

**HUMAN SPACE FLIGHT**  
**FISCAL YEAR 2002 ESTIMATES**  
**BUDGET SUMMARY**

**OFFICE OF SPACE FLIGHT**

**PAYLOAD AND ELV SUPPORT**

**SUMMARY OF RESOURCES REQUIREMENTS**

|                                                           | <u>FY 2000</u><br>OPLAN<br><u>REVISED</u> | <u>FY 2001</u><br>OPLAN<br><u>REVISED</u> | <u>FY 2002</u><br>PRES<br><u>BUDGET</u> | <u>Page</u><br><u>Number</u> |
|-----------------------------------------------------------|-------------------------------------------|-------------------------------------------|-----------------------------------------|------------------------------|
|                                                           |                                           | (Thousands of Dollars)                    |                                         |                              |
| Payload Carriers and Support.....                         | [49,300]                                  | 56,875                                    | 57,000                                  | HSF 4-3                      |
| Expendable Launch Vehicle Mission Support.....            | [30,600]                                  | 33,127                                    | 34,300                                  | HSF 4-6                      |
| Total.....                                                | <u>[79,900]</u>                           | <u>90,002</u>                             | <u>91,300</u>                           |                              |
| <br><u>Distribution of Program Amount by Installation</u> |                                           |                                           |                                         |                              |
| Johnson Space Center .....                                | [1,300]                                   | 1,300                                     | 1,300                                   |                              |
| Kennedy Space Center .....                                | [64,802]                                  | 74,502                                    | 75,174                                  |                              |
| Marshall Space Flight Center .....                        | [3,800]                                   | 3,300                                     | 3,426                                   |                              |
| Glenn Research Center .....                               | [139]                                     | --                                        | --                                      |                              |
| Goddard Space Flight Center.....                          | [9,824]                                   | 10,900                                    | 11,400                                  |                              |
| Jet Propulsion Laboratory .....                           | [35]                                      | --                                        | --                                      |                              |
| Total.....                                                | <u>[79,900]</u>                           | <u>90,002</u>                             | <u>91,300</u>                           |                              |

Note: Both of these projects were previously funded in the Payload Utilization and Operations budget line item in FY 2000. Beginning in FY 2001, these projects are funded from this budget line item.

**PROGRAM GOALS**

The Payload and ELV Support comprises two programs: Payload Carriers and Support and Expendable Launch Vehicle (ELV) Mission Support. Payload Carriers and Support provides technical expertise, facilities, flight carrier hardware and capabilities

necessary to perform payload buildup; test and checkout; integration and servicing of multiple payloads; transportation to the Space Shuttle; integration and installation into the Space Shuttle; post landing retrieval and de-integration of payloads.

Expendable Launch Vehicle (ELV) Mission Support has four goals. They are: (1) enhance probability of mission success and on-time cost effective launch services for NASA missions undertaken in support of NASA's strategic plan; (2) provide comprehensive advanced mission analysis and feasibility assessments for NASA payload customers; (3) increase efficiency in launch site operations and countdown management; and (4) provide low-cost secondary payload opportunities.

### **STRATEGY FOR ACHIEVING GOALS**

The principal areas of activity in the Payload and ELV Support programs are: 1) provide safe and efficient payload preparations and launch and landing services while reducing costs of Space Shuttle and ELV-related services; and 2) provide mission planning, integration and processing for science application missions.

The Payload and ELV Support budget reflects a commitment to accommodate a wide array of projects ranging from science missions, flight hardware development and integration, and space flight safety projects. It also maintains an institutional base from which to perform NASA programs at reduced cost through re-engineering, consolidation and operational efficiency processes.

**BASIS OF FY 2002 FUNDING REQUIREMENT**

**PAYLOAD CARRIERS AND SUPPORT**

|                                        | <u>FY 2000</u> | <u>FY 2001</u>         | <u>FY 2002</u> |
|----------------------------------------|----------------|------------------------|----------------|
|                                        |                | (Thousands of Dollars) |                |
| Payload Carriers and Support . . . . . | [49,300]       | 56,875                 | 57,000         |

**PROGRAM GOALS**

The primary goal for Payload Carriers and Support is to safely and efficiently assemble, test, checkout, service, and integrate a wide variety of Space Shuttle spacecraft and space experiments.

**STRATEGY FOR ACHIEVING GOALS**

The Payload Carriers and Support program provides the technical expertise, facilities and capabilities necessary to perform payload buildup; test and checkout; integration and servicing of multiple payloads; transportation to the launch vehicle; integration and installation into the launch vehicle; post-landing retrieval, and de-integration of payloads. Operational efficiencies have been achieved that reduced processing time and error rate. Additional efficiencies under development are anticipated to further reduce cost and improve customer satisfaction.

Payload Carriers and Support also funds smaller secondary payloads like the Get-Away Specials (GAS) and Hitchhiker payloads that are managed at Goddard Space Flight Center (GSFC). The GAS payloads are research experiments that are flown in standard canisters, which can fit either on the sidewall of the cargo bay or across the bay on the GAS bridge. They are the simplest of the small payloads with limited electrical and mechanical interfaces. Approximately 158 GAS payloads have been flown. The Hitchhiker payloads are the more complex of the smaller payloads, and provide opportunities for larger, more sophisticated experiments. The Hitchhiker system employs two carrier configurations: (1) a configuration on the Orbiter payload bay sidewall and (2) a configuration across the payload bay using a Multi-Purpose Experiment Support Structure (MP ESS). During the mission, the Hitchhiker payloads can be controlled and data can be received using the aft flight deck computer/standard switch panels or from the ground through the Payload Operations Control Center (POCC).

Payload analytical integration is the responsibility of the Flight Projects Directorate at the Marshall Space Flight Center (MSFC), supported by a contract with Boeing. Physical payload integration and processing is the responsibility of the Space Station and Shuttle Payloads Directorate at the KSC, also supported by a contract with Boeing.

Another item funded in Payload Carriers and Support is the Flight Support System (FSS) at the Goddard Space Flight Center. The FSS consists of three standard cradles with berthing and pointing systems along with avionics. It is used for on-orbit maintenance, repair, and retrieval of spacecraft. The FSS is used on the Hubble Space Telescope (HST) repair/revisit missions.

**MEASURES OF PERFORMANCE**

|                                                       | FY 2000     |               | FY 2001     |                | FY 2002     |
|-------------------------------------------------------|-------------|---------------|-------------|----------------|-------------|
|                                                       | <u>Plan</u> | <u>Actual</u> | <u>Plan</u> | <u>Revised</u> | <u>Plan</u> |
| <u>Missions Supported</u>                             |             |               |             |                |             |
| Space Shuttle Missions                                | [6]         | [4]           | 9           | 7              | 7           |
| Hitchhiker Experiments, includes CAP/SEM/HH Jr.       | [2]         | [3]           | 7           | 6              | 2           |
| Get-Away Special Payloads                             | [0]         | [1]           | 2           | 2              | 8           |
| Spacehab Missions                                     | [1]         | [2]           | 1           | 1              | 0           |
| Other Major Payloads                                  | [6]         | [4]           | 13          | 20             | 13          |
| Other Secondary Payloads                              | [7]         | [8]           | 1           | 8              | 2           |
| Multi-Purpose Experiment Support Structure (MP ESS)   |             |               |             |                |             |
| Pallets                                               | [3]         | [3]           | 5           | 4              | 3           |
| <u>Number of Payload Facilities Operating at KSC</u>  | [5]         | [5]           | 5           | 6              | 5           |
| <u>KSC Payload Ground Operations (PGOC) Workforce</u> | [308]       | [258]         | 334         | 302            | 322         |

**ACCOMPLISHMENTS AND PLANS**

Prior to FY 2001, the Payload Carriers and Support budget was contained in the Payload Utilization and Operations budget line item. Details on FY 2000 activity can be found in this section.

In FY 2001, Payload Carriers and Support will provide the FSS and a pallet, integration and testing support activities in preparation for HST Servicing Mission 3B. Launch and landing payload support activities include eight planned Space Shuttle Missions, encompassing payload processing support activities and facilities for 20 major payloads, including seven ISS assembly and utilization flights. A number of secondary payloads will also be supported. A Multi-Purpose Experiment Support Structure was modified to better utilize available volume of the Space Shuttle Payload Bay for scientific secondary payloads and to support ISS Launch-on-Need requirements. O&M of Payload Facilities at KSC is provided. The Vertical Processing Facility will remain closed until needed later in the year for payload processing to support the HST Servicing Mission 3B. After HST 3B requirements are fulfilled, further utilization of the VPF will be reviewed. Funding includes Construction of Facility funding in the amount of \$200,000 for facility planning and design for future projects. It is planned that reimbursable funds of \$1,059,000 will be received in FY 2001 to cover processing costs for GAS and Hitchhiker payloads.

In FY 2002, Payload Carriers and Support will provide the FSS and a pallet, integration and testing support activities for HST Servicing Mission 3B. Launch and landing payload support activities include 7 planned Space Shuttle Missions, encompassing

payload processing support activities and facilities for 13 major payloads, including 5 ISS assembly and utilization flights. A number of secondary payloads and ISS Launch- on-Need ORUs will also be supported. Operations and maintenance of payload facilities at KSC will be provided. Funding includes a Construction of Facility project in the amount of \$750,000 for repair and modernized Heating Ventilation and Air Condition (HVAC) for the Payload Hazardous Support Facility (PHSF), Building M7-1354 and an additional \$100,000 is for facility planning and design for future projects.

**BASIS OF FY 2002 FUNDING REQUIREMENT**

**EXPENDABLE LAUNCH VEHICLE SUPPORT**

|                                             | <u>FY 2000</u> | <u>FY 2001</u>         | <u>FY 2002</u> |
|---------------------------------------------|----------------|------------------------|----------------|
|                                             |                | (Thousands of Dollars) |                |
| Expendable Launch Vehicle Support . . . . . | [30,600]       | 33,127                 | 34,300         |

**PROGRAM GOALS**

The goals of the Expendable Launch Vehicle (ELV) mission support program are to: (1) enhance probability of mission success and on-time cost effective launch services for NASA missions undertaken in support of NASA's strategic plan; (2) provide comprehensive advanced mission analysis and feasibility assessments for NASA payload customers; (3) increase efficiency in launch site operations and countdown management; and (4) provide low-cost secondary payload opportunities.

**STRATEGY FOR ACHIEVING GOALS**

In FY 1999, NASA consolidated ELV management and acquisition of launch services at Kennedy Space Center (KSC). KSC is responsible for acquiring requisite launch services to meet all Enterprise requirements and for increasing the probability of mission success through focused technical oversight of commercially provided launch services. A core team of civil servants and contractors primarily located at KSC performs the technical management. KSC personnel are also resident at key launch sites, launch facilities and customer facilities. NASA personnel are resident at Vandenberg AFB in California where all launches into a polar orbit, such as those required by the Earth Science Enterprise, are conducted. Resident office personnel are located in launch service contractor plants, specifically, the Lockheed Martin Corporation Atlas Centaur plant in Denver and the Boeing Corporation Delta plant in Huntington Beach, California. KSC customer offices have been established at GSFC and JPL as the centers assigned program management responsibility for the majority of Space Science and Earth Science missions requiring access to space via NASA-provided 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 ELV's. Technical launch vehicle support is provided in the development and evaluation of spacecraft Announcement of Opportunities, to enable cost effective consideration of launch service options and technical compatibility. Early definition of vehicle requirements enables smooth transition to launch service and an excellent cost containment strategy.

Launch site operations and countdown management is being improved through the use of a consolidated launch team, efficient telemetry systems, and close partnership with Boeing and the USAF to assure lowest cost west coast Delta launch complex operations.

NASA's ELV secondary payload program enables efficient use of excess vehicle performance on selected NASA, USAF and commercial missions through funding integration of small secondary payloads. These payloads are sponsored by university research institutions and often international cooperatives which can take advantage of available limited excess space and performance on launch vehicles and accept the primary payload's launch schedule and orbit. NASA has developed a standard Delta secondary launch vehicle capability and has similar discussions under way with other US ELV providers.

**MEASURES OF PERFORMANCE**

| <u>Missions Supported</u> | <u>FY 2000</u> |               | <u>FY 2001</u> |                | <u>FY 2002</u> |
|---------------------------|----------------|---------------|----------------|----------------|----------------|
|                           | <u>Plan</u>    | <u>Actual</u> | <u>Plan</u>    | <u>Revised</u> | <u>Plan</u>    |
| Primary ELV Missions      | [9]            | [6]           | 11             | 10             | 8              |
| Secondary ELV Payloads    | [5]            | [1]           | 1              | 2              | 1              |
| Total Missions Supported  | [14]           | [7]           | 12             | 12             | 9              |

**ACCOMPLISHMENTS AND PLANS**

The ELV Sustaining effort will support launch site maintenance and sustaining operations at Vandenberg AFB and Cape Canaveral Air Station. It will also support technical insight across all launch vehicle classes (Small, Med-Lite, Medium, Intermediate and NLS).

Support is also included for 10 primary payload missions (including HETE-II, EO-1/SAC-C, HESSI, GENESIS, Odyssey, TIMED/JASON, GOES-M, MAP, AQUA, Kodiak Star) and 2 secondary payloads (QUIKTOMS, PROSEDS) to be launched in FY 2001.

In addition, support for 8 primary payload missions (including NOAA-M, GALEX, ICESAT/CATSAT, SCISAT, SORCE, CONTOUR, SIRTf, TDRS-I) and 1 secondary payload (CHIPS) to be launched in FY2002. This also supports the assessment of necessary modification and/or replacement of the NASA Operations Center at Vandenberg Air Force Base, CA.

In FY 2000, the NASA Launch Services (NLS) procurement for purchasing launch services for future NASA missions – including potential Space Station re-supply missions was competed. This contract provided for awards to multiple contractors with vehicles with demonstrated flight history. Two additional competitions are supported in this request. In FY2001/FY2002, the Next Generation Launch Services (NGLS) contracts will be competed. Next Generation Launch Services (NGLS) will enable emerging launch services companies, with little or no flight history, to compete for offering launch services to NASA. A Procurement Development Team (PDT)/Source Evaluation Board (SEB) was formed to compete the new Mission Support contract for ELV Integrated Services (ELVIS).

The NLS and NGLS procurements, in addition to the existing Small ELV (SELV) contracts will be used for the Alternative Access element of the Space Launch Initiative, for which funding began in FY 2001 in the SAT account. Alternative Access funding is intended to enable NASA to establish and use alternative means of access to the International Space Station. These funds will be used to purchase services, however, in the near-term they may support technology development or operational technology demonstrations to help enable near term commercial launch systems that could service space station. Alternative access could provide important benefits, including contingency capability, operational flexibility, increased competition, near-term flight opportunities, and development of capabilities to meet station-unique needs. The OSF ELV Program will continue to work closely

with OAST on Alternative Access and NASA envisions that funding for Alternative Access may be transferred from the SAT account to the HSF account in the future.

FY2001 funding includes construction of facility funding of \$200,000 for facility planning and design for future projects. FY 2002 funding includes two construction of facility projects totaling, \$1,950,000: (1) Modernize Launch Vehicle Data Center at Vandenberg Air Force Base, CA in the amount of \$1,200,000 and (2) Upgrade Mobile Service Tower and Pad Lighting, at the Vandenberg Launch Site Space Launch Complex-2 in the amount of \$750,000. It is planned that reimbursable funds of \$9,559,000 will be received in FY 2001 to cover processing costs for the Picosat payloads to be flown on an Athena-1 launch vehicle and \$571,000 will be received in FY 2002 to cover processing costs for secondary payloads.