductions for as long as possible before employing involuntary methods.

The remaining reduction in FTE is concentrated in only three of NASA's ten Centers. Central to this strategy in FY 1999 and FY 2000 is once again implementation of an aggressive buyout plan at three of the Office of Space Flight Centers to double the number of losses expected under the normal attrition. These NASA Centers that still need to reduce, have structured their buyout planning based on the results of comprehensive workforce assessments and their Workforce 2000 strategic plans. These plans identify the Center of Excellence and Mission for the Center, its restructuring strategy, and the number and skill mix of positions required for FY 2000. Those Centers have focused their plans for the buyout at their site based on consideration of what types of positions would be in excess in the future. The other seven Centers have reached the targets associated with the strategic plan, Centers of Excellence, and Lead Center roles defined over the past several years. This budget allows these Centers to begin the gradual replenishment and rebalancing of skills drained during the severe hiring constraints of the last 5 years. The Agency approach, as well as a summary by Center, is included in the Agency's workforce restructuring plan, which will be submitted to Congress with this budget.

The FY 2000 budget estimate of \$2,181.2 million for Research and Program Management represents a continuation of the aggressive downsizing NASA has undertaken since FY 1993 and incorporates the estimated reduction associated with the planned FY 1999 and FY 2000 buyouts. The requested funding level for FY 2000 is an increase of \$60.0 million from the FY 1999 budget plan of \$2,121.2 million. Of this total increase, funding for Research and Operations Support increased \$13.0 million. This increase reflects an augmentation to the Headquarters Operations budget. Included are increases for the CIO Initiatives, IFMP, and day to day operations such as parking, printing and graphics, and projected rent increases. Funding for Travel increases by \$2.9 million to accommodate rapidly accelerating costs of travel both domestic and international primarily associated with Space Station and other program initiatives across the Agency.

Personnel and related costs increase by \$44.1 million from FY 1999 to FY 2000. These increases fully fund the civil service workforce, the full year cost of the FY 1999 pay raise, the pay raise projected to be effective in January 2000, and normal salary growth offset by a 575 FTE reduction.

In summary, the FY 2000 budget requirement of \$2,181,200,000 will provide for 17,970 FTE civil service workyears to support the activities at nine NASA Installations and Headquarters.

The following describes, in detail, the cost elements within this program.

I. Personnel and Related Costs

A. Compensation and Benefits

1. Compensation

- a. Permanent Positions: This part of Personnel and Related Costs covers the salaries of the full-time permanent civil service workforce and is the largest portion of this functional category.
 - b. Other Than Full-Time Permanent Positions: This category includes the salaries of NASA's non-permanent workforce. Programs such as Presidential Management Interns, students participating in cooperative training, summer employment, youth opportunity, and temporary clerical support are covered in this category.
 - c. Reimbursable Detailees: In accordance with existing agreements, NASA reimburses the parent Federal organization for the salaries and related costs of persons detailed to NASA.
 - d. Overtime and Other Compensation: Overtime, holiday, post and night differential, and hazardous duty pay are included in this category. Also included are incentive awards for outstanding achievement and superior performance.
2. Benefits: In addition to compensation, NASA, as authorized and required by law, makes the employer's contribution to personnel benefits. These benefits include contributions to the Civil Service Retirement Fund, the Federal Employees Retirement System, employees' life and health insurance, payments to the Medicare fund for permanent employees, and social security contributions. Payments to the civil service retirement fund for re-employed annuitants and severance pay to former employees involuntarily separated through no fault of their own are also included.

B. Supporting Costs

1. Transfer of Personnel: Provided under this category are relocation costs required by law, such as the expenses of selling and buying a home, subsistence expenses, and the movement and storage of household goods.
2. Investigative Services: The Office of Personnel Management is reimbursed for activities such as security investigations of new hires and revalidation of sensitive position clearances, recruitment advertising, and Federal wage system surveys.
3. Personnel Training: Training is provided within the framework of the Government Employees Training Act of 1958. Part of the training costs is for courses offered by other Government agencies, and the remainder is for training through nongovernment sources.

II. Travel

- A. Program Travel: The largest part of travel is for direction, coordination, and management of program activities including international programs and activities. The complexity of the programs and the geographical distribution of NASA Installations and contractors necessitate this category of travel. As projects reach the flight stage, support is required for prelaunch activities including overseas travel to launch and tracking sites. The amount of travel required for flight projects is significant as it is directly related to the number of systems and subsystems, the number of design reviews, and the number and complexity of the launches and associated ground operations.
- B. Scientific and Technical Development Travel: Travel to scientific and technical meetings and seminars permits employees engaged in research and development to participate in both Government sponsored and nongovernment sponsored activities. This participation allows personnel to benefit from exposure to technological advances, which arise outside NASA, as well as allowing personnel to present both accomplishments and problems to their associates and provides for the dissemination of technical results to the United States community.
- C. Management and Operations Travel: Management and operations travel provides for the direction and coordination of general management matters and travel by officials to review the status of programs. It also includes travel by functional managers in such areas as personnel, financial management, and procurement. This category also includes the cost of travel of unpaid members of research advisory committees; and initial duty station, permanent change of assignment, and related travel expenses.

III. Research Operations Support

- A. Facilities Services: Facilities Services provides basic security, fire protection, and other custodial services. It also provides maintenance of roads and grounds and of all administrative buildings and facilities. Finally, it provides rental of administrative buildings and all utility costs of administrative buildings.

- B. Technical Services: Technical Services provides the Administrative Automatic Data Processing capability that supports Accounting, Payroll, Budgeting, Procurement, and Personnel as well as all the other Administrative functions. It also funds the Graphics and Photographic support to these functions. Finally, it funds the Installationwide safety and public information programs.

- C. Management and Operations: Management and Operations funds the telephone, mail, and logistics systems, the administrative equipment and supplies, and the transportation system including the general purpose motor pools and the program support aircraft. It also funds the basic medical and environmental health programs. Finally, it funds printing and reproduction and all other support, such as small contract and purchases for the Center Directors staff and the Administrative functions.

SUMMARY OF BUDGET PLAN BY FUNCTION

	<u>FY 1998</u> <u>OPLAN</u> <u>9/29/99</u>	<u>FY 1999</u> <u>OPLAN</u> <u>12/22/98</u>	<u>FY 2000</u> <u>PRES</u> <u>BUDGET</u>
PERSONNEL AND RELATED COSTS	\$1,592.3	\$1,602.8	\$1,646.9
TRAVEL	\$44.4	\$48.8	\$51.7
RESEARCH OPERATIONS SUPPORT	<u>\$388.9</u>	<u>\$469.6</u>	<u>\$482.6</u>
TOTAL PROGRAM PLAN	<u>\$2,025.6</u>	<u>\$2,121.2</u>	<u>\$2,181.2</u>

DETAIL OF BUDGET PLAN BY FUNCTION

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
	(Millions of Dollars)		
I. Personnel and related costs	<u>\$1,592.3</u>	<u>\$1,602.8</u>	<u>\$1,646.9</u>
<u>A. Compensation and benefits</u>	<u>\$1,540.7</u>	<u>\$1,557.9</u>	<u>\$1,598.1</u>
1. Compensation	\$1,255.9	\$1,282.3	\$1,320.9
2. Benefits	\$284.8	\$275.6	\$277.2
<u>B. Supporting costs</u>	<u>\$51.6</u>	<u>\$44.9</u>	<u>\$48.8</u>
1. Transfer of personnel	\$12.0	\$10.7	\$9.5
2. Investigative services	\$2.5	\$1.5	\$1.7
3. Personnel training	\$37.1	\$32.7	\$37.6
II. Travel	<u>\$44.4</u>	<u>\$48.8</u>	<u>\$51.7</u>
A. Program travel	\$28.0	\$30.4	\$32.5
B. Scientific and technical development travel	\$5.1	\$5.4	\$5.7
C. Management and operations travel	\$11.3	\$13.0	\$13.5
III. Research operations support	<u>\$388.9</u>	<u>\$469.6</u>	<u>\$482.6</u>
A. Facilities services	\$124.1	\$127.3	\$130.5
B. Technical services	\$147.2	\$189.3	\$206.5
C. Management and operations	\$117.6	\$153.0	\$145.6
Total	<u>\$2,025.6</u>	<u>\$2,121.2</u>	<u>\$2,181.2</u>

**DISTRIBUTION OF BUDGET PLAN BY FUNCTION BY INSTALLATION
(MILLIONS OF DOLLARS)**

FUNCTION	TOTAL NASA	JSC	KSC	MSFC	SSC	GSFC	ARC	DFRC	LARC	GRC	HQS
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PERSONNEL AND RELATED COSTS

FY 1998	1,592.3	284.0	154.0	229.2	18.9	270.8	135.2	44.7	188.0	164.9	102.6
FY 1999	1,602.8	287.1	149.7	227.6	20.5	276.3	135.9	49.9	188.3	165.0	102.5
FY 2000	1,646.9	287.5	149.2	227.0	21.3	289.3	142.4	53.3	199.6	171.3	106.0

TRAVEL

FY 1998	44.4	8.1	4.0	6.1	0.6	6.8	3.5	1.5	4.0	3.4	6.4
FY 1999	48.8	8.8	5.0	6.4	0.6	7.5	3.3	1.4	4.9	3.7	7.1
FY 2000	51.7	9.4	5.4	6.6	0.8	8.1	3.8	1.5	4.8	3.9	7.4

RESEARCH OPERATIONS SUPPORT

FY 1998	388.9	40.1	72.5	46.9	21.3	49.9	28.3	8.6	22.3	24.6	74.4
FY 1999	469.6	48.2	78.4	54.9	25.7	53.4	29.9	7.1	25.0	27.8	119.2
FY 2000	482.6	43.7	79.9	52.7	27.6	56.6	28.9	6.1	20.0	24.7	142.4

TOTAL

FY 1998	2,025.6	332.2	230.5	282.2	40.8	327.5	167.0	54.8	214.3	192.9	183.4
FY 1999	2,121.2	344.1	233.1	288.9	46.8	337.2	169.1	58.4	218.2	196.5	228.8
FY 2000	2,181.2	340.6	234.5	286.3	49.7	354.0	175.1	60.9	224.4	199.9	255.8

SUMMARY OF BUDGET PLAN BY INSTALLATION
(MILLIONS OF DOLLARS)

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
JOHNSON SPACE CENTER	\$332.2	\$344.1	\$340.6
KENNEDY SPACE CENTER	\$230.5	\$233.1	\$234.5
MARSHALL SPACE FLIGHT CENTER	\$282.2	\$288.9	\$286.3
STENNIS SPACE CENTER	\$40.8	\$46.8	\$49.7
AMES RESEARCH CENTER	\$167.0	\$169.1	\$175.1
DRYDEN FLIGHT RESEARCH CENTER	\$54.8	\$58.4	\$60.9
LANGLEY RESEARCH CENTER	\$214.3	\$218.2	\$224.4
GLENN RESEARCH CENTER	\$192.9	\$196.5	\$199.9
GODDARD SPACE FLIGHT CENTER	\$327.5	\$337.2	\$354.0
HEADQUARTERS	<u>\$183.4</u>	<u>\$228.8</u>	<u>\$255.8</u>
AGENCY TOTAL	<u>\$2,025.6</u>	<u>\$2,121.2</u>	<u>\$2,181.2</u>

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY INSTALLATION

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Johnson Space Center	3,147	2,992	2,819
Kennedy Space Center	1,869	1,784	1,633
Marshall Space Flight Center	2,822	2,690	2,525
Stennis Space Center	244	260	260
Goddard Space Flight Center	3,338	3,351	3,304
Ames Research Center	1,478	1,457	1,457
Dryden Flight Research Center	558	636	634
Langley Research Center	2,420	2,389	2,374
Glenn Research Center	2,074	2,003	1,983
Headquarters	<u>974</u>	<u>983</u>	<u>981</u>
Total, full-time equivalents	<u>18,924</u>	<u>18,545</u>	<u>17,970</u>

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Space station	2,172	2,560	2,575
U.S./Russian cooperative program	32	27	15
Space shuttle	2,341	2,172	2,043
Payload and utilization operations	533	324	306
Space science	1,871	1,865	1,787
Life and microgravity sciences	601	529	512
Earth Science	1,560	1,496	1,518
Aero-space technology	3,235	3,126	3,018
Advanced space transportation technology	1,078	1,037	1,094
Commercial technology programs	181	159	157
Academic programs	37	35	33
Mission communication services	296	283	223
Space communications services	91	108	93
Safety, reliability and quality assurance	128	110	102
Construction of facilities	<u>120</u>	<u>128</u>	<u>123</u>
Subtotal, direct full-time equivalents	<u>14,276</u>	<u>13,959</u>	<u>13,599</u>
Program management (Headquarters)	47	46	44
Center management and operations	<u>4,601</u>	<u>4,540</u>	<u>4,327</u>
Total, full-time equivalents	<u>18,924</u>	<u>18,545</u>	<u>17,970</u>

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2000 ESTIMATES

LYNDON B. JOHNSON SPACE CENTER

ROLES AND MISSIONS

SPACE STATION - Development of the International Space Station will provide an on-orbit, habitable laboratory for science and research activities, including flight and test hardware and software, flight demonstrations for risk mitigation, ground operations capability and facility construction, shuttle hardware and integration for assembly and operation of the station, mission planning, and integration of Space Station systems.

Space Station elements will be provided by the U.S. and our international partners. The U.S. elements include two nodes, a laboratory module, truss segments, four photovoltaic arrays, a habitation module, three pressurized mating adapters, a cupola, unpressurized logistics carriers and a centrifuge accommodation module. Various systems are also being developed by the U.S. including thermal control, life support, navigation and propulsion, command and data handling, power systems, and internal audio/video. The U.S. elements also include the FGB energy tug, being provided by a Russian firm under the Boeing prime contract, and pressurized logistics modules, provided by Italy.

Canada, the European nations, Japan, and Russia are also developing hardware for the International Space Station program. Laboratory elements will be provided by the Japanese and European Space Agencies. Canada will provide the remote manipulator system, vital for assembly of the station. The Russian Space Agency is providing experiment, power, life support and service modules, Soyuz crew transfer vehicle, and universal docking modules.

The Johnson Space Center (JSC) has lead center management responsibility for the International Space Station program. In addition, specific JSC technical responsibilities include development of a set of facilities and systems to conduct the operations of the Space Station including on-orbit control of the Space Station.

The Center also provides institutional personnel as well as engineering and testbed support to the Space Station program. This includes test capabilities, the provision of Government Furnished Equipment (GFE), and engineering analysis support for the work of the prime contractor, its major subcontractors, and NASA system engineering and integration efforts.

SPACE SHUTTLE - JSC has lead center management responsibility for the Space Shuttle. In addition, JSC will provide development, integration, and operations support for the Mission Control Center (MCC), the Shuttle Mission Simulator (SMS), and other ground facilities needed for Space Shuttle Operations. JSC will provide Space Shuttle operational flight program management including system integration, crew equipment modification and processing, crew training, flight mission planning and operations, and procurement of Orbiter hardware.

PAYLOAD AND UTILIZATION OPERATIONS - JSC conducts concept studies and development on flight systems and options for human transportation. JSC provided support to the last flight of Spacelab in FY 1998. Other JSC activities include the engineering and technical base, payload operations and support equipment, and technology program support. Under this program, the X-38 experimental vehicle is being developed to demonstrate the technologies and processes required to produce crew return vehicle.

SPACE SCIENCE - The Center supports the Agency's planetary science program in the area of geosciences required to support future programs, provide curatorial support including distribution of samples for research and dissemination of information for lunar materials, U. S. Antarctic meteorites, and other materials from the solar system, and interact with outside scientists. This research focuses on the composition, structures, and evolutionary histories of the solid bodies of the universe.

LIFE AND MICROGRAVITY SCIENCES AND APPLICATIONS - JSC is the Lead Center for the following programs/functions; Biomedical Research and Countermeasures (BR&C); Advanced Human Support Technologies (AHST); and Space Medicine Research (SMR). It also has a supporting role in the Microgravity Research program in biotechnology. As Lead Center for BR&C, AHST, and SMR, JSC will integrate all supporting center activities relative to completing assigned HEDS goals and objectives. As part of the Space Medicine and Biomedical Research and Countermeasures activities, JSC will evaluate human physiological changes associated with the space flight environment and develop effective countermeasures to assure crew health and optimal performance during all phases of flight. The JSC will continue to expand the role and incorporate the National Space Biomedical Research Institute (NSBRI) into all relative aspects of the BR&C program. JSC will define and develop on-board health care systems and environmental monitoring systems; crew medical training; ground-based medical support of missions; develop a longitudinal crew health data base; and develop medical and psychological crew selection criteria. JSC will develop and integrate all science flight experiments for space flight missions; operate integrated payload systems; and train mission and payload specialists in the science aspect of their missions. In support of microgravity research, the JSC has established a center for support of biotechnology applications in Microgravity in order to study growth factors, medical chemo/immunotherapeutic, and human tissue transplantation.

MISSION/SPACE COMMUNICATION SERVICES - The Space Operations Management Office (SOMO), manages the telecommunication, data processing, mission operation, and mission planning services needed to ensure the goals of NASA's exploration, science, and research and development programs are met in an integrated and cost-effective manner. NASA's Space Communications/Operations program is composed of ground networks, mission control and data systems, and space network elements. Included within the space network is the management at GSFC of NASA's Tracking and Data Relay Satellite System (TDRSS).

CENTER MANAGEMENT AND OPERATIONS - Provides management, administrative, and financial oversight of NASA programmatic elements under JSC cognizance. In addition, the center provides for the operation and maintenance of the institutional facilities, systems, and equipment.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM

JOHNSON SPACE CENTER

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Space station	1,144	1,269	1,180
U.S./Russian cooperative program	16	12	0
Space shuttle	1,070	1,055	995
Payload and ELV Support	187	8	7
Space science	45	27	27
Life and microgravity sciences	126	110	110
Earth Sciences	0	0	0
Aero-space technology	0	0	0
Advanced space transportation program	6	6	6
Commercial technology programs	13	11	11
Academic programs	7	5	5
Mission communication services	35	33	33
Space communications services	2	2	2
Safety, reliability and quality assurance	2	2	2
Construction of facilities	<u>26</u>	<u>17</u>	<u>14</u>
Subtotal, direct full-time equivalents	2,679	2,557	2,392
Program management (Headquarters)	0	0	0
Center management and operations	<u>468</u>	<u>435</u>	<u>427</u>
Total, full-time equivalents	<u>3,147</u>	<u>2,992</u>	<u>2,819</u>

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2000 ESTIMATES

JOHN F. KENNEDY SPACE CENTER

ROLES AND MISSIONS

SPACE STATION - The Kennedy Space Center (KSC) is a supporting center for the Space Station Program. The KSC has developed a set of facilities, systems, and capabilities to conduct the operations of the Space Station. KSC develops launch site operations capabilities for conducting prelaunch and post-landing ground operations including integrated testing, interface verification, servicing, launch activities, and experiment-to-rack physical integration. The KSC provides launch site logistics support, resupply and customer utilization. The KSC serves as the primary agent for management and integration of ground processes for all U.S. launched International Space Station (ISS) elements from manufacture and assembly through verification and launch. The KSC develops and maintains ISS flight systems expertise to support the ISS- on orbit- mission and retain technical and operational experience within NASA & KSC for ground processing and verification of space flight hardware for follow-on programs.

SPACE SHUTTLE - The KSC is a supporting center for the Space Shuttle Program. The KSC provides Space Shuttle launch preparation, including orbiter processing and Ground Support Equipment (GSE) logistics; and operation and maintenance of GSE. The KSC develops a set of facilities, systems, and capabilities to conduct launch and recovery operations, including development of new launch and recovery operations concepts, techniques, and associated hardware.

PAYLOAD AND UTILIZATION OPERATIONS - The KSC is the Lead Center for Payload Carriers, and Payload Processing and Support Programs. The KSC provides support for all payload experiment integration, upper stages processing, ground support equipment (GSE) logistics and operations and maintenance of GSE. The KSC develops, activates, validates, operates and maintains Payload Carrier facility systems, GSE, and processes to enable efficient launch site processing of Payload Carrier payloads.

EXPENDABLE LAUNCH VEHICLES - The KSC serves as the Lead Center for the acquisition and management of Expendable Launch Vehicle (ELV) Services. The KSC assures customer support through mission design and analysis, trade studies, and verification of launch vehicle performance requirements. The KSC provides government oversight of all launch vehicle and payload processing and checkout activities for all NASA contracted expendable launch vehicle and upper stage launch services both at the KSC and the Vandenberg Air Force Base. The KSC develops, activates, validates, operates and maintains ELV facility systems, GSE, and processes to enable efficient launch site processing of ELV.

CENTER MANAGEMENT AND OPERATIONS - The KSC provides administrative and financial services in support of Center management and provide for the operation and maintenance of the institutional facilities, systems, laboratories, test beds, associated technical infrastructure, and equipment. The KSC is delegated functional management responsibility for Agency liquid propellant consumables, liquid hydrogen and helium, and provides selected fluids for various Federal Government Agencies.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM

KENNEDY SPACE CENTER

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Space station	322	352	346
U.S./Russian cooperative program	0	0	0
Space shuttle	767	730	699
Payload and ELV Support	231	217	211
Space science	0	0	0
Life and microgravity sciences	19	16	16
Earth Sciences	0	0	0
Aero-space technology	0	0	0
Advanced space transportation program	18	10	11
Commercial technology programs	12	15	13
Academic programs	0	0	0
Mission communication services	0	0	0
Space communications services	0	0	0
Safety, reliability and quality assurance	18	21	17
Construction of facilities	<u>3</u>	<u>3</u>	<u>3</u>
Subtotal, direct full-time equivalents	1,390	1,364	1,316
Program management (Headquarters)	0	0	0
Center management and operations	<u>479</u>	<u>420</u>	<u>317</u>
Total, full-time equivalents	<u>1,869</u>	<u>1,784</u>	<u>1,633</u>

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2000 ESTIMATES

GEORGE C. MARSHALL SPACE FLIGHT CENTER

ROLES AND MISSIONS

SPACE STATION – The Marshall Space Flight Center (MSFC) provides engineering support to the program including engineering analysis in support of the station system engineering and integration effort and the work of the prime and major subcontractors. In addition MSFC has the responsibility for the development of the Environmental Control and Life Support (ECLS) system as well as responsibility for the management and engineering oversight of the Italian Space Agency in the development of Nodes 2 and 3. Included also are the logistics carriers development and maintenance activities and the design integration of cargo elements for Station mission assembly and logistics supply flights. It is be responsible for developing payload utilization capabilities and planning and executing payload integration and operations activities. This includes the development and operation of the EXPRESS Rack and Pallet payload carriers, the payload operations integration center, and data systems. MSFC is also responsible for the management of all Microgravity Research projects to be implemented on the ISS.

SPACE SHUTTLE – As the Center of Excellence for establishing, upgrading, and maintaining world class excellence in space propulsion programs, MSFC provides for the design, development, and procurement for propulsion elements for the Space Shuttle Transportation (STS) system for contracts not assigned to the Space Flight Operations Contractor.

SPACE SCIENCE – MSFC has led the development and operations of the Advanced X-Ray Astrophysics Facility (AXAF) being launched in 1999. MSFC is also responsible for the development and operations of the Relativity Mission (Gravity Probe-B) planned for launch in late 2000, as well as management of selected payloads. As Center of Excellence for Optics, MSFC provides design and development support to the Goddard Space Flight Center and Jet Propulsion Laboratory.

LIFE AND MICROGRAVITY SCIENCES AND APPLICATIONS – As NASA's Lead Center for Microgravity Research, MSFC has responsibility for NASA's Microgravity initiatives, generating and communicating valuable knowledge of basic and applied physical, chemical and biological processes that are affected or hidden by the effects of gravity on Earth, and facilitating the use of space for the development of commercial products and services. MSFC performs research in the areas of materials science and biotechnology and will manage peer selected research and define and develop facilities and hardware apparatus necessary to achieve research objectives. MSFC also focuses on developing and transferring to the private sector the technology and applications of products developed for space.

AERO-SPACE TECHNOLOGY – The Center provides space transportation system and propulsion technologies to reduce cost and schedule risk in the development of next generation space transportation vehicles. It develops advanced propulsion and airframe system technologies to support ground and flight demonstration projects, while focusing on future

break through technologies. The Center will conduct technology efforts, under contract including cooperative agreements, with the U.S. launch vehicle industry, to improve the competitiveness of current systems.

EARTH SCIENCE - MSFC is studying the interrelationship of global-scale climate processes and regional-scale hydrology, which is the science of water's distribution and variability over Earth, its integrating role in linking the planet's physical, biogeochemical, and geophysical fluid subsystems, and the associated human dimensions of Earth system variability. Utilizing global observations and information systems, improved and validated predictive models will be developed. MSFC will also lead in the establishment and operation of the Global Hydrology and Climate Center

MISSION/SPACE COMMUNICATION SERVICES - MSFC manage and maintains the NASA Integrated Services Network (NISN) - NISN services provide communications hardware, software, and transmission medium that inter-connects NASA Headquarters, installations, universities, and major contractor locations for the transfer of data, voice, and video.

CENTER MANAGEMENT AND OPERATIONS - MSFC provides administrative and financial services in support of Center management and provides for the operation and maintenance of the institutional facilities, systems, and equipment. MSFC is the lead center for the development and implementation of the NASA Automation Consolidation Center (NACC), Agency Consolidated Payroll, Earned Value Performance Management, and Agency Logistics Business Systems Operations and Maintenance.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
MARSHALL SPACE FLIGHT CENTER

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Space station	493	561	596
U.S./Russian cooperative program	13	15	15
Space shuttle	394	325	301
Payload and ELV Support	12	11	6
Space science	302	269	179
Life and microgravity sciences	156	155	190
Earth Sciences	104	94	74
Aero-space technology	0	0	0
Advanced space transportation program	603	555	558
Commercial technology programs	66	45	45
Academic programs	10	10	9
Mission communication services	1	0	0
Space communications services	11	17	8
Safety, reliability and quality assurance	10	11	9
Construction of facilities	<u>16</u>	<u>32</u>	<u>12</u>
Subtotal, direct full-time equivalents	2,191	2,100	2,002
Program management (Headquarters)	0	0	
Center management and operations	<u>631</u>	<u>590</u>	<u>523</u>
Total, full-time equivalents	<u>2,822</u>	<u>2,690</u>	<u>2,525</u>

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2000 ESTIMATES

JOHN C. STENNIS SPACE CENTER

ROLES AND MISSIONS

HUMAN SPACE FLIGHT - As the Lead Center for Propulsion Testing, SSC operates, maintains, and manages a propulsion test center and related capabilities for development, certification, and acceptance of rocket propulsion systems and components. The Center provides, maintains and manages the facilities and the related capabilities required for the continued development and acceptance testing of the Space Shuttle Main Engines. SSC also maintains and supports the Center's technical core laboratory and operations to enable SSC to conduct advanced propulsion test technology research and development for government and commercial propulsion programs.

EARTH SCIENCE - Through the Commercial Remote Sensing Program, SSC will undertake commercial partnership programs that apply remote sensing technologies in business applications and reduce new product development costs. As part of the Applied Research and Data Analysis program, SSC conducts fundamental and applied research which increase our understanding of environmental systems sciences, with emphasis on coastal research of both land and oceans.

AERO-SPACE TECHNOLOGY - Through the Technology Transfer and Small Business Innovative Research programs, SSC broadens and accelerates the development of spin-off technologies derived from national investments in aerospace research. SSC will also support the development of new and innovative propulsion technologies through the Advanced Space Transportation Program that supports the agency goal of reducing the cost of access to space.

CENTER MANAGEMENT AND OPERATIONS - The Center provides operates, maintains, and manages the institutional base and laboratories required to support and accomplish assigned programs of NASA and, on a reimbursable basis, other Federal and State agencies and organizations resident at the SSC.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM

STENNIS SPACE CENTER

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Space station	0	0	0
U.S./Russian cooperative program	0	0	0
Space shuttle	34	30	21
Payload and ELV Support	0	0	0
Space science	0	0	0
Life and microgravity sciences	0	0	0
Earth Sciences	22	33	33
Aero-space technology	0	1	0
Advanced space transportation program	46	42	33
Commercial technology programs	3	3	3
Academic programs	4	5	5
Mission communication services	0	0	0
Space communications services	0	0	0
Safety, reliability and quality assurance	1	2	2
Construction of facilities	<u>33</u>	<u>34</u>	<u>52</u>
Subtotal, direct full-time equivalents	143	150	149
Program management (Headquarters)	0	0	0
Center management and operations	<u>101</u>	<u>110</u>	<u>111</u>
Total, full-time equivalents	<u>244</u>	<u>260</u>	<u>260</u>

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2000 ESTIMATES

GODDARD SPACE FLIGHT CENTER

ROLES AND MISSIONS

SPACE SHUTTLE/PAYLOAD AND UTILIZATION OPERATIONS - GSFC manages flights of the Hitchhiker, a reusable carrier system which provides increased flight opportunities with reduced lead-time while maximizing Space Shuttle load factors and minimizing spaceflight costs. GSFC also manages and coordinates the Agency's Get Away Special (GAS) program.

SPACE SCIENCE - GSFC manages physics and astronomy activities in the following discipline areas: gamma ray astronomy, X-ray astronomy, ultraviolet and optical astronomy, infrared and radio astronomy, particle astrophysics, solar physics, interplanetary physics, planetary magnetospheres, and astrochemistry. GSFC also is responsible for conducting the mission operations for a variety of operating spacecraft. Other activities include managing NASA's sounding rocket and scientific balloon program.

GSFC also conducts planetary exploration research into the physics of interplanetary and planetary space environments and participates in planetary mission instrument development, operations, and data analysis. GSFC develops technologies targeted at improved spaceborne instruments, and on-board spacecraft systems and subsystems.

EARTH SCIENCE - GSFC is the Lead Center for Earth Science, including the Earth Observing System (EOS). The primary objective of the EOS is to collect data on global change and to observe regional-to-global processes. The EOS will document global change over a fifteen-year period to provide long-term, consistent data sets for use in modeling and understanding global processes. This process and modeling research effort will provide the basis for establishing predictive global change models for policy makers and scientists.

Manages Earth Probes and New Millennium flight projects; manages, on a reimbursable basis, the acquisition of meteorological observing spacecraft for the National Oceanic and Atmospheric Administration (NOAA). Goddard conducts science correlation measurements from balloons, sounding rockets, aircraft, and ground installations support to interagency NASA/NOAA/DOD.

AERO-SPACE TECHNOLOGY - The Wallops Flight Facility conducts flight studies of new approach and landing procedures using the latest in guidance equipment and techniques, pilot information displays, human factors data, and terminal area navigation. As an integral partner in the Agency's High Performance Computing and Communications (HPCC) program, GSFC leads an effort to enhance the infusion of HPCC technologies into the Earth and space science community through the provision of advanced computer architectures and communication technologies. GSFC promotes private sector

investment in space-based technologies through the transfer of technologies that derive from NASA's programs and activities.

MISSION/SPACE COMMUNICATION SERVICES - Research and technology involves the investigation and development of advanced systems and techniques for spacecraft communications and tracking, command and control, and data acquisition and processing. The primary objectives are to apply technology and develop advanced capabilities to meet the tracking and data processing requirements of new missions and to improve the cost effectiveness and reliability of flight mission support.

Although the Johnson Space Center is designated as the Space Operations Lead Center, GSFC manages a number of critical program elements, including operation of the Tracking and Data Relay Satellite System (TDRSS); the development of the replenishment TDRSS spacecraft; mission control, data processing, and orbit/attitude computation support; operating the Space Tracking and Data Network (STDN), the NASA Communications (NASCOM) Network, and the Aeronautics, Balloons and Sounding Rocket Program.

The NASCOM Network links the stations of the Deep Space Network (DSN), STDN, TDRSS, and other tracking and data acquisition elements with control centers and data processing and computation centers.

CENTER MANAGEMENT AND OPERATIONS - Provides administrative and financial services in support of Center management and provides for the operation and maintenance of the institutional facilities, systems, and equipment.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
GODDARD SPACE FLIGHT CENTER

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Space station	0	0	0
U.S./Russian cooperative program	0	0	0
Space shuttle	4	4	4
Payload and ELV Support	50	56	56
Space science	1,011	1,045	1,045
Life and microgravity sciences	0	0	0
Earth Sciences	1,070	981	1,024
Aero-space technology	12	4	0
Advanced space transportation program	0	0	0
Commercial technology programs	22	23	23
Academic programs	0	0	0
Mission communication services	186	180	120
Space communications services	70	78	72
Safety, reliability and quality assurance	21	8	7
Construction of facilities	<u>0</u>	<u>0</u>	<u>0</u>
Subtotal, direct full-time equivalents	2,446	2,379	2,351
Program management (Headquarters)	0	0	0
Center management and operations	<u>892</u>	<u>972</u>	<u>953</u>
Total, full-time equivalents	<u>3,338</u>	<u>3,351</u>	<u>3,304</u>

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2000 ESTIMATES

AMES RESEARCH CENTER

ROLES AND MISSIONS

AERO-SPACE TECHNOLOGY – ARC conducts aeronautics research in ground-based and airborne automation technologies, human factors and operational methodologies for efficient, safe and effective airspace operations. ARC develops an integrated set of experimental and computational technologies built around an embedded information systems backbone, to provide rapid, accurate vehicle synthesis and testing capabilities. ARC conducts research spanning computation through flight, for Rotorcraft and Powered Lift configurations and for high performance aircraft to improve efficiency, affordability, and performance. ARC continues an interdisciplinary research program which provides the technology base for the development of subsonic and high speed transport aircraft. The center emphasizes joint research and technology projects with other NASA installations, government agencies, industry and academia.

ARC will strengthen basic research and technology development for aerospace systems that transport humans and instrumentation to and from space and within the atmospheres of other bodies within the solar system. The center conducts research thermal protection systems and arcjet testing is performed to meet national needs for access to space and planetary exploration.

SPACE SCIENCE - Ames has the agency lead role in Astrobiology (the study of life in the universe) which in Space Science focuses on the origin of life and its possible development on other worlds. Research includes advanced laboratory and computation facilities for astrochemistry; planetary atmosphere modeling, including relationships to the atmosphere of the Earth; the formation of stars and planetary systems; and an infrared technology program to investigate the nature and evolution of astronomical systems. Development of the Stratospheric Observatory for Infrared Astronomy (SOFIA) will continue. Research and development (R&D) in advanced information technologies are directed toward significantly increasing the efficiency of SOFIA as it becomes operational. Ames also is the lead center for information technology efforts in the cross-enterprise spacecraft technology program funded in space science.

LIFE AND MICROGRAVITY SCIENCES - Ames has the agency lead role in Astrobiology and Gravitational Biology and Ecology programs. These synergistic programs examine the adoption of life forms to reduced gravity and the evolution and distribution of life in the universe. Research continues into the effects of gravity on living systems using spaceflight experiments, ground simulation, and hypergravity facilities to understand the how gravity affects the development, structure and functions of living systems. Also studied are options for preventing problems in crew health and psychophysiology during and after extended spaceflight. Ames has a primary focus on advanced physical/chemical technologies for life support, including research into all aspects of regenerative life support. Research is conducted in the areas of ecosystems and health monitoring.

EARTH SCIENCE - Ames has the agency lead role in Astrobiology which in Earth Science focuses on the relationship between life on Earth and our changing environment. Instruments and computer models for the measurement and analysis of atmospheric constituents and properties from aircraft platform are being developed. Applied research and developments to enhance the use of remote and in-situ sensing technology for Earth resources applications continues.

SAFETY, RELIABILITY AND QUALITY ASSURANCE - ARC will provide institutional safety and health programs and develop and integrate Safety, Reliability and Quality Assurance guidelines into program and project development.

CENTER MANAGEMENT AND OPERATIONS - ARC will provide administrative and financial services in support of Center management and provides for the operation and maintenance of the institutional facilities, systems and equipment.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM

AMES RESEARCH CENTER

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Space station	37	55	76
U.S./Russian cooperative program	0	0	0
Space shuttle	0	0	0
Payload and ELV Support	0	0	0
Space science	175	172	173
Life and microgravity sciences	89	72	54
Earth Sciences	45	44	44
Aero-space technology	657	662	637
Advanced space transportation program	69	66	86
Commercial technology programs	1	1	1
Academic programs	2	2	2
Mission communication services	0	0	0
Space communications services	0	0	0
Safety, reliability and quality assurance	10	10	9
Construction of facilities	<u>25</u>	<u>25</u>	<u>25</u>
Subtotal, direct full-time equivalents	1,110	1,109	1,107
Program management (Headquarters)	0	0	0
Center management and operations	<u>368</u>	<u>348</u>	<u>350</u>
Total, full-time equivalents	<u>1,478</u>	<u>1,457</u>	<u>1,457</u>

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2000 ESTIMATES

DRYDEN FLIGHT RESEARCH CENTER

CENTER ROLES AND MISSIONS

AERO-SPACE TECHNOLOGY - Develop, manage, and maintain facilities and testbed aircraft to support safe, timely, and cost effective NASA flight research and to support industry, university, and other government agency flight programs.

Conceive, formulate, and conduct piloted and unpiloted research programs in disciplinary technology, integrated aeronautical systems, and advanced concepts to meet current and future missions throughout subsonic, supersonic, and hypersonic flight regimes.

Conduct flight research programs in cooperation with other NASA Installations, other government agencies, the aerospace industry, and universities. Transition results, techniques, methods, and tools to industry and government users in a timely manner.

DFRC will also provide flight test support for atmospheric tests of experimental or developmental launch systems, including reusable systems.

SPACE SHUTTLE /PAYLOAD AND UTILIZATION OPERATIONS - The DFRC provides operational and technical support for the conduct of Space Shuttle missions, including on-orbit tracking and communications, landing support of crew and science requirements.

CENTER MANAGEMENT AND OPERATIONS - DFRC will provide administrative services in support of Center management and provides for the operation and maintenance of the Institutional facilities, systems and equipment.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
DRYDEN FLIGHT RESEARCH CENTER

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Space station	0	20	30
U.S./Russian cooperative program	0	0	0
Space shuttle	26	9	9
Payload and ELV Support	0	0	0
Space science	0	0	0
Life and microgravity sciences	0	0	0
Earth Sciences	30	39	39
Aero-space technology	283	326	336
Advanced space transportation program	77	93	90
Commercial technology programs	4	4	4
Academic programs	0	0	0
Mission communication services	19	19	19
Space communications services	0	0	0
Safety, reliability and quality assurance	12	1	1
Construction of facilities	<u>0</u>	<u>0</u>	<u>0</u>
Subtotal, direct full-time equivalents	451	511	528
Program management (Headquarters)	0	0	0
Center management and operations	<u>107</u>	<u>125</u>	<u>106</u>
Total, full-time equivalents	<u>558</u>	<u>636</u>	<u>634</u>

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2000 ESTIMATE

LANGLEY RESEARCH CENTER

ROLES AND MISSIONS

AERO-SPACE TECHNOLOGY - Conduct advanced research in fundamental aerodynamics; high-speed, highly maneuverable aircraft technology; hypersonic propulsion; guidance and controls; acoustics; and structures and materials. Develop a technology base for improving transport, fighter, general aviation, and commuter aircraft. Conduct an aeronautical research and technology program to study current and future technology requirements and to demonstrate technology applications. Conduct theoretical and experimental research in fluid and flight mechanics to determine aerodynamic flows and complex aircraft motions.

Develop innovative new airframe systems to improve safety and significantly reduce cost per seat mile of commercial transport aircraft and reduce emissions to improve environmental compatibility. Pioneer the development of new materials, structural concepts, and fabricate technologies to revolutionize the cost, performance, and safety of future aircraft structures for radically new aircraft design.

Study critical environmental compatibility issues in order to make decisions on future high speed civil transport technology and development programs. Develop technology options for realization of practical hypersonic and transatmospheric flight.

Conduct control and guidance research programs to advance technology in aircraft guidance and navigation, aircraft control systems, cockpit systems integration and interfacing techniques, and performance validation and verification methods. Conduct research in aircraft noise prediction and abatement.

Conduct aeronautics and space research and technology development for advanced aerospace transportation systems, including hypersonic aircraft, missiles, and space access vehicles using airbreathing and rocket propulsion. Specific technology discipline areas of expertise are aerodynamics, aerothermodynamics, structures, materials, hypersonic propulsion, guidance and controls, and systems analysis. Conduct long-range studies directed at defining the technology requirements for advanced transportation systems and missions.

EARTH SCIENCE - Perform an agency-designated Atmospheric Science mission role in support of the Earth Science Enterprise in the NASA Strategic Plan. Conduct a world-class peer reviewed and selected atmospheric science program in support of national goals in preserving the environment and in fundamental science. Specific discipline areas of expertise are Earth radiation research, particularly the role of clouds in the Earth's energy budget; middle and upper atmospheric research; and tropospheric research. Perform innovative scientific research to advance the knowledge of atmospheric radiative, chemical, and dynamic processes for understanding global change; develop innovative passive and active sensor

systems concepts for atmospheric science measurements; explore advanced laser and LIDAR technologies for Earth science missions; develop advanced ultra-lightweight and adaptive materials, structural systems technologies and analytical tools for significantly reducing the end-to-end cost and increasing the performance of earth observation space instruments and systems. Serve as a Primary Data Analysis and Archival Center (DAAC) for Earth Radiation and Atmospheric Chemistry for the Earth Observing System.

SPACE SCIENCES -LaRC will support the solicitation and selection process of the Office of Space Science's (OSS) Discovery, Explorer and Solar Terrestrial Probes Programs; conduct reviews of candidate and selected missions and independent assessments of on-going space science missions to help ensure that OSS criteria for high quality science return within cost and schedule constraints are met; develop advanced ultra-lightweight and adaptive materials, structural systems technologies and analytical tools for significantly reducing the end-to-end cost and increasing the performance of space science instruments and systems. Langley is developing the SABER instrument which will be on the TIMED mission to explore the mesosphere and lower thermosphere globally and achieve a major improvement in the understanding of the fundamental processes governing energetics, chemistry, dynamics and transport. Langley is also analyzing SAMPEX data to assess the relative importance of solar terrestrial coupling due to varying electron precipitation compared to that due to 11-year solar flux variations.

LIFE AND MICROGRAVITY SCIENCES - LaRC conducts space radiation exposure studies in support of current and future human space efforts for a more accurate assessment of astronaut radiation exposures and body shielding factors.

SYSTEMS ANALYSIS/INDEPENDENT PROGRAM EVALUATION AND ASSESSMENT - Langley serves as the Agency lead center for systems analysis and the conduct of independent evaluation and assessment of Agency programs. Maintain, as a Center core competency, appropriate expertise and analysis tools to support the Agency's Strategic Enterprises in the definition and development of advanced systems concepts to achieve NASA's goals. The Center utilizes core systems analysis capabilities (supplemented with expertise from other Centers as appropriate) to support the Office of the Administrator by conducting independent assessments of advanced concepts and proposed new systems to validate conceptual level designs prior to Agency commitment to major developmental funding. LaRC supports the Administrator's Program Management Council (PMC) in the organization, administration, and technical support of PMC review process.

SAFETY, RELIABILITY, AND QUALITY ASSURANCE - The Center will provide a Safety, Reliability, and Quality Assurance program that conducts independent assessment activities which reduce program risk.

CENTER MANAGEMENT AND OPERATIONS - LaRC will provide administrative and financial services in support of Center management and provides for the operation and maintenance of the institutional facilities, systems, and equipment.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM

LANGLEY RESEARCH CENTER

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Space station	8	11	17
U.S./Russian cooperative program	0	0	0
Space shuttle	2	0	0
Payload and ELV Support	40	28	22
Space science	59	74	85
Life and microgravity sciences	7	7	0
Earth Sciences	239	265	271
Aero-space technology	1,313	1,250	1,236
Advanced space transportation program	148	148	167
Commercial technology programs	33	33	33
Academic programs	0	0	0
Mission communication services	0	0	0
Space communications services	0	11	11
Safety, reliability and quality assurance	2	4	4
Construction of facilities	<u>0</u>	<u>0</u>	<u>0</u>
Subtotal, direct full-time equivalents	1,851	1,831	1,846
Program management (Headquarters)	0	0	0
Center management and operations	<u>569</u>	<u>558</u>	<u>528</u>
Total, full-time equivalents	<u>2,420</u>	<u>2,389</u>	<u>2,374</u>

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2000 ESTIMATES

GLENN RESEARCH CENTER

ROLES AND MISSIONS

LIFE AND MICROGRAVITY SCIENCES - The Glen Research Center (GRC) provides leadership and management of the fluid physics, combustion science, acceleration measurement and telescience disciplines of NASA's Microgravity Science Program. GRC conducts and sponsors ground-based scientific studies that may lead to experiments in space. The center has a substantial effort in the design, buildup, testing, and integration of hardware for experiment packages to be launched aboard the Space Shuttle and the utilization of the Space Station for scientific missions.

SPACE STATION - GRC support to the space station program includes technical and management support in the areas of power and on-board propulsion components and system, engineering and analysis, technical expertise, and testing for components and systems. This includes use of facilities and testbeds and construction of flight hardware as required.

MISSION COMMUNICATIONS SERVICES - GRC manages and operates the Advanced Communications Technology Satellite (ACTS) to prove highrisk communication technologies, to transfer the knowledge gained to US satellite industry developers and users, and to reaffirm the US satellite communications preeminence in this rapidly growing world-wide market. The Center also ensures timely and high quality availability of radio frequency spectrum to enable the realization of NASA goals; actively stimulating the effective use of (ACTS).

AERO-SPACE TECHNOLOGY - As the NASA Lead Center for Aeropropulsion, GLC conducts world-class research critical to the Agency Aeronautics Enterprise goals of developing and transferring enabling technologies to U.S. industry and other government agencies. The Center's Aeropropulsion program is essential to achieving National goals to promote economic growth and national security through safe, superior, and environmentally compatible U.S. civil and military aircraft propulsion systems. The Aeropropulsion Program spans subsonic, supersonic, hypersonic, general aviation, and high performance aircraft propulsion systems through innovative application of research in materials, structures, internal fluid mechanics, instrumentation and controls, interdisciplinary technologies, and aircraft icing.

As the NASA Center of Excellence in Turbomachinery, GRC's expertise is critical to advancing the Agency's goals in the aeronautics and space programs. This designation enables GRC to be a cost-effective resource across multiple Agency programs in the vital and strategic discipline area of turbomachinery. Areas of expertise include air breathing propulsion and power systems, primary and auxiliary propulsion and power systems, on-board propulsion systems, and rotating machinery for the pumping of fuels.

CENTER MANAGEMENT AND OPERATIONS - Provides administrative and financial services in support of Center Management and provides for the operation and maintenance of the institutional facilities, systems, and equipment.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM

LEWIS RESEARCH CENTER

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Space station	153	274	318
U.S./Russian cooperative program	0	0	0
Space shuttle	22	0	0
Payload and ELV Support	9	0	0
Space science	188	187	187
Life and microgravity sciences	171	135	108
Earth Sciences	17	7	0
Aero-space technology	926	846	772
Advanced space transportation program	106	112	138
Commercial technology programs	17	14	14
Academic programs	5	4	3
Mission communication services	50	51	51
Space communications services	5	0	0
Safety, reliability and quality assurance	10	8	8
Construction of facilities	<u>0</u>	<u>0</u>	<u>0</u>
Subtotal, direct full-time equivalents	1,679	1,638	1,599
Program management (Headquarters)	0	0	0
Center management and operations	<u>395</u>	<u>365</u>	<u>384</u>
Total, full-time equivalents	<u>2,074</u>	<u>2,003</u>	<u>1,983</u>

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2000 ESTIMATES

NASA HEADQUARTERS

ROLES AND MISSIONS

NASA Corporate Headquarters

MISSION - The mission of Headquarters is to plan and provide executive direction for the implementation of U. S. space exploration, space science, aeronautics, and technology programs. This includes corporate policy development, program formulation, resource allocations, program performance assessment, long-term institutional investments, and external advocacy for all of NASA.

MAJOR CORPORATE ROLES - At NASA Headquarters, the broad framework for program formulation will be conducted through four Strategic Enterprises: Human Exploration and Development of Space, Earth Science, Aeronautics and Space Transportation Technology, and Space Science. Consistent with the NASA strategic plan, the Strategic Enterprises develop program goals and objectives to meet the needs of external customers within the policy priorities of the Administration and Congress.

Corporate level enabling processes and staff functions will provide cross-cutting interfaces required to support the Strategic Enterprises in legislative affairs, public affairs, budget and financial management, equal opportunity programs, human resources, education, legal affairs, procurement, international affairs, management systems and facilities, information systems and technology, small business, safety and mission quality, advisory committees, and policy and plans.

The Office of Headquarters Operations provides and manages the infrastructure necessary to support the Headquarters installation.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM

NASA HEADQUARTERS

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Space station	15	18	12
U.S./Russian cooperative program	3	0	0
Space shuttle	22	19	14
Payload and ELV Support	4	4	4
Space science	91	91	91
Life and microgravity sciences	33	34	34
Earth Sciences	33	33	33
Aero-space technology	44	37	37
Advanced space transportation program	5	5	5
Commercial technology programs	10	10	10
Academic programs	9	9	9
Mission communication services	5	0	0
Space communications services	3	0	0
Safety, reliability and quality assurance	42	43	43
Construction of facilities	<u>17</u>	<u>17</u>	<u>17</u>
Subtotal, direct full-time equivalents	336	320	309
Program management (Headquarters)	47	46	44
Center management and operations	<u>591</u>	<u>617</u>	<u>628</u>
Total, full-time equivalents	<u>974</u>	<u>983</u>	<u>981</u>

DETAIL OF PERMANENT POSITIONS

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Executive level II	1	1	1
Executive level IV	<u>2</u>	<u>2</u>	<u>2</u>
Subtotal	3	3	3
ES-6	50	50	50
ES-5	109	109	109
ES-4	167	167	167
ES-3	70	70	70
ES-2	62	62	62
ES-1	<u>47</u>	<u>47</u>	<u>47</u>
Subtotal	505	505	505
CA	1	1	1
SL/ST	61	60	59
GS-15	2236	2184	2131
GS-14	3496	3414	3332
GS-13	6086	5943	5801
GS-12	1862	1818	1775
GS-11	1197	1169	1141
GS-10	258	252	246
GS-9	443	433	422
GS-8	241	235	230
GS-7	605	591	577
GS-6	533	521	508
GS-5	93	91	89
GS-4	16	16	15
GS-3	4	4	4
GS-2	<u>0</u>	<u>1</u>	<u>1</u>
Subtotal	17,132	16,732	16,331
Sp ungraded positions established by NASA Admin.	25	25	25
Ungraded positions	<u>355</u>	<u>355</u>	<u>355</u>
Total permanent positions	<u>18,020</u>	<u>17,620</u>	<u>17,219</u>
Unfilled positions, EOY	<u>0</u>	<u>0</u>	<u>0</u>
Total, permanent employment, EOY	<u>18,020</u>	<u>17,620</u>	<u>17,219</u>

PERSONNEL SUMMARY

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
Average GS/GM grade	12.5	12.5	12.5
Average ES salary	\$118,776	\$121,450	\$124,185
Average GS/GM salary	\$64,477	\$66,798	\$69,737
Average salary of special ungraded positions established by NASA Administrator	\$92,047	\$95,361	\$99,557
Average salary of ungraded positions	\$44,619	\$46,225	\$48,259

CENTER LOCATIONS AND CAPITAL INVESTMENT

JOHNSON SPACE CENTER - The Lyndon B. Johnson Space Center is located 20 miles southeast of Houston, Texas. NASA owns 1,618 acres of land at the Houston site and uses another 60,552 at the White Sands Test Facility, Las Cruces, New Mexico. The total replacement cost including land, buildings, structures and facilities, equipment, and other fixed assets was \$2,720,153,000 as of September 30, 1998.

KENNEDY SPACE CENTER - The Kennedy Space Center is located 50 miles east of Orlando, Florida. NASA owns 82,943 acres and uses launch facilities at Cape Canaveral Air Station and Vandenberg Air Force Base. The total replacement cost including land, buildings, structures and facilities, equipment, and other fixed assets was \$1,592,393,000 as of September 30, 1998.

MARSHALL SPACE FLIGHT CENTER - The Marshall Space Flight Center is located within the U.S. Army's Redstone Arsenal at Huntsville, Alabama. MSFC also manages operation at the Michoud Assembly 15 miles east of New Orleans, Louisiana and the Slidell Computer Complex in Slidell, Louisiana. The total replacement cost including land, buildings, structures and facilities, equipment, and other fixed assets was \$3,035,495,000 as of September 30, 1998.

STENNIS SPACE CENTER - The Stennis Space Center is located approximately 50 miles northeast of New Orleans, Louisiana. NASA owns 20,663 acres and has easements covering an additional 118,284 acres. The total replacement cost including land, buildings, structures and facilities, equipment, and other fixed assets was \$360,186,000 as of September 30, 1998.

GODDARD SPACE FLIGHT CENTER - The Goddard Space Flight Center is located 15 miles northeast of Washington, D.C. at Greenbelt, Maryland. NASA owns 1,121 acres at this location and an additional 6,176 acres at the Wallops Flight Facility in Wallops Island, Virginia. The total replacement cost including land, buildings, structures and facilities, equipment, and other fixed assets at both locations was \$2,563,817,000 as of September 30, 1998.

AMES RESEARCH CENTER - The Ames Research Center is located south of San Francisco on Moffett Field, California. NASA owns 447.5 acres at the Moffett Field location. The total replacement cost including land, buildings, structures and facilities, equipment, and other fixed assets at both locations was \$915,036,000 as of September 30, 1998.

DRYDEN FLIGHT RESEARCH CENTER - The Dryden Flight Research Center is 65 air miles northeast of Los Angeles. Dryden is located at the north end of Edwards Air Force Base on 838 acres of land under a permit from the Air Force. The total replacement cost at Dryden, including fixed assets in progress and contractor-held facilities at various locations, as of September 30, 1998 was \$388,775,000.

LANGLEY RESEARCH CENTER - The Langley Research Center is adjacent to Langley Air Force Base which is located between Williamsburg and Norfolk at Hampton, Virginia. NASA owns 788 acres and has access to 3,276 acres. The total replacement cost including land, buildings, structures and facilities, equipment, and other fixed assets was \$1,053,165,000 as of September 30, 1998.

GLENN RESEARCH CENTER - The Glenn Research Center occupies two sites; the main site is in Cleveland, Ohio, adjacent to Cleveland-Hopkins Airport; the second site is the Plum Brook Station located south of Sandusky, Ohio, and 50 miles west of Cleveland. NASA owns 6,805 acres and leases an additional 14 acres at the Cleveland location. The total replacement cost including land, buildings, structures and facilities, equipment, and other fixed assets at both locations was \$617,065,000 as September 30, 1998.

NASA HEADQUARTERS - NASA Headquarters is located at Two Independence Square, 300 E St. SW, Washington, D.C. and occupies other buildings in the District of Columbia, Maryland, and Virginia.