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Office of Space Flight (Code M)
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The total Fiscal Year 2003 budget request for the Human Exploration and Development of Space Enterprise is $6,130.9 million; this is comprised of $5,058.8 million in direct program funding and $1,072.1 million for institutional support. This represents a decrease of 11.2 percent from FY 2002. There are an estimated 4,864 direct Full Time Equivalent employees included within the Human Exploration and Development of Space Enterprise in Fiscal Year 2003.

I. The International Space Station Program -- $1,492.1 million

The International Space Station (ISS) Program enables or enhances each of the specific goals identified for the U.S. space program as stated in the National Space Policy. The successful operation of this world-class orbiting laboratory, along with the research, technological and commercial advances that it enables will support future decisions on the feasibility and desirability of conducting further human exploration activities beyond low-earth orbit.

In 1993, the ISS was established as a less costly alternative to its predecessor, the Space Station Freedom. Since that time the ISS Program has achieved many of the financial goals to lower annual development and operations costs and to achieve early deployment of a three-person on-orbit crew. However, the ISS Program has also seen significant schedule slippage and cost growth. The Administration, through the President's fiscal year 2002 Budget Blueprint, initiated actions to set the ISS back on a course of fiscal accountability; the President's fiscal 2003 budget maintains this course. The ISS is funded at $1,492 million in the fiscal 2003 budget, about $230 million less than provided in the fiscal 2002 appropriation.

The Program is in the third and final phase of deployment, having completed an initial preparatory phase utilizing the Shuttle and the Russian Space Station Mir (Phase 1), and enabling permanent human presence and early research capability in orbit (Phase 2). With key contributions of Canada, Russia and the United States currently in orbit, the ISS is already the most capable spacecraft ever deployed and it is still growing.

The U.S. elements will continue to be regularly deployed through early 2004, at which time the on-orbit assembly will transition primarily to that of the partner nations' contributions. With elements already in orbit exceeding operational expectations and with most of the remaining U.S. hardware already in final preparation at the launch site, vehicle-design and development risk has largely been retired.

While last year brought actions designed to contain cost growth and to gain better understanding of its source and nature, this year will be one of action. Last year, an independent task force of research, management and financial experts, led by Thomas Young, provided NASA with a number of recommendations to restore and maintain fiscal responsibility and ensure the fundamental soundness of the overall NASA ISS Program. NASA is acting upon these recommendations and others, to put in place the right processes, tools and management controls, as well as measures to evaluate the program's progress along the way.

In the fiscal 2002 budget projections for fiscal 2004 and subsequent years, there was a mismatch between the Administration's budget targets for ISS and the program's cost projections. This "cost challenge" amounted to approximately half a billion dollars. Based on forward actions, NASA expects to eliminate this unresolved management challenge. By this spring the program will have a clearly defined set of cost requirements so that by fall, a true understanding of total program costs can be achieved. An initiative that will clearly redefine research priorities is also underway. The outcomes of these actions will largely determine the end-state requirements and necessary steps to realizing the great opportunities ISS provides.

The fiscal 2003 budget proposal represents a restrained fiscal approach that provides adequate support to address currently identified requirements. The program is pushing ahead to address the total complement of technical, cost and schedule challenges facing completion of the U.S. Core station, and to reaffirm NASA's strong commitment to its international partnerships.

Program Status and the Year Ahead

The past year has seen sustained ISS assembly. The program was performing in all phases of development, test, assembly, operations and research as the ISS completed its Phase II objectives. The Joint Airlock was attached to the station in July 2001, moving the program into the third and final phase of development. Once installed and activated, the airlock became the primary path for ISS spacewalk entry and departure for U.S. spacesuits.

Other fiscal 2001 ISS highlights in orbit include the arrival of the first permanent crew, Expedition 1, via a Soyuz spacecraft in November 2000. Over its four-month stay the crew had an extremely productive on-orbit tour, marked by the buildup of ISS capability and early research. The heart of the U.S. research and operational control system was deployed in February 2001, with the launch of the U.S. Laboratory *Destiny,* the first long-term U.S. orbiting lab in over 20 years. With *Destiny*, day-to-day command and control of the ISS transitioned to the United States. *Leonardo,* the Italian-built logistics module, ferried the first three payload racks to ISS in March 2001, allowing the second ISS expeditionary crew, also launched in March, to increase research activities while continuing ISS outfitting.

The Expedition 2 crew employed the Human Research Facility and other equipment to perform 18 NASA experimental investigations primarily focused on Biomedical Research during their stay. In April 2001, the primary contribution of Canada was deployed, a state-of-the-art robotic arm; *Rafaello,* a second Italian-built logistics module, also carried two payload Express Racks to orbit.

In August 2001, the Expedition 3 crew arrived and *Leonardo* was used to carry two additional EXPRESS research experiment racks to ISS, bringing the total number of racks to five. During the Expedition 3 crew's stay, 19 experiments were performed in the biomedical and microgravity area, as well as Earth observations and educational payloads. Closing out the year, the Russian Docking Compartment (DC-1) was berthed with the Service Module in September 2001, providing ISS crew a second airlock for spacewalks.

For much of fiscal 2002 the station will be supplied with experiment and logistics racks. The major framework of the station will begin to take shape and the arrival of the next three rotating Expedition crews is planned.

Beginning with Flight 8A in April 2002, the crew will install the Integrated Truss Structure (ITS) SO and the Mobile Transporter. The SO ITS is the center of the 91-meter (300-foot) station truss and attaches to the U.S. Lab. The Mobile Transporter will create a movable base for the station’s Canadian Mechanical arm, allowing it to travel along the station trusses after delivery of the Mobile Base System (MBS) on UF2. The second utilization flight, UF2, in May 2002, will transport the Expedition 5 crew to the ISS in addition to providing experiment racks and three stowage and re-supply racks. The MBS delivery will complete the Canadian Mobile Servicing System once installed on the Mobile Transporter.

The first starboard truss segment, S1, arrives on Flight 9A in August 2002. The S1 truss will provide among other things external cooling systems. The first port truss segment, P1, is scheduled to be launched in September 2002. P1 is a mirror image of S1 in appearance and capability. P1 is launched without its S-Band system, which is installed on P1 on a spacewalk when moved from P6 (currently on orbit).

The Utilization and Logistics Flight (ULF1) is scheduled to launch in January 2003 and will mark the first flight of a deployable cargo carrier known as the External Stowage Platform (ESP2). The ESP2 will be deployed from the Space Shuttle by the Space Station Remote Manipulator System (robotic arm) and will attach to the ISS air lock as a permanent spare-parts stowage facility. It will include a cargo pallet, specially outfitted with release mechanisms, to permit Orbital Replacement Unit change-out, and cable systems to provide power directly from the ISS to individual payloads. The Expedition 6 crew will also arrive on ULF1.

II. Space Shuttle Program -- $3,208.0 million

The primary goals of the Space Shuttle Program (SSP) are to: (1) fly safely; (2) meet the flight manifest; (3) improve supportability; and (4) improve the system's safety. The Space Shuttle continues to be the most versatile reusable launch vehicle ever built, having completed 107 missions. Seven shuttle missions were flown last year with five of those missions launched during a six-month period.

The Space Shuttle has delivered to the ISS the U.S. Laboratory module, solar arrays for power generation, the ISS robotic arm -- Canadarm2, the Joint Airlock that was used to perform the first ISS spacewalk, several tons of logistical materials in three logistics flights, and four Expedition crews. A maximum of seven flights are planned for fiscal 2002 including a servicing mission to the Hubble Space Telescope and a Spacehab mission. Four flights are planned for fiscal 2003. The budget supports five flights in fiscal 2004 (four for ISS and one for Hubble Space Telescope servicing) and an average of four flights per year thereafter (all for ISS). This represents a reduction of two flights per year from the previous plan of six flights per year. However, there is a change in budgeting approach, to the effect that any additional flights above the four per year minimum requirement for Station will be budgeted for by NASA's Enterprises.

The Space Shuttle budget structure consists of four major components: Flight Hardware, Ground Operations, Flight Operations and Program Integration. Included in the four categories are supportability upgrades to counteract possible vehicle and ground-system obsolescence. Vendor loss and high failure rates of aging components, high repair costs of Shuttle-specific devices, and negative environmental impacts of some outdated technologies are also addressed by these categories.

In addition, this fiscal 2003 budget request continues funding for selected safety upgrades that will improve reliability and ensure safe operations of the Space Shuttle. Examples include the Cockpit Avionics Upgrade, which will reduce crew workload, and the Advanced Health Management System of the Space Shuttle Main Engines, which will improve real-time monitoring of engine performance. Ongoing Space Shuttle studies may yield additional safety improvements that could be implemented into the Shuttle fleet. Completion of upgrades installation is currently planned for 2007.

An effort is underway to assess competitive sourcing/privatization of Space Shuttle operations. NASA has established a Space Shuttle Privatization Business Review Team (with membership from the banking, financial and academic fields), and a Space Shuttle Privatization Policy Team to evaluate two families of options (Government and private industry). As always, a critical discriminator among options for competitive sourcing is the mandatory requirement that safety is not compromised.

III. Payload and ELV Support -- $87.5 million

The Payload and ELV Support budget consists of two major Programs -- Payload Carriers and Support, and Expendable Launch Vehicles (ELV) Mission Support.

The Payload Carriers and Support budget supports the processing and flight of Space Shuttle payloads, including processing of unpressurized carriers, Get-Away Special (GAS), Hitchhiker and Flight Support System carriers. Funding supports the required technical expertise and facilities to perform the payload buildup, test and checkout, integration, servicing, transportation and installation of payloads into the Shuttle launch vehicle.

In fiscal 2001, launch and landing payload support activities were provided for seven Space Shuttle missions, all of which were ISS assembly and utilization flights. In fiscal 2002, launch and landing payload support activities will be provided for seven Space Shuttle missions, including five ISS assembly and utilization flights, one servicing visit to the Hubble Space Telescope (HST-03B), and one research mission (STS-107). In fiscal 2003, launch and landing payload support activities will be provided for four planned Space Shuttle missions for ISS assembly and utilization.

The Expendable Launch Vehicle Mission Support budget provides funding for technical expertise and NASA-unique facilities to perform technical oversight and management for all NASA missions requiring flight on NASA-acquired launch services. Advanced mission design/analysis and leading-edge integration services are provided for the full range of NASA missions under consideration for launch on ELVs. In FY 2001, NASA supported seven primary payload launches including (1) HETE-11, (2) EO-1/SAC-C, (3) Mars Odyssey, (4) MAP, (5) GOES-M, (6) Genesis and (7) Kodiak Star, and one secondary payload (Quiktoms), which was not successfully deployed. In fiscal 2002, 10 primary payload missions and one secondary payload are planned to be launched. In fiscal 2003, nine primary payload missions and one secondary payload are planned to be launched.

Investments and Support -- $1,178,2 million

A new Budget Line Item (BLI) was established in fiscal 2001 to ensure NASA's rocket-propulsion test capabilities are properly managed and maintained in world-class condition. The Rocket Propulsion Test Support Program is a consolidation of ongoing activities to achieve a more effective test program.

The Human Exploration and Development of Space Enterprise (HEDS) institutional support budget address two primary goals of this enterprise. The first goal is to recruit, train and maintain a civil service workforce that reflects the cultural diversity of the Nation. This workforce and related infrastructure are sized and skilled consistently with accomplishing NASA's research, development and operational missions for the Enterprise with innovation, excellence and efficiency. The second goal is to ensure that the facilities critical to achieving HEDS Enterprise goals are constructed and maintained to function effectively, efficiently and safely, and that NASA installations conform to requirements and initiatives for the protection of the environment and human health.

The HEDS institutional support budget funds requirements for civil service salaries, other personnel and related costs, travel and the necessary support for all administrative functions, and other basic services in support of research and development activities at NASA installations.

In addition, the HEDS institutional-support budget line funds construction-of-facility requirements for discrete projects required for components of the basic infrastructure and institutional facilities, and almost all are for capital repair. NASA facilities are critical for the HEDS Enterprise, to sustaining the future of aeronautics and advanced space transportation, which both support military and private industry users. NASA has conducted a thorough review of its facilities infrastructure, and has found that the deteriorating plant condition warrants an increased repair and renovation rate to avoid hazards to personnel, facilities and mission, and that some dilapidated facilities need to be replaced. Increased investment in facility revitalization is needed to maintain a facility infrastructure that is safe and capable of supporting NASA's missions.

The engineering and technical base (ETB) budget will continue to support the institutional capability in the operation of space flight laboratories, technical facilities and test-beds; to conduct independent safety and reliability assessments; and to stimulate science and technical competence in the United States. Also, funding to support additional academic program activities is provided in this budget.

IV. Space Communications and Data Systems Program -- $117.5 million

The program goal is to provide space communications and data services responsive to customer missions at the lowest cost to the Agency. This is done by providing integrated solutions to operational communications and information-management needs of all NASA strategic enterprises. Space communications and data services are provided by NASA's Space Network, Deep Space Network, Ground Network, Wide Area Network and Western Aeronautical Test Range.

Communication services are conducted in the facilities provided by NASA at multiple locations both in the United States and at overseas sites. These services provide command, tracking and telemetry data services between the ground facilities and flight mission vehicles. This capability includes all the interconnecting telecommunications services to link tracking-and-data-acquisition network facilities, mission control facilities, data capture and processing facilities, industry and university facilities, and the investigating scientists.

The program performs infrastructure upgrades and replenishment efforts necessary to maintain the service capability that satisfy the approved mission model. The program conducts technology and standards infusion efforts to provide more efficient and effective services.

In line with the National Space Policy, the program is committed to seeking and encouraging commercialization of NASA communications services and to participate with NASA enterprises in collaborative inter-agency, international and commercial initiatives. The Space Communications and Data Systems Program budget structure consists of four components:

- Operations ($82.1 million)
- Mission and Data Services Upgrades ($1.4 million)
- Tracking and Data Relay Satellite System Replenishment ($16.5 million)
- Technology ($17.5 million)

The budgets of other strategic enterprises contribute to the Space Communications and Data Systems program.

Beginning in FY 2003, a decentralized management approach is being implemented that involves transferring management functions previously performed by the Space Operations Management Office (SOMO) at the Johnson Space Center to Headquarters. The transition process begins in fiscal 2002 with the transfer of certain technology infusion and upgrades tasks and project-unique capabilities to the appropriate enterprises. Beginning in fiscal 2003, the Deep Space Network, Ground Network, Space Network and Western Aeronautical Test Range and their associated budgets will be managed by individual NASA enterprises. The Space Communications Office at Headquarters will manage and direct an integrated Agency-wide Space Communications and Data Systems program, perform overall program integration and continue management of the Consolidated Space Operations Contract (CSOC).

The CSOC is now in its fourth year of providing end-to-end space-operations mission and data services to both NASA and non-NASA customers. Data Services metrics indicate the contractor continues to acquire and deliver user data above expectation. In fiscal 2001, in order to be more responsive to customer needs, CSOC implemented a decentralized contract approach to streamline CSOC decision-making at NASA performing centers.

The TDRSS replenishment project is proceeding well. The TDRS-8 spacecraft was launched successfully on June 30, 2000, with on-orbit checkout completed in September 2000. The spacecraft is operational and meets all user service telecommunications performance requirements except for the Multiple Access (MA) system, which has a performance shortfall. Modifications to the TDRS-I and -J spacecraft flight hardware and test program as a result of the MA anomaly have been implemented. TDRS-I launch is now planned for March 2002. The launch of TDRS-J is slated for October 2002.

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