National Aeronautics and
Space Administration
Office of the Administrator
Washington, DC 20546-0001

May 10, 2005

The Honorable Richard Shelby
Chairman
Subcommittee on Commerce, Justice, and Science
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

The purpose of this letter is to submit to the Committee a comprehensive update to NASA's FY 2005 Operating Plan, last updated for urgent funding requirements for three programs within NASA's Science Mission Directorate by letter dated April 28, 2005. This letter also provides an update to the FY 2004 Operating Plan, last updated on December 23, 2004.

Aggregate NASA funding in this FY 2005 Operating Plan update is unchanged, at $16,196.4 million. The following table displays a comparison of the FY 2005 budget from the President's request through all updates.

FY 2005 Operating Plan—May 2005 Update (in millions of dollars)

	NASA FY 2005 Budget Request	Initial FY 2005 Operating Plan	April FY 2005 Operating Plan	NASA Changes	May FY 2005 Operating Plan
TOTAL NASA	**16,244.0**	**16,196.4**	**16,196.4**		**16,196.4**
Science, Aeronautics & Exploration	7,760.0	7,680.8	7,680.8	-61.6	7,619.2
Exploration Capabilities	8,456.4	8,484.2	8,484.2	+61.6	8,545.8
Inspector General	27.6	31.3	31.3		31.3

First, and most importantly, I want to thank the Committee for providing NASA with additional flexibility in the FY 2005 appropriations bill to address the challenges in

executing NASA's FY 2005 budget. It is my pledge to keep the Committee fully informed regarding how the Agency spends the funds provided.

With this Operating Plan update, NASA is fully funding – within our FY 2005 budget – the $762 million increase for returning the Space Shuttle safely to flight, consistent with the recommendations from the Columbia Accident Investigation Board (CAIB), over $400 million in Congressionally-directed items, $291 million for Hubble servicing, and over $500 million in necessary programmatic cost increases. However, identifying the nearly $2 billion in offsets needed to fund those items—including more than $1 billion in this Operating Plan update—has created some difficult choices for the Agency. Given a choice, my preference as Administrator is to eliminate lower-priority programs rather than reducing all programs in the face of budget difficulties, to maintain efficient execution of the programs which remain. Delays and deferrals inevitably lead to increased life cycle costs and erode the overall performance of the Agency's programs. Thus, NASA must set clear priorities to remain within the budget which has been allocated.

Allow me to be as clear as possible on what the impact of these costs mean to other programs. The Agency has adopted a "go-as-you-can-pay" approach toward space exploration, so several NASA missions will need to be delayed, deferred, cancelled, or their objectives accomplished in other ways in order to ensure adequate funding for the clear directions and priorities in FY 2005 of the President and the Congress. We have tried to be sensitive to the priorities of the affected research communities and have listened carefully to their input. For example, we will seek to balance planetary science, Earth science, solar physics, and astronomy within the overall science program by revisiting our Mars exploration program strategy and mission sequence. Deferring the Mars Science Laboratory (MSL) two years to 2011 is an option in this review. (If the review concludes that MSL should remain on schedule for launch in 2009, reductions will be taken from other missions in formulation in future operating plan updates and/or the FY 2007 budget request.) In order to preserve the option to service the Hubble Space Telescope and provide for a safe deorbit, this Operating Plan defers work on more advanced space telescopes like the Space Interferometer Mission (SIM) and Terrestrial Planet Finder (TPF). These and other adjustments are discussed in greater detail in the Enclosures.

Changes in this FY 2005 Operating Plan update include:

- Identification of offsets to fund the remaining $287.2 million of the estimated $762.0 million in emergent FY 2005 requirements for Return to Flight (RTF) and Columbia Accident Investigation Board (CAIB)-related activities; the initial Operating Plan funded $474.8 million.
- Identification of offsets totaling $423.0 million, after application of the across-the-board rescission directed in the FY 2005 Consolidated Appropriations Act (P.L. 108-447), to fund all Congressionally-directed items included in the Conference Report (House Report 108-792), which NASA is required to absorb

within the $16,196.4 million appropriation, from funding for ongoing and planned Agency programs.

- Funding adjustments for a number of programmatic increases, within funding levels by Mission Directorate, resulting from requirements internal to specific programs and projects.
- Realignment of management and funding responsibility for several programs—Hubble servicing and de-orbit, the Robotic Lunar Exploration Program, and ISS Cargo/Crew Services—to clarify program authority and responsibility.
- Distribution of remaining Space Launch Initiative (SLI) Transition Activities funding to realign remaining civil service workforce and related support from legacy SLI programs to other Mission Directorate programs, as planned.
- Reassignment of a small number of Congressional interest items from one Mission Directorate to another, based upon program content.
- A net transfer of $61.6 million from the Science, Aeronautics and Exploration appropriations account to the Exploration Capabilities appropriations account as a result of the transfer of funding to accommodate RTF requirements, preserve the option for Hubble servicing, and distribution of SLI transition funds.

A comparison of the most recent FY 2005 Operating Plan (April 28, 2005 update) with this Operating Plan update is provided in Enclosure 1. Congressional interest items are displayed in Enclosure 2, including the reassignments from one Mission Directorate to another, as noted above. Enclosure 3 provides a detailed explanation of the changes within the appropriations accounts. Enclosure 4 provides a summary comparison at the Theme level, from the President's FY 2005 budget request through each of the FY 2005 operating plan updates, summarizing the additions in this operating plan by the four categories of Shuttle RTF, Hubble servicing, unrequested Congressional interest items, and programmatic increases. Enclosure 5 displays a comparison of the most recent FY 2004 Operating Plan with the update provided in this letter. Enclosure 6 provides a detailed explanation of the changes in the FY 2004 Operating Plan update.

Several key features of NASA's May update to our FY 2005 Operating Plan are highlighted below.

Congressionally-Directed Items

Given the magnitude of the challenge to identify appropriations offsets to pay for Congressionally-directed items, NASA has endeavored since the initial Operating Plan to identify sources of funding for these items by Mission Directorate. As noted above, in this Operating Plan update, NASA has identified reductions within ongoing or planned programs to fund the total of $426.0 million in Congressionally-directed items in the Conference Report. In identifying these reductions to fully fund Congressionally-directed items, NASA has made every effort to avoid impacts to missions in development and to avoid funding solutions that would result in program delays and increases in life cycle costs. Consequently, the Agency has made difficult decisions in some instances to discontinue programs. In addition, based upon the comprehensive review of needed

offsets for Congressionally-directed items as well as other priority requirements, including Return to Flight and a potential Hubble Space Telescope servicing, NASA determined that the earlier decision to identify offsets for the $50.6 million in Education earmarks from non-Education sources was resulting in an unacceptable burden to the Mission Directorates, given the magnitude of the offsets they were already taking. Therefore, I have directed that offsets for Congressionally-directed items in Education be offset to the extent possible within the Education Program, consistent with the Conference Report and the approach being taken for offsetting unrequested Congressional items for all NASA's Mission Directorates.

The sources for the full $426.0 million in offsets, $423.0 million after application of the rescission, are identified in Enclosure 3. In summary, the offsets identified in this Operating Plan to pay for unrequested Congressional items are as follows:

- Space Science -$76 million
- Earth Science -$89 million
- Biological and Physical Research -$28 million
- Aeronautics -$88 million
- Exploration Systems -$94 million
- Education -$38 million
- Space Flight -$ 5 million
- Other -$ 5 million

NASA is releasing funds for Congressionally-directed items expeditiously, as proposals are received and evaluated. NASA is committed to working with FY 2005 earmark recipients to ensure that these directed activities contribute effectively to Agency priorities. Consistent with direction in the Conference Report, NASA will not charge general and administrative expenses "to Congressionally-directed spending on specific projects." The Agency will continue to charge full cost for all other programmatic direction included in the Conference Report.

Space Shuttle Return to Flight

NASA will return the Space Shuttle to flight as soon and as safely as possible, complete assembly of the ISS, and retire the Space Shuttle by 2010.

As identified in the initial FY 2005 Operating Plan, emergent FY 2005 RTF and CAIB-related funding requirements are estimated to be $762.0 million. The initial FY 2005 Operating Plan provided $474.8 million in FY 2005 for RTF requirements that had been approved for implementation by the Program Requirements Change Board and verified by the RTF Planning Team at that time. The $474.8 million was accommodated through redirection of resources from the Shuttle Service Life Extension Program (-$170.0 million), International Space Station (-$160.0 million), Exploration Systems (-$46.0 million), and Space Launch Initiative Transition (-$98.8 million).

This FY 2005 Operating Plan update identifies offsets for the remaining $287.2 million in emergent FY 2005 RTF and CAIB-related activities, accommodated through reductions as outlined in Enclosure 3, as follows:

- Space Science (-$20.0 million);
- Earth Science (-$35.0 million);
- Biological and Physical Research (-$73.0 million);
- Exploration Systems (-$158.0 million); and,
- Space and Flight Support (-$1.2 million).

NASA will continue to closely monitor Shuttle costs, and expects to establish updated RTF and CAIB-related estimates for FY 2005 and beyond following the RTF flight planned for this summer. Current estimates could change based on the results of the two RTF missions and associated lessons learned. NASA will communicate revised estimates for RTF and CAIB-related estimates as soon as they are available, and will continue to keep the Committee apprised through updates of NASA's Implementation Plan for Space Shuttle Return to Flight and beyond.

Program Realignment

I have made a determination to realign the management responsibility of three programs to clarify program authority and responsibility.

- Management responsibility for a potential Shuttle servicing mission for the Hubble Space Telescope (HST) and de-orbit of HST is consolidated within the Science Mission Directorate. Additional detail regarding HST follows.

- Management responsibility for the Robotic Lunar Exploration Program (RLEP) is realigned to the Exploration Systems Mission Directorate because RLEP is on the critical path for informing critical design and operations decisions related to the new Exploration Architecture for human missions to the moon. NASA recognizes the synergy for both science and exploration represented by the RLEP and will continue to maximize the benefits. The Lunar Reconnaissance Orbiter (LRO) program will continue to be managed and developed as planned by the Goddard Space Flight Center (GSFC).

- Management responsibility for ISS Crew and Cargo Services is realigned to the Exploration Systems Mission Directorate. NASA continues to assess its future requirements for crew and cargo transportation in support of the ISS and future human exploration. ESMD will be developing the CEV to be capable of ferrying the next generation of astronauts to the Space Station, Moon, and Mars. The ISS requires cargo transportation to supplement the Space Shuttle and to conduct operations after retirement of the Space Shuttle, and future human exploration will require cargo transportation separate from the CEV. Realignment is based on these common requirements.

- ISS operations, including the international relationships, as well as acquisition of existing commercial launch services will remain the responsibility of the Space Operations Mission Directorate. ESMD will be responsible for developing and acquiring new ISS crew and cargo capabilities. The two Directorates will work together on strategies for meeting their respective requirements.

The budget for these activities will be the responsibility of the new management organizations, although funding is still shown in the original organization to avoid making structural changes to the FY 2005 budget in the year of execution.

Hubble Space Telescope

NASA's initial FY 2005 Operating Plan included $175.0 million to support FY 2005 Hubble Space Telescope (HST) expenses to date, near-term design work required to safely de-orbit HST, ongoing assessment of alternative servicing options, and to support efforts to reach the Preliminary Design Review (PDR) milestone.

Based on analysis of the relative risks immediately following the loss of Columbia, NASA decided not to proceed with a Shuttle servicing mission. NASA's decision not to service the Hubble was a very difficult one, given the Hubble's record of spectacular successes. That decision was made at a time when significant uncertainty remained, regarding the technical solutions and risks associated with return to flight. After the two successful Space Shuttle flights needed to achieve our return to flight objectives, NASA will have learned a great deal more regarding the risks and operations of the vehicle than was known when the previous decision was made. I am committed to reassess this earlier decision, after return to flight, based on the relative risks to the Space Shuttle as well as the costs and benefits to our Nation's astronomy program. As a result, we are continuing our efforts to preserve the option for a Shuttle servicing mission for Hubble in advance of that decision. Consistent with this ongoing activity, this FY 2005 Operating Plan update has fully funded the $291 million identified in the Conference Report accompanying the FY 2005 Consolidated Appropriations bill, and has consolidated the funding and management responsibility within the Science Mission Directorate. NASA will use the balance of the FY 2005 funds to maintain options for servicing and deorbit of HST. NASA has also begun the analysis of how a de-orbit module for the Hubble Space Telescope could be added to the manifest of such a Space Shuttle servicing mission. I will make a decision regarding a Shuttle servicing mission for Hubble following the first two successful Return to Flight missions. In the interim, the agency will keep all stakeholders apprised as this work progresses.

Exploration Systems

I have initiated an Exploration Systems Architecture Study, to be completed by mid-July to support a number of key near-term decisions for NASA, the White House, and Congress. We will keep Congressional Committees informed as this study effort progresses. This architecture study will focus on four primary areas.

- Complete assessment of the top-level Crew Exploration Vehicle (CEV) requirements and plans to enable the CEV to provide crew transport to the ISS and to accelerate the development of the CEV and crew-launch system to reduce the gap between Shuttle retirement and CEV initial operating capability (IOC);
- Definition of top-level requirements and configurations for crew and cargo launch systems to support the lunar and Mars exploration programs.
- Development of a reference lunar exploration architecture concept to support sustained human and robotic lunar exploration operations.
- Identification of key technologies required to enable and significantly enhance these reference exploration systems and a reprioritization of near-term and far-term technology investments.

Biological and Physical Research

As reported in the initial FY 2005 Operating Plan, NASA has been engaged in an ongoing Zero Base Review of the Biological and Physical Research (BPR) portfolio to ensure that future investments are aligned with exploration objectives and that biological and physical research planned for the ISS is driven by the unique capabilities of the ISS. The objective of the review is to prioritize our needs for each phase of the planned exploration strategy, and to rebalance the research portfolio accordingly.

The Zero Base Review has been completed. The Review employed a methodical, disciplined process to align research tasks to exploration requirements, and was informed by NASA medical policies and the National Academies-reviewed Bioastronautics Roadmap. The review identified critical research priorities to reduce risk for long-duration human spaceflight, and has given NASA confidence that a significant part of on-going BPR research directly supports the Vision. However, certain tasks will be discontinued, others will be augmented, and still new ones will be started in order to fill critical research gaps in high priority areas identified during the review. These high-priority areas include space radiation health and shielding, advanced environmental control and monitoring, advanced extra-vehicular activities, human health and countermeasures, advanced life support, exploration medical care, and space human factors. The highest priorities for research on ISS have been identified as medical research with human subjects and microgravity validation of environmental control and life support technologies. Lower-priority tasks, which are now subject to reduced funding, include basic research using model organisms (such as cells or rodents), and fundamental research in physics, material science, or basic combustion – with no direct link to exploration requirements. Many of the changes identified in this Operating Plan update reflect the results of this study, including phasing out research in an orderly manner to avoid undue hardship to grantees, industry, or Centers.

Additional refinement to the research and development portfolio may take place in the future as a result of an ongoing study to determine the appropriate definition of ISS complete that is also compatible with a Shuttle retirement by 2010.

Project Prometheus

This Operating Plan reflects funding adjustments in Project Prometheus consistent with the President's FY 2006 request that defers the Jupiter Icy Moons Orbiter demonstration. The technology and capabilities being developed by the Prometheus Nuclear Systems and Technology Theme are critical for enabling the power and propulsion needs of the Vision for Space Exploration. As part of the Agency's effort to define an Exploration Systems Architecture, NASA will examine alternative nuclear systems, including surface nuclear power, nuclear thermal, and nuclear electric systems. NASA will restructure Project Prometheus for space-qualified nuclear systems to support human and robotic missions with clear priorities focused on near-term needs. We expect to make program decisions to focus our nuclear technology efforts on our highest priorities for the near-term applications as part of the Exploration Architecture study, to be completed this summer.

Workforce and NASA's Field Centers

While competitive processes are crucial to maintaining NASA at the "cutting edge" of science and technology, we must acknowledge that the NASA Centers and other Federal research and development laboratories exist, and have existed for decades, precisely because industrial competition does not serve to accomplish all of our national goals. In order to accomplish the national goals set forth by the President and Congress, NASA must set realistic priorities with limited resources. NASA centers will have an important role in definition of the architecture and requirements for exploration beyond low Earth orbit, and for the systems engineering and integration functions in building the systems of that architecture. We will continue to assess the skill-mix that we require, the number of people we require, where they will be, and how we are organizing ourselves to fulfill our obligations to the President and Congress. To begin to create some of the workforce flexibility necessary for the future, NASA has offered voluntary separation incentives (buyouts) to employees in positions identified with excess competencies.

Earlier this fiscal year, the Agency conducted buyouts at five NASA Centers in a continuing effort to meet our objective to rebalance and reshape the workforce with the competencies necessary to meet the challenges of our mission. As we move forward, the mix of skills required for past programs is not completely aligned with what we need for future missions. To begin reshaping the workforce, NASA's Ames Research Center, Glenn Research Center, Langley Research Center, Dryden Flight Research Center, and Marshall Space Flight Center offered voluntary separation incentives (buyouts) to their employees in positions identified with excess competencies. Voluntary early retirement authority also is available to complement the buyout offer. Although 325 employees accepted the buyout offer, the level of voluntary attrition was not sufficient to allow NASA to rebalance fully its competencies to the extent necessary to ensure optimum staffing in key areas.

A second round of buyouts was offered this spring to an expanded population across the NASA Centers and Headquarters. Primarily, the Agency is offering buyouts to

employees in positions in competencies no longer needed or needed in smaller numbers. To date, 240 employees have taken advantage of the Round 2 buyout offer, with another 80 separations planned over the next several months.

In addition to "regular" buyouts, incentives are being offered to create placements for employees in excess competency areas. Johnson, Kennedy, Goddard, and Headquarters are opening buyout opportunities to a broad range of employees. Managers then locate an employee at another Center whose position is in the surplus competency, and if a good match is found, a job offer is made and the transfer and buyout is approved. This phase of buyouts is ongoing through the end of the fiscal year. We hope to achieve several dozen buyout/placements through this process.

I look forward to working with the Committee on the implementation of this FY 2005 Operating Plan update.

Cordially,

Michael D. Griffin
Administrator

6 Enclosures

NASA FY 2005 Operating Plan *($ millions)*	April Operating Plan Update	Changes	May Operating Plan Update
TOTAL	**16,196.4**	**0.0**	**16,196.4**
SCIENCE, AERONAUTICS AND EXPLORATION	**7,680.8**	**-61.6**	**7,619.2**
SPACE SCIENCE	**4,067.8**	**-52.9**	**4,014.8**
SOLAR SYSTEM EXPLORATION (SSE)	**1,125.1**	**30.6**	**1,155.7**
DEVELOPMENT	297.1	2.6	299.8
MESSENGER DEVELOPMENT	0.0	0.0	0.0
DEEP IMPACT DEVELOPMENT	24.6	0.0	24.6
DAWN DEVELOPMENT	83.2	2.6	85.8
NEW HORIZONS/PLUTO DEVELOPMENT	189.3	0.0	189.3
OPERATIONS	273.1	0.2	273.3
RESEARCH	356.1	43.1	399.3
TECHNOLOGY AND ADVANCED CONCEPTS	198.7	-15.3	183.4
FUTURE DISCOVERY	32.8	0.0	32.8
FUTURE NEW FRONTIERS	24.1	-8.6	15.5
IN-SPACE POWER & PROPULSION (ISP)	133.3	-4.4	128.9
OTHER TECHNOLOGY	8.5	-2.2	6.3
MARS EXPLORATION	**681.1**	**-101.7**	**579.4**
DEVELOPMENT	143.7	0.0	143.7
MARS RECONNAISSANCE ORBITER DEV	143.7	0.0	143.7
OPERATIONS	9.8	25.8	35.6
RESEARCH	60.3	-1.7	58.6
TECHNOLOGY AND ADVANCED CONCEPTS	467.3	-125.8	341.4
MARS 2007 SCOUTS	101.3	10.5	111.8
MARS 2009 SCIENCE LABORATORY	172.1	-71.7	100.4
2009 U.S. TELESAT	15.4	-6.3	9.1
OPTICAL COMM	55.0	-9.1	46.0
MARS PROGRAM PLANS & ARCHITECTURE & OTHER	111.3	-49.2	62.1
OTHER TECHNOLOGY	12.0	0.0	12.0
LUNAR EXPLORATION	52.0	**0.0**	**52.0**
TECHNOLOGY AND ADVANCED CONCEPTS	52.0	0.0	52.0
LUNAR EXPLORATION	52.0	0.0	52.0
ASTRONOMICAL SEARCH FOR ORIGINS (ASO)	**1,135.7**	**-37.5**	**1,098.2**
DEVELOPMENT	303.2	94.8	398.0
HST DEVELOPMENT	115.3	116.0	231.3
KEPLER DEVELOPMENT	125.4	-30.2	95.2
SOFIA DEVELOPMENT	62.5	9.0	71.5
OPERATIONS	22.4	6.8	29.2
RESEARCH	209.9	-29.3	180.6
TECHNOLOGY AND ADVANCED CONCEPTS	600.2	-109.8	490.4
SIM	142.9	-43.0	99.9
JAMES WEBB SPACE TELESCOPE (JWST)	313.6	-26.7	286.9
TPF	51.8	-11.2	40.6
KECK INTERFEROMETER	12.2	0.5	12.8
OTHER ASO TECH. & ADV CONCEPT	79.7	-29.4	50.3

Totals may not add due to rounding

NASA FY 2005 Operating Plan *($ millions)*	April Operating Plan Update	Changes	May Operating Plan Update
STRUCTURE & EVOLUTION OF THE UNIVERSE	**377.5**	**-0.5**	**376.9**
DEVELOPMENT	124.4	16.2	140.6
GLAST DEVELOPMENT	101.7	9.6	111.4
SEU SMALL DEVELOPMENT PROJECTS	19.5	6.6	26.1
SWIFT	3.1	0.0	3.1
OPERATIONS	4.2	0.8	5.1
RESEARCH	209.0	-1.9	207.1
TECHNOLOGY AND ADVANCED CONCEPTS	39.8	-15.7	24.1
CONSTELLATION-X	11.8	-2.1	9.7
LISA	18.7	-5.0	13.7
OTHER SEU TECH. & ADV CONCEPTS	9.3	-8.6	0.7
SUN-EARTH CONNECTION (SEC)	**696.4**	**56.2**	**752.6**
DEVELOPMENT	273.2	57.6	330.8
STEREO DEV	72.8	7.1	79.9
SOLAR DYNAMICS OBSERVATORY DEV	156.2	-19.2	136.9
THEMIS	0.0	56.9	56.9
SEC SMALL DEVELOPMENT PROJECTS	44.3	12.8	57.1
OPERATIONS	33.4	-9.7	23.7
RESEARCH	191.8	6.8	198.6
TECHNOLOGY AND ADVANCED CONCEPTS	198.0	1.5	199.5
NEW MILLENNIUM PROGRAM	65.8	0.0	65.8
SOLAR-TERRESTRIAL PROBES (STP)	14.9	1.8	16.7
LIVING WITH A STAR (LWS)	46.2	17.7	63.9
FUTURE EXPLORERS/OTHER	71.0	-18.0	53.0
EARTH SCIENCE	**1,459.4**	**79.4**	**1,538.8**
EARTH SYSTEM SCIENCE	**1,383.6**	**47.9**	**1,431.5**
DEVELOPMENT	248.0	37.0	285.0
EOS/AURA	9.1	0.0	9.1
EP/CALIPSO	15.2	0.0	15.2
NPP (from Formulation)	139.1	-0.7	138.4
EP/CLOUDSAT	8.1	0.0	8.1
EOSDIS	39.6	10.5	50.1
EO/GIFTS	7.6	0.0	7.6
OTHER DEVELOPMENT	29.1	27.3	56.4
OPERATIONS	306.6	10.1	316.8
RESEARCH	548.3	-3.7	544.5
TECHNOLOGY AND ADVANCED CONCEPTS	280.7	4.5	285.2
EARTH SCIENCE APPLICATIONS	**75.8**	**31.5**	**107.3**
RESEARCH	44.3	2.4	46.6
TECHNOLOGY AND ADVANCED CONCEPTS	31.5	29.2	60.7

Totals may not add due to rounding

NASA FY 2005 Operating Plan *($ millions)*	April Operating Plan Update	Changes	May Operating Plan Update
BIOLOGICAL AND PHYSICAL RESEARCH	**1,030.8**	**-106.2**	**924.6**
BIOLOGICAL SCIENCES RESEARCH	**481.6**	**-107.6**	**374.0**
DEVELOPMENT	3.5	-0.4	3.1
OPERATIONS	117.3	-30.9	86.4
RESEARCH	360.8	-76.4	284.4
PHYSICAL SCIENCES RESEARCH	**295.8**	**9.5**	**305.4**
DEVELOPMENT	33.2	-4.2	29.0
MATERIALS SCIENCE RESEARCH RACK - 1	7.4	5.9	13.3
FLUIDS & COMBUSTION FACILITY	16.8	-1.0	15.7
LO TEMP MICROGRAVITY PHYSICS FACILITY	9.1	-9.1	0.0
OPERATIONS	105.5	-32.8	72.7
RESEARCH	157.1	46.5	203.6
RESEARCH PARTNERSHIPS & FLIGHT SUPT	**253.4**	**-8.1**	**245.3**
OPERATIONS	230.1	-42.1	188.0
RESEARCH	23.3	34.0	57.3
AERONAUTICS	**906.2**	**55.8**	**962.0**
AERONAUTICS TECHNOLOGY	**906.2**	**55.8**	**962.0**
TECHNOLOGY AND ADVANCED CONCEPTS	906.2	55.8	962.0
AVIATION SAFETY & SECURITY PROGRAM	185.3	-2.3	183.0
Vehicle Safety Technologies	76.7	0.2	76.9
System Safety Technologies	21.1	0.2	21.3
Weather Safety Technologies	43.7	-2.1	41.6
A/C & Systems Vulnerability Mitigation	35.0	-1.3	33.7
Other	8.9	0.7	9.5
VEHICLE SYSTEMS PROGRAM	568.6	61.6	630.2
Quiet Aircraft Technology	71.1	15.4	86.5
Ultra Effiecient Engine Technology	87.0	6.7	93.7
Low Emissions Alternative Power	119.2	-13.5	105.6
Efficient Aerodynamic Shapes & Integration	67.0	42.6	109.6
Integrated Tailored Aerostructure	70.4	-14.4	56.0
Autonomous Robust Avionics	20.1	-1.8	18.3
Flight & System Demonstration	111.3	19.7	131.0
Strategic Vehicle Architecture	22.6	7.0	29.5
AIRSPACE SYSTEMS PROGRAM	152.2	-3.4	148.8
Small Aircraft Transportation System	16.4	0.5	16.9
Virtual Airspace Modeling & Simulation	29.5	-2.9	26.6
Efficient Aircraft Spacing	34.9	2.0	36.9
Efficient Flight Path Management	13.8	-2.5	11.3
Strategic Airspace Usage	7.0	5.4	12.4
Space-Based Technologies	18.3	-3.7	14.6
Human Measures & Performance	17.8	-3.1	14.8
Technical Integration	14.5	0.9	15.4
EDUCATION PROGRAMS	**216.7**	**-37.8**	**178.9**
ACADEMIC PROGRAMS	126.9	-18.7	108.2
MINORITY UNIV RESEARCH & EDUCATION	89.8	-19.1	70.7

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NASA FY 2005 Operating Plan *($ millions)*	April Operating Plan Update	Changes	May Operating Plan Update
EXPLORATION CAPABILITIES	**8,484.2**	**61.6**	**8,545.8**
EXPLORATION SYSTEMS	**1,653.8**	**-222.4**	**1,431.4**
HUMAN AND ROBOTIC TECHNOLOGY	**1,127.2**	**-117.8**	**1,009.5**
TECHNOLOGY AND ADVANCED CONCEPTS	1,127.2	-117.8	1,009.5
TECHNOLOGY MATURATION	100.0	-16.0	84.0
PROJECT PROMETHEUS	431.7	-161.4	270.3
ADVANCED SPACE TECHNOLOGY	337.7	19.8	357.5
INNOVATIVE TECH TRANS PARTNERSHIPS (ITTP)	159.1	39.8	198.9
CENTENNIAL CHALLENGE	9.7	0.0	9.7
HUBBLE SERVICING MISSION	89.0	0.0	89.0
TRANSPORTATION SYSTEMS	**526.5**	**-104.6**	**421.9**
TECHNOLOGY AND ADVANCED CONCEPTS	526.5	-104.6	421.9
CREW EXPLORATION VEHICLE	421.9	0.0	421.9
SPACE LAUNCH INITIATIVE (SLI)	104.6	-104.6	0.0
SPACE FLIGHT	**6,830.4**	**284.0**	**7,114.4**
SPACE STATION	**1,676.3**	**0.0**	**1,676.3**
DEVELOPMENT	131.8	10.5	142.3
ISS CORE DEVELOPMENT	102.6	-0.8	101.8
ISS CAPABILITY UPGRADES	29.2	11.3	40.5
OPERATIONS	1,544.5	-10.5	1,534.0
SPACECRAFT OPERATIONS	686.3	-10.2	676.1
LAUNCH & MISSION OPERATIONS	451.8	43.7	495.5
OPERATIONS PROGRAM INTEGRATION	308.4	-44.0	264.4
ISS CARGO/CREW SERVICES	98.0	0.0	98.0
SPACE SHUTTLE	**4,669.0**	**295.2**	**4,964.2**
DEVELOPMENT	60.0	-3.9	56.1
SSME ADV HEALTH MANAGEMENT (AHM)	1.7	2.9	4.6
COCKPIT AVIONICS UPGRADE (CAU)	58.3	-6.8	51.5
OPERATIONS	4,609.0	299.1	4,908.1
PROGRAM INTEGRATION	686.9	115.1	802.0
GROUND OPERATIONS	1,040.5	63.5	1,104.0
FLIGHT OPERATIONS	406.7	0.3	407.0
FLIGHT HARDWARE	2,348.9	120.2	2,469.1
KSC Hurricane Damages	126.0	0.0	126.0
SPACE & FLIGHT SUPPORT	**485.1**	**-11.2**	**473.9**
DEVELOPMENT	75.4	0.0	75.4
PLUMBROOK	30.1	0.0	30.1
ENVIRONMENTAL COMPLIANCE & RESTORATION	45.3	0.0	45.3
OPERATIONS	409.7	-11.2	398.5
INSPECTOR GENERAL	**31.3**	**0.0**	**31.3**

Totals may not add due to rounding

FY 2005 Unrequested Congressional Items

($ in millions)	Pre Rescission Total	Total (Post 0.8% Rescission)
AGENCY TOTAL *(including one in-kind earmark)*	**[426.04]**	**[422.63]**
AGENCY TOTAL	**421.04**	**417.67**
SCIENCE, AERONAUTICS AND EXPLORATION APPROPRIATION ACCOUNT	**321.19**	**318.62**
SPACE SCIENCE	**71.55**	**70.98**
- Living With a Star - Solar Probe Mission	5.00	4.96
- Living With a Star - Geospace	15.00	14.88
- Living With a Star - preliminary study of solar sentinels	5.00	4.96
- Living With a Star - Solar Terrestrial Probes MMS Mission	10.00	9.92
- Detroit Science Center	0.25	0.25
- Coca Cola Space Science Center in Columbus, Georgia to support the Space Science Center	0.15	0.15
- To increase NASA's payload capacity for space shuttle servicing missions	2.10	2.08
- Sacramento Space Science Center at California State University	0.50	0.50
- Telescope construction at the Pisgah Astronomical Research Center	1.00	0.99
- FTEs for NASA program office @ APL	2.00	1.98
- TPF		0.00
- Competitive advanced technology development program among universities & non-profit organizations	15.00	14.88
- University of Idaho for RTULP Electronics for Space Applications	1.00	0.99
- Utah State University in Logan, Utah for the Calibration Center	1.00	0.99
- University of Missouri at Rolla for the Advanced Millimeter Wave Inspection System program	0.30	0.30
- New Mexico State University for the ultra-long balloon program to augment planned flights and technology development	3.00	2.98
- Montana State University to purchase clean room systems and basic process equipment related to the microdevice fabrication facility	1.50	1.49
- Texas Tech University Experimental Sciences Initiative, Lubbock, Texas to promote advanced and interdisciplinary research	1.00	0.99
- Southern Methodist University Multifab Facility in Dallas, Texas to develop multifabrication manufacturing technology	1.00	0.99
- University of Arkansas, Fayetteville, Arkansas for the Arkansas-Oklahoma Center for Space and Planetary Sciences	1.00	0.99
- Montana State University-Bozeman for the Center for Studying Life in Extreme Environments	1.50	1.49
- Marshall University in Bridgeport, West Virginia for the continuation of NASA related composites workforce development training at the Composites Technology Institute	2.50	2.48
- University of Maryland, Baltimore County for photonics research	1.75	1.74

FY 2005 Unrequested Congressional Items

($ in millions)	Pre Rescission Total	Total (Post 0.8% Rescission)
AGENCY TOTAL *(including one in-kind earmark)*	**[426.04]**	**[422.63]**
AGENCY TOTAL	**421.04**	**417.67**
EARTH SCIENCE	**83.34**	**82.67**
- North Carolina Museum of Natural Sciences for NASA Earth Science integration planning	0.50	0.50
- Continuation of emerging research that applies remote sensing technologies to forest management practices at the State University of New York, College of Environmental Sciences and Forestry	0.50	0.50
- Advanced Interactive Discovery Environment engineering research program at Syracuse University	1.00	0.99
- Regional Application Center for the Northeast	3.00	2.98
- Institute for Scientific Research, Inc. for development and construction of research facilities	15.90	15.77
- On-going activities of the Goddard Institute for Systems, Software, and Technology Research, including mission design tools, Earth Science analysis, and remote sensing instrumentation development	1.50	1.49
- Goddard Space Flight Center's Clustering and Advanced Visual Environments Initiative	1.00	0.99
- University of California Center for Science and the Environment	1.00	0.99
- Hyper spectral remote sensing research and development at the Desert Research Institute	0.50	0.50
- Space Place	0.40	0.40
- Implementation of a remote data storage capability at NASA IV&V facility	4.50	4.46
- Earth Science Applications Program	15.00	14.88
- Synergy, including $1.4M for Battelle Pacific Northwest Laboratory's Infomart; not more than $1.5 to support the transition of Synergy Infomart activities to the ESE Application Division; and $12M through for extension of Synergy Data Pools	15.00	14.88
- Columbia project (ESS) - Upgrade the GSFC's Center for Computational Science [NCCS] (accomodated through in-kind transfer of equipment)	[5.0]	[4.96]
- Pearl River Community College in Mississippi for remote sensing, geographic information system and GPS training	0.39	0.39
- Idaho State University for the Temporal Landscape Change Research program	1.00	0.99
- University of Alaska for weather and ocean research	3.00	2.98
- Utah State University in Logan, Utah for the Intermountain region Digital Image Archive and Processing Center	1.00	0.99
- University of Northern Iowa for the GeoTREE project	0.75	0.74
- University of Texas Mid-American Geospatial Information Center at the UT Center for Space Research in Austin, Texas to continue information collection through satellite imaging	1.00	0.99
- Liberty Science Center, Jersey City, New Jersey for the Hudson Harbor and Estuary Ecological Learning Center	0.50	0.50
- University of Connecticut for the Center for Land Use and Education Research	0.75	0.74
- University of Vermont, Burlington for the Center for Advanced Computing	0.75	0.74
- Wallops Island Flight Facility for developing a standard small launch vehicle, universal FTS, doppler radar and launch modeling laboratory	5.40	5.36
- University of North Dakota in Grand Forks for the Northern Great Plains Space Sciences and Technology Center	2.00	1.98
- Integrated Sensing Systems at the Rochester Institute of Technology	1.50	1.49
- Upgrade High End Production Capability at the Goddard Space Flight Center to improve climate and weather research capabilities	2.00	1.98
- Little River Canyon Field School	3.50	3.47

FY 2005 Unrequested Congressional Items

($ in millions)	Pre Rescission Total	Total (Post 0.8% Rescission)
AGENCY TOTAL *(including one in-kind earmark)*	**[426.04]**	**[422.63]**
AGENCY TOTAL	**421.04**	**417.67**
BIOLOGICAL & PHYSICAL RESEARCH	**26.80**	**26.59**
- Space radiation research at the Loma Linda University Medical Center	3.00	2.98
- Northwestern University Institute for Proteomics and Nanobiotechnology	0.50	0.50
- Simulator for Injuries	0.40	0.40
- Michigan Research Center	1.25	1.24
- Gravitational space biology research at North Carolina State University	0.50	0.50
- National Center of Excellence in Bioinfomatics, in Buffalo NY	3.00	2.98
- University of Missouri at Columbia for the National Center for Gender Physiology studies on basic biomedical knowledge for the improvement of life on earth and solution of problems in human space flight	1.50	1.49
- Marshall Space Flight Center for propulsion materials microgravity research [OBPR]	5.00	4.96
- Alliance for Nanohealth, Houston, Texas to purchase equipment and conduct research on Nanotechnology and medicine	2.00	1.98
- University of Louisville Space Flight Exploration: The Impact on Perception, Cognition, Sleep and Brain Physiology Project at the University of Louisville in Louisville, Kentucky	2.00	1.98
- National Technology Transfer Center at Wheeling Jesuit University to transfer and adapt the Walter Reed Army Medical Center's Health Forces program, into medically underserved rural areas	1.00	0.99
- State University of Buffalo Center for Bioinformatics, Erie, New York	1.00	0.99
- Central NY Biotechnology Research Center, Syracuse NY	1.00	0.99
- State University of NY Downtown Medical Center, Brooklyn, for Adv Biotechology Incubator project	0.90	0.89
- Inland Northwest Space Alliance in Montana for the FreeFlyer program	3.00	2.98
- University of Montana in Missoula, Montana for the National Space Privatization Program	0.75	0.74

FY 2005 Unrequested Congressional Items

($ in millions)	Pre Rescission Total	Total (Post 0.8% Rescission)
AGENCY TOTAL *(including one in-kind earmark)*	**[426.04]**	**[422.63]**
AGENCY TOTAL	**421.04**	**417.67**
AERONAUTICS	**88.45**	**87.74**
- Intelligent Propulsion System Foundation Technologies (Propulsion 21) to continue research by the existing coalition of NASA, state government, industry, and academia	25.00	24.80
- Michigan Small Aircraft Transportation System	0.50	0.50
- Virginia Institute for Performing Engineerin and Research	3.00	2.98
- Virtual Systems Laboratory of the National Aviation Technology Center, School of Aviation, Dowling College, New York	0.70	0.69
- University of Toledo Turbine Institute	1.70	1.69
- Research Triangle Institute, International for Synthetic Vision SystemdCombined Vision Systems	0.60	0.60
- Research on Advanced Wireless Communications for Airport Applications	2.10	2.08
- To research Secure Automatic Dependent Surveillance Broadcast (ADS-B) Surveillance data link technology for enhanced aviation security'and general aviation airspace access	2.70	2.68
- Project SOCRATES	5.00	4.96
- National Aviation Technology Center at Dowling College, New York	1.00	0.99
- Development of an Aircraft Radio Guidance System (ARGUS) utilizing a new radio frequency interferometer that will provide 2 or 3 dimensional navigation guidance for airborne, space or surface vehicles	0.50	0.50
- Development of a Research Flight Computing System in support of the NASA Dryden Flight Research Center's Altairfiedator B UAV Technology Demonstrator Project	1.00	0.99
- Hydrogen Research Initiative	7.50	7.44
- Applied Polymer Technology Extension Consortium for research on polymers	1.00	0.99
- Continue design work on X-43C as follow-on to X-43A	25.00	24.80
- University of Missouri at Rolla for Aerospace Propulsion Particulate Emissions Reduction Program	2.30	2.28
- National Institute of Aviation Research in Kansas for icing research	1.00	0.99
- Wichita State University in Wichita, Kansas for the National Center for Advanced Materials Performance for composite materials research	2.00	1.98
- Glenn Research Center for the National Center for Communications, Navigation and Surveillance	1.00	0.99
- Iowa State University for the Center for Nondestructive Evaluation	1.00	0.99
- Chesapeake Information Based Aeronautics Consortium	3.00	2.98
- Florida Institute of Technology in Melbourne Florida for its Hydrogen, Fuel Cell & Sensor Technology Initiative	0.85	0.84

FY 2005 Unrequested Congressional Items

($ in millions)	Pre Rescission Total	Total (Post 0.8% Rescission)
AGENCY TOTAL *(including one in-kind earmark)*	**[426.04]**	**[422.63]**
AGENCY TOTAL	**421.04**	**417.67**
EDUCATION PROGRAMS	**51.05**	**50.64**
- National Space Grant College and Fellowship program	9.10	9.03
- Experimental Program to Stimulate Competitive Research (EPSCoR), for total of $12M	7.40	7.34
- SEMAA, for a total of $4.8M	0.30	0.30
- State of Alabama for the Alabama Math, Science, and Technology Initiative	0.50	0.50
- Education Training Center at the U.S. Space and Rocket Center	0.25	0.25
- Educational Advancement Alliance, to support the Alliance's K-12 math, science, and technology education enrichment program	2.00	1.98
- Albany State University Darton College in Albany, Georgia for the Science, Engineering, Math and Aerospace Academy program	0.40	0.40
- South Georgia Technical College in Americus, Georgia for the Science, Engineering, Math and Aerospace Academy program	0.25	0.25
- Albany State University in Albany, Georgia for project "Jumpstart" for a Math, Science Education Enhancement program for precollege students	0.25	0.25
- Georgia Project/ABAC College, Tifton, Georgia to implement a K-12 program for Hispanic students in science, engineering, math and aerospace in SW Georgia who struggle with English as a Second Language	0.25	0.25
- University System of Georgia Board of Regents, Atlanta, Georgia for purchase and implementation of a pre-testing software for math and science educational and career-related standardized test	0.40	0.40
- Georgia Southwestern College in Americus, Georgia for grants and scholarships in math and science for students implemented through the Multicultural Affairs Program	0.10	0.10
- New Science Center at St. Bonaventure's University in New York State	4.00	3.97
- JASON Foundation	2.00	1.98
- Challenger Learning Center in Cookeville, Tennessee	0.30	0.30
- Tennessee Technological Institute for the development of a Challenger Learning Center	1.00	0.99
- Hollins University for upgrades to its science infrastructure	0.25	0.25
- University of New England Marine Science Center	0.25	0.25
- Liberty Science Center	0.50	0.50
- National Center for Air and Space Law at the University of Mississippi	1.00	0.99
- Christa McAuliffe Planetarium in New Hampshire for the construction of the Alan Shepard Discovery Center	0.50	0.50
- Southeast Missouri State University for the NASA-ERC Initiative	0.50	0.50
- Texas A&M Space Engineering Institute in College Station, Texas to continue minority engineering outreach in conjunction with NASA	1.00	0.99
- Northern Kentucky University/University of Louisville for the Taking Astronomy to the Schools Project at Northern Kentucky University in Camp County, Kentucky	1.00	0.99
- US Space and Rocket Center in Huntsville, Alabama for education training equipment and the museum exhibit improvement program	0.75	0.74
- Sci-Quest, Northern Alabama Science Center for interactive immersive reality science laboratory	0.25	0.25
- Delaware Aerospace Education Foundation in Kent County, Delaware	0.75	0.74
- Chabot Space and Science Center in Oakland, California for The Future for Humans in Space Education Program	0.50	0.50
- Dominican U. San Rafael, CA for Center for Science and Technology for sci teacher training/education	0.25	0.25

FY 2005 Unrequested Congressional Items

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AGENCY TOTAL *(including one in-kind earmark)*	**[426.04]**	**[422.63]**
AGENCY TOTAL	**421.04**	**417.67**
- Rowan University, Pomona, New Jersey for the Engineering and Technology Satellite Campus	0.25	0.25
- Museum of Science and Industry in Chicago, Illinois for the Henry Crown Space Center	0.25	0.25
- Glendale Community College, California for the Cimmarusti Science Center's Teacher Training and Science Education Outreach Program	0.25	0.25
- Science Center of Iowa in Des Moines, Iowa	0.50	0.50
- Improvements to the Cooper Library at the University of South Carolina, Columbia, South Carolina	2.00	1.98
- College of Charleston, South Carolina for the School of Science and Mathematics	2.00	1.98
- Boston Museum of Science, Massachusetts for the National Center for Technology Literacy	1.00	0.99
- Space Education Initiative, Wisconsin for the Wisconsin Aerospace Education Initiative	0.75	0.74
- Mitchell Institute, Portland, Maine for science and engineering education	1.75	1.74
- Virginia Air and Space Museum, Norfolk, Virginia	1.00	0.99
- Griffith Observatory, Los Angeles, California	0.75	0.74
- University of Hawaii, Hilo for the Mauna Kea Astronomy Education Center	4.00	3.97
- Aerospace Education Center, Cleveland OH	0.35	0.35
- Morehouse College in Atlanta, Georgia to support the technology center	0.20	0.20

FY 2005 Unrequested Congressional Items

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AGENCY TOTAL *(including one in-kind earmark)*	**[426.04]**	**[422.63]**
AGENCY TOTAL	**421.04**	**417.67**
EXPLORATION CAPABILITIES APPROPRIATION ACCOUNT	**93.35**	**92.60**
EXPLORATION SYSTEMS	**93.35**	**92.60**
- Innovative Tech Transfer Partnerships, to continue commercial programs	30.00	29.76
- Glennan Microsystems Initiative	0.40	0.40
- Garrett Morgan Commercial	0.30	0.30
- Simulation based acquisition for manned space flight vehicle, design and testing, MSFC	0.90	0.89
- Technology Research & Development Authority of Central Florida for continuing investment in IT, and security technologies	0.15	0.15
- Idaho National Engineering and Env Lab for dev't of performance safety, and mission success tools for NASA programs	2.00	1.98
- Alabama A&M University for Advanced Propulsion Materials Research	0.25	0.25
- Nano and Micro Devices Laboratory at the University of Alabama in Huntsville	0.50	0.50
- Continuation of the Space Alliance Technology Outreach Program for business incubators in Florida and New York	6.00	5.95
- National Center of Excellence in Wireless and Information Technology Programs at Stony Brook University, New York	1.00	0.99
- National Center of Excellence in Small Scale Systems Packaging at the State University of New York at Binghamton	1.00	0.99
- Within funds provided, $10M for PRL at MSFC to perform non-nuclear research on spacecraft engine systems that support nuclear thermal propulsion development	10.00	9.92
- Integrated system simulation strategy	3.00	2.98
- Stennis Space Center for the commercial technology program	4.00	3.97
- Marshall Space Flight Center for the commercial technology program	4.00	3.97
- MCNC-Research and Dev't Institute (RDI) for continued funding for a Lab for Distributed Chemical and Biological Sensors	0.60	0.60
- Cryogenic Power Electronics Development at the State University of New York at Albany	1.00	0.99
- COM Simulation Architecture	0.40	0.40
- Bowling Green State University Hybrid Engine project	0.30	0.30
- University of Alabama in Huntsville for a Space Flight Guidance, Navigation, and Control Test Bed	0.50	0.50
- National Center of Excellence in Infotonics in Rochester, New York	3.00	2.98
- Computing, Information and Communications Technology Program (CICT) for High Information Density Approaches to Mobile Broadband Inte Communications	3.00	2.98
- National Center for Communication, Navigation, and Surveillance at GRC	0.20	0.20
- Mobile Broadband Network project, a joint effort between NASA and the Air Force Research Laboratory	3.00	2.98
- Transfer to Air Force Research Laboratory to continue joint research between NASA and Air Force on emerging areas of computing including computing, quantum & biomelecular information processing technology	3.00	2.98
- Purdue University in West Lafayette, Indiana for the Advanced Manufacturing Institute	0.75	0.74
- Wheeling Jesuit University, West Virginia for continued operation of the National Technology Transfer Center	2.00	1.98
- University of New Orleans, Louisiana for the Composites Research Center of Excellence and for the development of advanced metallic joining technologies at Michoud Space Center	1.00	0.99
- University of Maryland, College Park for the nanotechnology institute	1.75	1.74
- SSME program office at Marshall for development of a knowledge management integrated data environment	2.00	1.98
- Validated Probabilistic Lifting Tools	0.35	0.35
- Transfer to Air Force Research Lab to begin development of miniature synthetic radar technology	3.00	2.98

FY 2005 Unrequested Congressional Items

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AGENCY TOTAL *(including one in-kind earmark)*	**[426.04]**	**[422.63]**
AGENCY TOTAL	**421.04**	**417.67**
- Glenn Research Center for the commercial technology program	4.00	3.97
Corporate G&A (to be allocated to each program)	**2.50**	**2.48**
- NASA's Independent Verification and Validation Facility, of which $800,000 is available for continuation of the Code Level Metrics Data Program; $400,000 is available for continuation of IV & V of Neural Nets; and $400,000 is available for Software Legacy	2.50	2.48
INSPECTOR GENERAL	**4.00**	**3.97**
- To conduct the annual audit of NASA's financial statements	3.80	3.77
- Unspecified	0.20	0.20

SCIENCE MISSION DIRECTORATE

Solar System Exploration

Unrequested Congressional items not previously funded:

- +$18.4M

Offsets and other Changes:

- Reductions identified below are to fund unrequested Congressional items or NASA budget priorities, unless otherwise stated.
- +$2.6M, Development
  - +$2.6M, Dawn
    - Late delivery of spacecraft structure has eroded schedule and budget reserves.
    - Still holding launch date of June 2006.
    - Total lifecycle cost is $366.4M, compared to $363.8M (FY06 IBPD).

- +$0.2M, Operations
  - +$0.2M, Other
  - Other notification: $.9M of the Deep Space Network (DSN) provides for Architecture and Engineering for the Seed Array ($.5M) in support of the Lunar Reconnaissance Orbiter mission, and for DSN Facilities Planning and Design (FP&D, $.4M).

- +$24.7M, Research
  - +$10.2M, increases for management of the HQ Peer Review contract, level 1 funding, and for SMD fee for services. No increases to research awards;
  - +$1.4M, to address increases in participation in the national FIRST Robotics program;
  - +$2.2M, Cassini DA, to balance full cost funding;
  - +$7.3M, Stardust MO&DA, additional risk reduction to ensure a successful sample return scheduled for January 2006;
  - +$5.0M, Genesis MO&DA, additional funds for sample recovery and investigations; and
  - -$1.4M, Research & Analysis (R&A), no impact to existing grants, but reduced flexibility for future grant selection.

- -$15.3M, Technology & Advanced Concepts
  - -$8.6M, New Frontiers
    - This reduction is consistent with the plan proposed in the FY06 budget, and allows sufficient funding to proceed with July 2005 selection.
  - -$4.4M, Radioisotope Power Systems (RPS)
    - Deletes 2nd generations Stirling (SRG) and RPS Power Conversion Technology Research but maintains 1st generation SRG. This reduction is consistent with the plan proposed in the FY06 budget, for a down-select from parallel paths.
  - -$2.2M, Other Technology, closeout of residual outer planet technology tasks.

Mars Exploration

Offsets and other Changes:

- Reductions identified below are to fund unrequested Congressional items or NASA budget priorities, unless otherwise stated.
- +$25.8M, Operations
  - +$14.6M, extending Spirit and Opportunity from April 2005 through the end of this fiscal year;
  - +$5.1M, funds Mars Global Surveyor fiscal 2005 extension 3 (September 2004 through September 2006);

  - +$6.7M, funds Mars Odyssey fiscal 2005 extension 1 (August 2004 through September 2006); and
  - -$0.6M, Other.

- -$1.7M, Research
  - -$1.7M, Mars Data Analysis, no impact to ongoing Mars research activities. Minimal reduction in future research activities.

- -$125.8M, Technology and Advanced Concepts
  - +$10.5M, Phoenix
    - Additional funds to resolve technical problems and risk reduction activities related to entry/descent/landing (EDL).
  - -$71.7M, Mars Science Lab (MSL)
    - Mars Exploration Program strategy and mission sequence are under review. Deferring MSL two years to 2011 is an option in this review. If the review concludes that MSL should remain on schedule for launch in 2009, reductions will be taken from other missions in formulation in future operating plan updates and/or the FY 2007 budget request.
  - -$6.3M, Mars Telecommunications Orbiter (MTO)
    - Adjusts funding profile consistent with project requirements and schedule.
    - This reduction is consistent with the plan proposed in the FY06 budget with no impact to content or schedule.
  - -$9.1M, Optical Communication Technology Demonstration
    - Adjusts funding profile consistent with project requirements and schedule.
    - Ability to deliver Optical system on time to meet MTO 2009 schedule will not be impacted.
  - -$15.0M, Program Plans & Architecture
    - Reduces Program Plans and Architecture. The reduction is to the landing system and advanced entry/descent/landing (EDL) technologies for future missions.
  - -$15.0M, MARS Next Decade
    - Reduces near-term risk reduction activities for post 2009 launched missions.
  - -$19.2M, Safe on Mars
    - Defers Mars Human Precursor effort; will be re-evaluated as part of the Mars Exploration Program replan.

Lunar Exploration

Management Realignment

- Management responsibility for the Robotic Lunar Exploration Program (RLEP) is realigned to the Exploration Systems Mission Directorate because RLEP is on the critical path for informing critical design and operations decisions related to the new Exploration Architecture for human missions to the moon. NASA recognizes the synergy for both science and exploration represented by the RLEP and will continue to maximize the benefits. The Lunar Reconnaissance Orbiter (LRO) program will continue to be managed and developed as planned by the Goddard Space Flight Center (GSFC). The $52 million budget for Lunar Exploration will be the responsibility of the Exploration Systems Mission Directorate, although funding is still shown in the Science Mission Directorate to avoid making structural changes to the FY 2005 budget in the year of execution.

Astronomical Search for Origins (ASO)

Unrequested Congressional items not previously funded:

- +$14.9M

Offsets and other Changes:

- Reductions identified below are to fund unrequested Congressional items or NASA budget priorities, unless otherwise stated.
- +$94.8M, Development
  - +$116.0M, Hubble Space Telescope development to support HST development activities related to servicing and deorbit options. Management of HST servicing is being consolidated within the Science Mission Directorate.
    - +35.0M is additional funding from offsets in Science Mission Directorate; and
    - +81.0M is additional funding from offsets identified in Exploration Systems Mission Directorate (ESMD) – see ESMD writeup for details.
  - -30.2M, Kepler
    - Final confirmation into implementation phase delayed from December 2004 to April 2005; launch schedule will be delayed and assessed during upcoming budget cycle.
  - +$9.0M, Stratospheric Observatory for Infrared Astronomy (SOFIA), to cover contractor overruns and test flight delays caused by a stand down due to safety issues. A review of this project will identify a revised first flight date.
- +$6.8M, Operations
  - +$6.1M, accounting transfer from multi-mission operations to support HST Operations. No programmatic impact.
  - +$0.7M, Other.

- -$29.3M, Research
  - -$5.9M, ASO Research & Analysis transfer to SEU R&A rebalances research activity across the Universe Division to reflect actual grant awards.
    - No programmatic impact.
  - -$3.5M, ASO Research & Analysis.
    - Will defer FY05 awards, which will reduce FY06 planned selections/awards by 25%.
  - -$4.3M, Spitzer Space Telescope Data Analysis.
    - Spacecraft operating without issue; reserves can be reduced with no programmatic impact.
  - -$15.5M, HST Data Analysis, transfer within the HST science trade space to offset a portion of HST development activities related to servicing and deorbit options.
    - Will reduce planned Guest Observer selection/awards by 30%.
  - -$0.1M, Other.

- -$124.7M, Technology and Advanced Concepts
  - -$43.0M, Space Interferometry Mission (SIM)
    - This reduction is consistent with planned 2 year delay in the FY06 budget request. The extent of this deferral and an appropriate Origins strategy is currently under review.
  - -$26.7M, James Webb Space Telescope (JWST), funding rephasing.
    - This reduction is consistent with plan proposed in the FY06 budget request and defers some non-critical path activities to FY2006, consistent with current contractor requirements.
  - -$26.1M, Terrestrial Planet Finder (TPF)
    - Will hold budget to FY 2004 level. Will result in a 1 year delay. The extent of this deferral and an appropriate Origins strategy is currently under review.
  - +$0.5M, Keck Interferometer, will fund Environmental Impact Study for Outrigger Telescopes, while deferring FY05 Differential Phase activities to FY 2006.
  - -$25.6M, Wide-field Infrared Survey Explorer (WISE)
    - Mission architecture is under review. Out-year and schedule impacts will be assessed during upcoming budget cycle.
  - -$3.8M, Other ASO technology and advanced concepts
    - -$4.8 M, Next Decadal Planning (human/robotic strategic planning) work replaced by agency level planning activities, no programmatic impact;
    - +$1.3M, Keck single aperture project broken out of Next Decade Planning; and
    - -$0.3M, other.

Structure and Evolution of the Universe

Unrequested Congressional items not previously funded:

- +$3.0M

Offsets and other Changes:

- Reductions identified below are to fund unrequested Congressional items or NASA budget priorities, unless otherwise stated.
- +$16.2M, Development
  - +$9.6M Gamma-ray Large Area Space Telescope (GLAST)
    - Aligns funding to confirmation review baseline costs approved in FY2004.
  - +$6.6M, SEU Small Development Projects
    - +$4.4M Herschel cost increase due to schedule delays for SPIRE and HIFI band 6 instruments and HIFI instrument cost growth resulting from technical problems that were resolved in late FY 2004. Life-cycle cost is now $320.3M from $315.9M.
    - +$2.5M Astro-E2 increase due to launch delay of host mission (Japan); adjustment made within the Explorer Program.
    - -$0.3M, other.

- +$0.8M, Operations
  - +$0.8M Chandra Operations adjustment.

- -$4.9M, Research
  - +$6.8M SEU R&A increase realigns funds from ASO Research to SEU Research, reflecting actual distribution of FY2005 research/grant selections.
  - -$2.3M Long Term Space Astrophysics research archive reduction of 10%. Will be accommodated by selecting fewer new activities; no current work will be affected.
  - -$3.5M, SEU Research & Analysis
    - Will defer FY05 awards, which will reduce FY06 planned selections/awards by 25%.
  - -$3.0M CHANDRA Data Analysis
    - Will reduce planned Guest Observer selection/awards by 25%.
  - -$3.0M, Balloon
    - Will defer to FY06 a portion of the planned 2005 ultra long duration balloon work at Wallops carrying science instruments to an altitude of up to 26 miles, which could result in a minimal delay in planned 2006 efforts.
  - +$0.1M, other.

- -$15.7M, Technology and Advanced Concepts
  - -$2.1M, Constellation-X (Con-X) funding will hold to FY 2004 level.
    - Project cost and schedule impacts are being assessed and will be addressed in the upcoming budget cycle request.
  - -$5.0M, Laser Interferometer Space Antenna (LISA)
    - Will hold funding to 2004 level. Project cost and schedule impacts are being assessed and will be addressed in the upcoming budget cycle request.
  - -$8.6M, Future SEU
    - Will delay in instrument work for ESA's Extreme Universe Space Observatory (EUSO) mission, consistent with pending programmatic decisions.

Sun-Earth Connection

Unrequested Congressional items not previously funded:

- +$34.7M

Offsets and other Changes:

- Reductions identified below are to fund unrequested Congressional items or NASA budget priorities, unless otherwise stated.
- +$57.6M, Development
  - +$7.1M STEREO
    - Schedule delays with spacecraft and instruments result in launch delay of four months (Nov 05 to Feb 06).
    - Life-cycle cost increased from $458.1 to $465.2.
  - -$19.2M Solar Dynamics Observatory (SDO)
    - Approximately a four month schedule impact (under review) with TBD growth in life-cycle cost.
    - Life-cycle cost will be updated through the FY2007 budget cycle.
  - +$56.9M, THEMIS
    - +$51.6M, accounting transfer from Technology and Advanced Concepts.
    - +$5.3M, increase due to the delay in completion of Confirmation Review. Launch delay of 2 months from August 2006 to October 2006.
  - +$12.8M, SEC Small Development Projects
    - +$4.0M, Solar-B
      - Increase due to instrument overrun and changes in requirements from Japan's Institute of Space and Astronautical Science (ISAS).
      - Will hold launch to September 2006.
      - Life-cycle cost increased from $174.3M to $178.3M.
    - +$1.4M TWINS
      - Increase due to launch delay of DOD host mission of approximately 15 months from March 2004 and June 2006 to 3rd quarter 2005 and 3rd quarter 2006.
    - +$0.6M CINDI
      - Increase due to launch delay of DOD host mission of approximately 20 months from January 2004 to September 2005.
    - +$6.8M AIM
      - This increase adjusts funding to the baseline approved in the confirmation review, consistent with the plan proposed in the FY06 budget, with no impact to content or schedule.

- -$9.7M, Operations
  - Accounting transfer of Multi-Mission Operations to benefiting programs; ASO HST, ASO Research and other SEC data analysis missions. No programmatic impact.

- +$6.8M, Research
  - Accounting transfer of Multi-Mission Operations into SEC data analysis missions.

- -$33.2M, Technology & Advanced Concepts
  - -$8.1M, Future STP
    - To realign funding within the STP program for STEREO and Solar-B.
  - -$7.1M, Future LWS
    - Space Environment Testbeds (SET) launch opportunity delayed due to inability to co-manifest with ST-8; first SET mission now manifested on Air Force launch in 2010. Reduction of Program Reserve.

- -$18.0M, Future Explorers
  - +$47.7M, increase in funding from internal explorer realignments and other SMD adjustments.
  - -$51.6M, accounting transfer for THEMIS to development line.
  - -$14.1M, additional funds for THEMIS, TWINS, CINDI and AIM.

Earth System Science

Unrequested Congressional items not previously funded:

- +$51.1M

Offsets and other Changes:

- Reductions identified below are to fund unrequested Congressional items or NASA budget priorities, unless otherwise stated.
- -$4.9M, Development
  - -$4.4M, EOSDIS, Jason and Sage requirements transferred to Operations. Reduces funds available for Information Technology solicitations.
  - -$1.0M, NPP, reduction to project reserves.
  - +$0.5M, Other.

- +$10.1M, Operations
  - +$10.1M, fund Ground Network requirements for obsolescence/risk reduction activities and to support extended missions.

- -$7.5M, Research
  - -7.5M, A reduction of 1.4% for research analysis, data analysis and algorithm refinement. No impact to funded grants, but there may be a small reduction in future grant selections.
  - Other notification:$1.5M of the Earth System science research funds provide for the modification of approximately 1,500 square feet of space in the Earth System science building (Building 33) at Goddard Space Flight Center to incorporate modular clean rooms and a gowning room.

- -$1.0M, Technology and Advanced Concepts
  - +$17.3M, Advanced Technology Initiatives, fund formulation activities of UAVSAR and investment in laser risk reduction;
  - -$16.1M, LDCM, requirements and schedule rephased to accommodate 2 OLI instruments for integration and operation on NPOESS;
  - -$6.2M, Future ESSP Support, reduction to program reserves;
  - +5.2M, Instrument Incubator, to provide funding for FY 05 Round 4 selections;
  - -1.0M, OCO, reduces program reserves; and
  - -0.2M, Other.
  - +0.0M, Glory funded at the original level of the President's FY 2005 budget request, to enable continued development of instruments and spacecraft bus.

Earth Science Applications

Unrequested Congressional items not previously funded:

- +$31.5 M

Education

Offsets and other Changes:

- NASA determined that the earlier decision (included in the initial FY 2005 operating plan) to identify offsets for the $50.6 million in Education Congressional interest items from non-Education sources was resulting in an unacceptable burden to the Mission Directorates, given the magnitude of the offsets they were already taking. Offsets for Congressionally-directed items in Education are instead being offset to the extent possible within the Education Program, consistent with the Conference Report and the approach being taken for offsetting Congressional interest items for all NASA's Mission Directorates.

- As a result, Education is reduced by $37.8 million from the funding level in the initial FY 2005 operating plan, to offset unrequested Congressional items not previously funded of $50.6 million to the extent possible. The balance of the offsets are taken from other Mission Directorates.

- -$18.7 Academic programs
  - -$3.0M, Experimental Program to Stimulate Competitive Research (EPSCoR): program will be funded with FY04 carryover (no programmatic impact).
  - -$1.3M, eEducation, Small Programs (Center for Distance Learning): program will be funded with FY04 carryover (no programmatic impact).
  - -$7.8M, Science & Technology Scholarship Program (STSP): Program roll-out will be deferred.
  - -$2.9M, Program support: Reduction of HQ contractor.
  - -$3.7M, multiple small reductions resulting in scope reduction or delays to several activities including Educator Astronaut, Aerospace Education Services Program (AESP), Elementary & Secondary, Small Programs, Classroom of the Future (CoTF), Learning Technologies Project (LTP), NASA Education Technology Services (NETS), and NASA Explorer Institutes (NEI).

- -$19.1M, Minority University Research & Education Program (MUREP)
  - -$2.0M, Science, Engineering, Mathematics & Aerospace Academy (SEMAA): program will be funded with FY04 carryover (no programmatic impact).
  - -$2.0M, Network Resources & Training Sites (NRTS): Competition for new institutional grants will be deferred.
  - -$6.2M, University Research Centers (URCs): Competition for new institutional grants will be deferred.
  - -$2.2M, Faculty Awards for Research (FAR): Competition for new institutional grants will be deferred.
  - -$2.6M, Undergraduate Scholars: Some activity will be funded with FY04 carryover. Thirty-one new student awards for tuition, fees and summer internships will be deferred.
  - -$2.9M, Minority University Research & Education Program, Small Programs: Activity in several ongoing projects will be deferred, including NETS website content development, the Norfolk State University Pre-Service Teachers Program, collaborative efforts with the American Association for the Advancement of Science (AAAS), and access for high school students with disabilities.
  - -$1.2M, multiple small reductions resulting in scope reduction or delays to several activities including Partnership Awards for Integration of Research (PAIR), Curriculum Improvement Partnership Award (CIPA), Math Science Teacher & Curriculum Enhancement Program (MASTAP), and Research Academy.

EXPLORATION SYSTEMS MISSION DIRECTORATE

Biological Sciences Research

Unrequested Congressional items not previously funded:

- +$17.8M, Research

Offsets and other Changes:

- Reductions identified below are to fund unrequested Congressional items or NASA budget priorities, unless otherwise stated.
- -$0.4M, Development

- -$30.9M, Operations
  - Phasing out of ISS utilization in non-exploration directed fundamental research based on programmatic zero base review. Specific activities phased out include ISS animal and cellular utilization support hardware.
  - Reductions are consistent with FY06 Budget request.

- -$94.1 Research
  - -$79.4M, Research
    - Phasing out fundamental research not directly linked to exploration goals based on programmatic zero base review. Specific research phased out includes fundamental plant, cellular, and space biology research.
    - Reductions are consistent with FY06 Budget request.
  - -$14.7M, Future Research Tasks
    - Funding initially planned for new tasks in FY05 is being redirected to fund other needs within Biological and Physical Research based on Zero Base Review.

Physical Sciences Research

Unrequested Congressional items not previously funded:

- +$1.9M

Offsets and other Changes:

- Reductions identified below are to fund unrequested Congressional items or NASA budget priorities, unless otherwise stated.
- -$4.2M, Development
  - +$5.9M, Materials Science Research Rack – 1 (MSRR)
    - Reprogramming ISS utilization of the MSRR to match Exploration requirements and honor International Partners commitments. Additional cost incurred for integrating International Partners module into the U.S. rack and for continued engineering support during Shuttle return-to-flight delay.
  - -$1.0M, Fluids and Combustion Facility (FCF)
    - Adjustment in the development of FCF rack capability to match reduced utilization due to focusing ISS research.
  - -$9.1M, Low Temperature Microgravity Physics Facility
    - This facility was terminated in FY 2004, as described in NASA's letter to the Congress dated July 23, 2004; funding has been redirected to other needs within Biological and Physical Research.

- -$32.8M, Operations
  - Reduced FCF utilization and cellular biotechnology on ISS due to the phase out of fundamental research not associated with Exploration requirements.
  - Funding changes consistent with FY 2006 budget request.

- +$44.6M, Research
  - Funding of new research activities to focus PSR program on new Life Support and Habitation projects and supporting human system technologies directly linked to Explorations requirements identified in the Zero Base Review. New areas of emphasis include fire detection, advanced life support, and spacesuit technologies.

Research Partnerships & Flight Support

Unrequested Congressional items not previously funded:
- +$6.9M

Offsets and other Changes:
- Reductions identified below are to fund unrequested Congressional items or NASA budget priorities, unless otherwise stated.
- -$42.1M, Operations
  - -$22.8M, Operations
    - -$8.1M, Space Product Development funding realigned to support Research;
    - -$14.8M, Multi-User Systems and Support project: funds available because of constrained research opportunities during Shuttle return-to-flight delay.
  - -$19.3M, Future Operations Tasks
    - Multi-User Systems and Support project; Funding planned for new tasks in FY05 is being redirected to fund other needs within Biological and Physical Research based on Zero Base Review.

- $27.1M, Research
  - +$8.0M, Space Product Development, funding realigned from Operations will support industry-led partnerships addressing exploration technology challenges and associated commercial opportunities;
  - +$6.7M, Alpha Magnetic Spectrometer re-baselining due to launch delays and cost growth; and
  - +$12.4M, funding to support an increase in program support requirements.

AERONAUTICS RESEARCH MISSION DIRECTORATE

Aeronautics Technology

Unrequested Congressional items not previously funded:
- +$87.7M

Offsets and other Changes:

- Reductions identified below are to fund unrequested Congressional items or NASA budget priorities, unless otherwise stated.

-$5.4M, Aviation Safety & Security Program

- -$1.9M, Vehicle Safety Technologies
  - +$2.2M, redirect funding from the SLI Transition Account for civil service personnel supporting the following tasks:
    - Sensor Skin to increase Safety in Aircraft and Spacecraft Operations;
    - Real Time GPS Reflection Aircraft Altimeter, Safe operations of an aircraft in all weather, and traffic and terrain conditions; and
    - Safe Wireless Measurement of Aircraft Fuel Levels at any Orientation and Incipient Crack Detection.
  - -$4.1M, reduce System Safety Technologies to ensure adequate funding of higher priority Information Sharing Initiative; and

- +$0.2M, System Safety Technologies
  - +$0.2M, to ensure successful accomplishment of minimum programmatic commitments.

- -$3.1M, Weather Safety Technologies
  - -$3.1M, cancel flight research tests on both the B757 and C206 to ensure adequate focus on completing critical research tasks.

- -$1.3M, Aircraft & Systems Vulnerability Mitigation (ASVM)
  - -$1.3M, activities eliminated or delayed until FY06:
    - Protected Asset Flight Systems;
    - Flight Evaluation for Aircraft Recovery;
    - Electromagnetic Surveillance and Detection; and
    - Fuel Tank Inerting.

- +$0.7M, Technical Integration (TI)
  - +$0.7M, realign funding from the SLI Transition Account for civil service personnel supporting program management for Safety Formulation and Aviation Security.

-$6.7M, Vehicle Systems Program

- +$15.4M, Quiet Aircraft Technology
  - +$5.1M, to increase scope of existing noise reduction work to focus on general turbo-fan for next increment of noise reduction.
  - +10.3M, transfer funding from the SLI and X-37 Transition Accounts for civil service personnel conducting studies related to next generation subsonic noise reduction.

- -$21.6M, Ultra Efficient Engine Technology
  - -$21.6M, terminate all on-going out-of-house tasks and activities in FY05.
  - Reduced funding for UEET large scale demonstration to realign the activities to focus on general turbo-fan for next generation of noise reduction.

  -$21.8M, Low Emissions Alternative Power
  - Terminate Constant Volume Combustion technology development effort to align activities to hydrogen fuel technologies.

- +$17.8M, Efficient Aerodynamic Shapes & Integration
  - +$15.3M, transfer funding from the SLI and X-37 Transition Accounts for civil service personnel, developing fundamental technologies for hypersonics research activities as the closeout for X-43A;
  - +$6.2M, continue hypersonic long range research, beyond X-43A;
  - +$9.6M, technical correction realigning Center G&A with no programmatic impacts;

- -$11.7M, reduce scope of aeronautics modeling technology; descope key components of Conceptual Design Shop, supersonic low-boom/low-drag technologies, and cruise-efficient Extremely Short Takeoff and Landing (ESTOL) wing design activities; and reduce NASA Research Announcement (NRA) Phase II awards to advance beyond technology readiness levels 4/5; and
- -$1.6M, begin phase-out of basic rotorcraft research activities.

- -$17.4, Integrated Tailored Aerostructures
  - +$0.6M, transfer funding from the SLI Transition Account for civil personnel performing risk reduction analysis for ARES Mars Aircraft;
  - -$5.3M, reduce solid free-form metallic fabrication to fund Hypersonics research activities, as Hypersonic close-out activities; and
  - -$12.7M, elimination of Extremely Short Takeoff and Landing (ESTOL) technology.

- -$1.8M, Autonomous Robust Avionics
  - -$1.0M, begin phase-out of basic rotorcraft research activities; and
  - -$0.8M, reduce research on autonomous aircraft.

- +$15.7M, Flight & Systems Demonstration
  - +$23.7M, transfer funding from the SLI and X-37 Transition Accounts for civil service personnel supporting flight research activities including:
    - High-Altitude Long-Endurance (HALE) Remotely Operated Aircraft (ROA) research demonstration, +$14.2M; and
    - Supersonic Low-Boom Noise Reduction research demonstration, +$9.5M
  - -$8.0M, reduce Intelligent Flight Control System test demonstrations: milestones slipped by one quarter and Earth Science Mission Capability Flight Testing efforts reduced.

- +$7.0M, Strategic Vehicle Architecture
  - +$1.4M, transfer funding from the SLI Transition Account for civil service personnel conducting system analysis to assess Vehicle Systems Program technology investments; and
  - +$5.6M, increase systems analysis work in support of the Vehicle Systems Program.

-$19.8M, Airspace Systems Program

- -$2.9M, Virtual Airspace Modeling & Simulation
  - -$2.9M, discontinue real-time airspace simulations and system-wide modeling analysis tool and cancel wake vortex analysis for airspace concepts and evaluation system.

- -$2.9M, Efficient Aircraft Spacing
  - +$4.1M transfers funding from the SLI Transition Account for civil service personnel supporting wake vortex alleviation;
  - -$2.2M, transfers Collaborative Traffic Flow Management task to Strategic Airspace Usage; and
  - -$4.8M, eliminates Runway Independent effort and reduces support to the Airspace Operations Laboratory and Flight Deck Display Research Laboratory.

- -$2.5M, Efficient Flight Path Management
  - -$2.5M, descope Human Factors Support for Advanced Multi-Facility Traffic Management, En Route Descent Advisor, and Advanced Routing for both Integrated Trajectory Management and Tactical Conflict Detection.

- +$5.3M, Strategic Airspace Usage
  - +$2.2M, realign Collaborative Traffic Flow Management task from Efficient Airspace Systems project; and
  - +$3.1M, increase support for the systems-wide evaluation and planning tool effort.

- -$10.0M, Space-Based Technologies
  - -$10.0M, descope Oceanic Communications and Surveillance research efforts.

- -$7.7M, Human Measures & Performance
  - -$7.7M, eliminates funding for simulation effort and research facilities.

- +$0.9M, Technical Integration
  - +$0.9M, augment the collaborative, communication, and partnership support.

EXPLORATION SYSTEMS MISSION DIRECTORATE

Human and Robotic Technology

Unrequested Congressional items not previously funded:
- +$92.6M

Offsets and other Changes:
- Reductions identified below are to fund unrequested Congressional items or NASA budget priorities, unless otherwise stated.
- -$16M, Technology Maturation
  - Reduction will require a delay in initiating some of the projects announced at the end of the Broad Agency Announcement process in 2004. After the completion of the ongoing architecture studies NASA will reevaluate the need to continue specific projects in the research and development portfolio.
- -$171.3M, Project Prometheus
  - Reduction slows down the effort to bring a Prometheus 1 flight demonstration to an early decision milestone in 2005. NASA is still fully funding its commitment to its Department if Energy partner.
- -$10.4M, Innovative Technology Transfer Partnerships
  - Reduction is a minor delay in some technology transfer projects, with no impact to Congressionally mandated programs.
- -$12.7M, Advanced Space Technology
  - Offsets made available because of reduced flight activity requiring use of MUSS facilities. Reductions have no negative impact to the project or to it related civil servant work force.

Management Realignment

- Management responsibility for a potential Shuttle servicing mission for the Hubble Space Telescope (HST) and de-orbit of HST is transferred from the Exploration Systems Mission Directorate (ESMD) and consolidated within the Science Mission Directorate. The budget for these activities will be the responsibility of the Science Mission Directorate, although the $89 million in ESMD funding identified in the initial FY 2005 operating plan is still shown in ESMD.

- Management responsibility for the Robotic Lunar Exploration Program (RLEP) is realigned from the Science Mission Directorate (SMD) to the Exploration Systems Mission Directorate because RLEP is on the critical path for informing critical design and operations decisions related to the new Exploration Architecture for human missions to the moon. NASA recognizes the synergy for both science and exploration represented by the RLEP and will continue to maximize the benefits. The

Lunar Reconnaissance Orbiter (LRO) program will continue to be managed and developed as planned by the Goddard Space Flight Center (GSFC). The $52 million budget for Lunar Exploration will be the responsibility of the Exploration Systems Mission Directorate, although funding is still shown in the Science Mission Directorate to avoid making structural changes to the FY 2005 budget in the year of execution.

Transportation Systems

Offsets and other Changes:

- -$104.6M, Space Launch Initiative
  - Realign remaining Civil Servants and related support from legacy SLI program to other agency programs; Completes SLI Transition.

Management Realignment

- Responsibility for ISS Crew and Cargo Services is realigned from the Space Operations Mission Directorate (SOMD) to the Exploration Systems Mission Directorate (ESMD) to ensure that this capability is fully integrated into the new space transportation system, including the Crew Exploration Vehicle (CEV) development effort. The $98 million budget for ISS Cargo/Crew Services will be the responsibility of ESMD, although funding is still shown in SOMD to avoid making structural changes to the FY 2005 budget in the year of execution.

SPACE OPERATIONS MISSION DIRECTORATE

Space Station

Offsets and other Changes:

- +$10.5M, Development
  - -$0.8M, ISS Core Development
    - Realigning program under-spend to Launch and Mission Operations to cover work deferred from FY 2004 into FY 2005 due to Shuttle stand-down.
      - No programmatic impacts.
  - +$11.3M, Capability Upgrades
    - Accelerate ECLSS installation in the US Lab to mitigate risk associated with oxygen generation capability currently provided by the Russian ELEKTRON and fund the resolution of technical issues associated with ECLSS rack development including Oxygen Generation System (OGS) hydrogen dome, OGS washer failure, Urine Processor Assembly (UPA) valve leaks, and UPA gears issues.
- -$10.5M, Operations
  - $-10.2M, Spacecraft Operations
    - +$1.1M, Realigning program funding from Operations Program Integration to cover work deferred from FY 2004 into FY 2005 due to Shuttle stand-down.
      - No programmatic impacts.
    - -$11.3M, Operations funding for Spares and Sustaining Engineering delayed due to rack development issues reallocated to Capability upgrades.
  - +$43.7M, Launch & Mission Operations
    - Realigning program funding from Operations Program Integration to cover work deferred from FY 2004 into FY 2005 due to Shuttle stand-down.
      - No programmatic impacts.

- -$44.0M, Operations Program Integration
  - -$42.9M, Realigning program under-spend to Launch and Mission Operations to cover work deferred from FY 2004 into FY 2005 due to Shuttle stand-down.
    - No programmatic impacts.
  - -$1.1M, Realigning program funding to Operations Program Integration to cover work deferred from FY 2004 into FY 2005 due to Shuttle stand-down.
    - No programmatic impacts.

Management Realignment

- Responsibility for ISS Crew and Cargo Services is realigned from the Space Operations Mission Directorate (SOMD) to the Exploration Systems Mission Directorate (ESMD) to ensure that this capability is fully integrated into the new space transportation system, including the Crew Exploration Vehicle (CEV) development effort. The $98 million budget for ISS Cargo/Crew Services will be the responsibility of ESMD, although funding is still shown in SOMD to avoid making structural changes to the FY 2005 budget in the year of execution.

Space Shuttle

Space Shuttle increases in this operating plan update reflect +$287.2 million from other agency programs, which in addition to the +$474.8 million provided in the initial FY 2005 operating plan, provides $762 million in additional FY 2005 funds supporting Return to Flight and CAIB related activities.

Offsets and other Changes:

- -$3.9M, Development
  - -$6.8M, Cockpit Avionics Upgrade (CAU)
    - -$6.8M, realigning funding from CAU to Adv Health Management (AHM) and to Program Integration.
      - No programmatic impacts; CAU closeout costs lower than previously expected.
  - +$2.9M, SSME Adv Health Management (AHM)
    - +$2.9M, Failures on SSME Block II controllers, causing the work on AHM retrofits to be delayed.
      - The life cycle costs have not changed from the initial baseline; total project costs remain unchanged.

- +$299.1M, Operations
  - +$115.1M, Program Integration
    - +$108.9M, reallocating/transferring funds from other agency programs to continue supporting Return to Flight and CAIB related activities.
    - +$2.3, realigning program funds from Flight Operations to consolidate mission directorate support under Program Integration.
      - No programmatic impacts; total project costs remain unchanged.
    - +$3.9, realigning program funds from CAU to support completion of AHM Phase IIA and closeout costs associated with AHM Phase IIB and Vehicle Health Monitoring System (VHMS).
      - No programmatic impacts.
    - $0.0M, Infrastructure/Construction of Facilities (CoF) Projects
      - The Shuttle Program reassessed the amount of Infrastructure and CoF repairs and upgrades to conduct during FY 2005 including:
        - -$13.9M, defer Vehicle Assembly Building (VAB) repairs from FY05 to support RTF activities and current schedules in the VAB;

- -$0.8M, reallocating/transferring funds from External Tank (ET) Research and Development to support ET CoF Planning and Design;
- +$13.6M, reassessment of numerous CoF minor revitalization projects to support essential upgrades; and
- +$1.1M, reassessment of CoF Planning and Design activity for FY 2005.

- +$63.5M, Ground Operations
  - +$63.5M, reallocating/transferring funds from other agency programs to continue supporting Return to Flight and CAIB related activities.

- +$0.3M, Flight Operations
  - +$2.6M, reallocating/transferring funds from other agency programs to continue supporting Return to Flight and CAIB related activities.
  - -$2.3M, realigning program funds to Program integration to consolidate mission directorate support under Program Integration.
    - No programmatic impacts.

- +$120.2M, Flight Hardware,
  - +$112.2M, reallocating/transferring funds from other agency programs to continue supporting Return to Flight and CAIB related activities.
  - +$8.0M, reallocating funds from the Space and Flight Support Launch Services Program to Space Shuttle.

Space and Flight Support

Offsets and other Changes:

- Reductions identified below are to fund unrequested Congressional items or NASA budget priorities, unless otherwise stated.
- +$1.0M, Crew Health & Safety reallocation from International Space Station for increase in Medical Informatics and Health Care Systems requirements.
- -$12.2M, Launch Services Program, reduce uncosted carryover and reallocations to: Space Shuttle as contribution to Return to Flight and CAIB related activities ($1.2 million); to Space Shuttle ($8.0 million); to Crew Health & Safety ($1.0 million); and for Education ($2.0m).

Space & Flight Support CoF Changes

- $0.0M, Operations
  - Launch Services
    - $+3.0M, Construction dollars needed to support the Hangar AE HVAC System Revitalization and ACM Abatement;
    - $+3.0M, Construction dollars needed for SLC-2 Mobile Servicing Tower (MST)/Fixed Umbilical Tower (FUT) Structure/Corrosion Repair;
    - $+0.9, returned to Launch Services Program;
    - $-0.9M, Construction for SLC-2 Pad Grounding Systems to be deferred;
    - $+0.8M, for Design; and
    - $-6.8M, Reduction in uncosted carryover

INSTITUTIONAL CROSSCUTS

Corporate G&A

Unrequested Congressional items not previously funded:

- +2.5M

Offsets and other Changes:

- Net reduction in corporate G&A activities.

Center G&A

- -$1.6M, Institutional Construction of Facilities (CoF)
    - Institutional CoF is included within each Center's G&A. The funding decrease of -$1.6M is due to deferral of Minor Revitalization and Construction projects at KSC and DRFC.

NASA FY 2005 Operating Plan Summary

FY 2005 Operating Plan
Enclosure 4
May 2005 Update

			April Op Plan Update			May Op Plan Update						
($ in millions)	FY05 Pres. Budget Req.	Initial Op Plan	Adds Program-matic Increases	Offsets Total Offsets	Total April Op Plan	Adds Shuttle RTF	Adds HST	Adds Unre-quested Items	Adds Program-matic Increases	Offsets Total Offsets	Net Change	Total May Op Plan
Science, Aero & Explor.	**7,760**	**7,681**	**126**	**-126**	**7,681**	**--**	**116**	**268**	**330**	**-776**	**-62**	**7,619**
Space Science	4,138	4,068	126	-126	4,068	--	116	71	157	-397	-53	4,015
Solar Sys Expl	1,187	1,125	75	-75	1,125			18	29	-17	31	1,156
Mars Exploration	691	681	41	-41	681				37	-139	-102	579
Lunar Exploration	70	52			52					--	--	52
Astron Search for Orig	1,067	1,136	10	-10	1,136		116	15	15	-183	-38	1,098
Struct & Evol of Univ	378	377			377			3	17	-21	-1	377
Sun-Earth Connection	746	696			696			35	59	-38	56	753
Earth Science	1,485	1,459	--	--	1,459	--	--	83	27	-30	79	1,539
Earth System Science	1,409	1,384			1,384			51	27	-30	48	1,431
Earth Science App'n	77	76			76			32	--	--	32	107
Biological & Phys Res	1,049	1,031	--	--	1,031	--	--	27	70	-203	-106	925
Biol Sci Research	492	482			482			18	--	-125	-108	374
Phys Sci Research	300	296			296			2	51	-43	10	305
Res Partn & Flt Supt	257	253			253			7	19	-34	-8	245
Aeronautics	919	906	--	--	906	--	--	88	76	-108	56	962
Education	169	217	--	--	217	--	--	--	--	-38	-38	179
					--							
Exploration Capabilities	**8,456**	**8,484**	**--**	**--**	**8,484**	**287**	**--**	**93**	**49**	**-367**	**62**	**8,546**
Exploration Systems	1,782	1,654	--	--	1,654	--	--	93	--	-315	-222	1,431
Hum & Rob Tech	1,094	1,127			1,127			93		-210	-118	1,010
Transport Systems	689	527			527					-105	-105	422
Space Flight	6,674	6,830	--	--	6,830	287	--	--	49	-52	284	7,114
Int'l Space Station	1,863	1,676			1,676				11	-11	--	1,676
Space Shuttle	4,319	4,669			4,669	287			30	-22	295	4,964
Space & Flt Supt	492	485			485				8	-19	-11	474
												--
Inspector General	**28**	**31**	**--**	**--**	**31**	**--**	**--**	**--**	**--**	**--**	**--**	**31**
					--							
TOTAL	**16,244**	**16,196**	**126**	**-126**	**16,196**	**287**	**116**	**361**	**379**	**-1,143**	**0.0**	**16,196**

NASA FY 2004 Operating Plan

	Dec-04 Operating Plan	FY2004 Total Changes	May 2005 Operating Plan
AGENCY TOTAL	**15,378.0**	**0.0**	**15,378.0**
SCIENCE, AERO & EXPLORATION	**7,872.5**	**0.0**	**7,872.5**
SPACE SCIENCE	**3,992.0**	**0.0**	**3,992.0**
SOLAR SYSTEM EXPLORATION (SSE)	**1,296.2**		**1,296.2**
DEVELOPMENT	378.9		378.9
MESSENGER	59.8		59.8
DEEP IMPACT	52.6		52.6
DAWN	126.4		126.4
NEW HORIZONS (PLUTO)	140.1		140.1
OPERATIONS	306.4		306.4
RESEARCH	319.7		319.7
TECH & ADV CONCEPTS	291.2		291.2
Project Prometheus	220.7		220.7
New Frontiers	7.4		7.4
Other	63.1		63.1
MARS EXPLORATION	**596.3**		**596.3**
DEVELOPMENT	195.2		195.2
MARS RECONNAISSANCE ORBITER	195.2		195.2
MARS SMALL MISSIONS			
OPERATIONS	47.9		47.9
RESEARCH	72.1		72.1
TECH & ADV CONCEPTS	281.0		281.0
Phoenix (formerly 2007 Mars Scout)	25.5		25.5
2009 Mars Science Laboratory	111.7		111.7
2009 US Telesat	10.1		10.1
Other	133.7		133.7
ASTRONOMICAL SEARCH FOR ORIGINS (ASO)	**900.4**		**900.4**
DEVELOPMENT	264.8		264.8
HST	147.0		147.0
SOFIA	66.9		66.9
KEPLER	50.8		50.8
OPERATIONS	27.2		27.2
RESEARCH	189.2		189.2
TECH & ADV CONCEPTS	419.3		419.3
Space Interferometry Mission (SIM)	88.0		88.0
James Webb Space Telescope (JWST)	243.2		243.2
Terrestrial Planet Finder (TPF)	40.6		40.6
Keck Interferometer	12.8		12.8
Widefield Infrared Survey Explorer (WISE)	11.4		11.4
Other	23.2		23.2

Totals may not add due to rounding

NASA FY 2004 Operating Plan

	Dec-04 Operating Plan	FY2004 Total Changes	May 2005 Operating Plan
STRUCTURE AND EVOLUTION OF THE UNIVERSE	**451.3**		**451.3**
DEVELOPMENT	225.5		225.5
GP-B	45.1		45.1
GLAST	102.7		102.7
Swift	32.2		32.2
Herschel	18.3		18.3
Planck	13.4		13.4
SEU SMALL PROJECTS	13.6		13.6
OPERATIONS	13.8		13.8
RESEARCH	183.4		183.4
TECH & ADV CONCEPTS	28.7		28.7
Beyond Einstein (Con-X and LISA)	24.5		24.5
EUSO	1.8		1.8
Other	2.3		2.3
SUN-EARTH CONNECTION (SEC)	**730.8**		**730.8**
DEVELOPMENT	253.2		253.2
STEREO	123.2		123.2
SOLAR DYNAMICS OBSERVATORY (SDO)	88.1		88.1
AIM	18.2		18.2
SEC SMALL PROJECTS	23.7		23.7
OPERATIONS	50.4		50.4
RESEARCH	183.3		183.3
TECH & ADV CONCEPTS	243.8		243.8
New Millennium Program (NMP)	84.5		84.5
Future Explorers (incl THEMIS)	103.5		103.5
Solar Terrestrial Probes (STP)	17.6		17.6
Living with a Star (LWS)	38.2		38.2
Other			
LUNAR EXPLORATION	**17.0**		**17.0**
TECH & ADV CONCEPTS	17.0		17.0
Lunar Exploration	17.0		17.0

Totals may not add due to rounding

NASA FY 2004 Operating Plan

	Dec-04 Operating Plan	FY2004 Total Changes	May 2005 Operating Plan
EARTH SCIENCE	**1,607.7**	**0.0**	**1,607.7**
EARTH SYSTEM SCIENCE	**1,505.0**	**0.0**	**1,505.0**
DEVELOPMENT	325.3	12.9	338.2
AURA	65.1		65.1
CALIPSO	40.8	8.2	49.0
CLOUDSAT	29.3	5.8	35.1
EOSDIS	117.0		117.0
Solar Radiation and Climate Experiment (SORCE)	2.3		2.3
GIFTS (EO-3)	24.5	-1.1	23.4
Climate Change Research Initiative (CCRI) Polarimeter	12.1		12.1
Other	34.2		34.2
OPERATIONS	316.4		316.4
RESEARCH	534.8		534.8
TECH & ADV CONCEPTS	328.6	-12.9	315.7
TECHNOLOGY INFUSION	86.3		86.3
NPOESS Preparatory Project (NPP)	102.0		102.0
Global Precipitation Mission (GPM)	29.2		29.2
Landsat Data Continuity Mission (LDCM)	35.4	-12.9	22.5
Ocean Surface Topography Mission (OSTM)	23.8		23.8
OTHER	51.9		51.9
EARTH SCIENCE APPLICATIONS	**102.7**		**102.7**
RESEARCH	54.1		54.1
TECH & ADV CONCEPTS	48.7		48.7
BIOLOGICAL & PHYS RESEARCH	**985.6**		**985.6**
BIOLOGICAL SCIENCES RESEARCH	**364.9**		**364.9**
DEVELOPMENT	13.4		13.4
OPERATIONS	100.7		100.7
RESEARCH	250.8		250.8
PHYSICAL SCIENCES RESEARCH	**357.3**		**357.3**
DEVELOPMENT	43.6		43.6
MATERIAL SCI RESEARCH FACILITY 1	14.3		14.3
FLUIDS & COMBUSTION FACILITY	25.4		25.4
LOW TEMP MICROGRAVITY PHYSICS FAC	3.9		3.9
OPERATIONS	161.0		161.0
RESEARCH	152.7		152.7
RESEARCH PARTNERSHIPS AND FLIGHT SUPPORT	**263.3**		**263.3**
OPERATIONS	222.8		222.8
RESEARCH	40.5		40.5

Totals may not add due to rounding

NASA FY 2004 Operating Plan

	Dec-04 Operating Plan	FY2004 Total Changes	May 2005 Operating Plan
AERONAUTICS	**1,056.8**		**1,056.8**
AERONAUTICS TECHNOLOGY	**1056.8**		**1056.8**
TECH & ADV CONCEPTS	**1,056.8**		**1,056.8**
AVIATION SAFETY PROGRAM	183.1		183.1
Vehicle Safety Technologies	75.7		75.7
System Safety Technologies	30.8		30.8
Weather Safety Tech.	48.2		48.2
Aviation Securities Tech.	28.4		28.4
AIRSPACE SYSTEMS PROGRAM	232.3		232.3
Advanced Air Transportation Tech.	98.2		98.2
Small Aircraft Transportation Sys (SATS)	31.5		31.5
Virtual Airspace Modeling & Sim (VAMS)	30.5		30.5
Aviation Operations Systems	19.1		19.1
Next Generations Air Transportation Sys	53.0		53.0
VEHICLE SYSTEMS PROGRAM	641.4		641.4
Quiet Aircraft Technology (QAT)	65.7		65.7
21st Century Aircraft Technology (TCAT)	52.4		52.4
Flight Research	79.9		79.9
Advanced Vehicle Concepts (AVC)	60.6		60.6
Breakthrough Vehicle Tech.	152.8		152.8
Ultra-Efficient Engine Tech.	91.9		91.9
Propulsion & Power	129.4		129.4
Flight & System Demonstration	8.7		8.7
EDUCATION PROGRAMS	**230.4**	**0.0**	**230.4**
ACADEMIC PROGRAMS	138.6	4.5	143.1
MINORITY UNIVERSITY RESEARCH & EDUCATION	91.8	-4.5	87.3

Totals may not add due to rounding

NASA FY 2004 Operating Plan

	Dec-04 Operating Plan	FY2004 Total Changes	May 2005 Operating Plan
SPACE FLIGHT CAPABILITIES	**7,478.3**		**7,478.3**
SPACE FLIGHT	**5,890.1**		**5,890.1**
SPACE STATION	**1,363.7**		**1,363.7**
DEVELOPMENT	134.4		134.4
Flight Hardware	60.1		60.1
Ops Capability Development	23.9		23.9
ECLSS	25.7		25.7
Node 3	24.8		24.8
OPERATIONS	1,229.3		1,229.3
SPACECRAFT OPERATIONS	539.6		539.6
LAUNCH & MISSION OPERATIONS	435.8		435.8
OPERATIONS PROGRAM INTEGRATION	253.9		253.9
SPACE SHUTTLE	**4,060.9**	**0.0**	**4,060.9**
DEVELOPMENT	81.7	0.8	82.5
SSME Adv Health Mgt Sys (AHMS)	3.0	0.8	3.8
Cockpit Avionics Upgrade	78.7		78.7
OPERATIONS	3,979.2	-0.8	3,978.4
PROGRAM INTEGRATION	663.3	-0.8	662.5
GROUND OPERATIONS	972.9		972.9
FLIGHT OPERATIONS	352.4		352.4
FLIGHT HARDWARE	1,990.6		1,990.6
SERVICE LIFE EXTENSION PROGRAM (SLEP) (RETURN TO FLIGHT, included above)	[413.0]		[413.0]
SPACE & FLIGHT SUPPORT	**465.5**		**465.5**
DEVELOPMENT	84.2		84.2
PLUMBROOK DECOMMISSIONING	43.4		43.4
ENVIRONMENTAL COMPLIANCE & RESTORATION	40.8		40.8
OPERATIONS	381.3		381.3
CROSSCUTTING TECHNOLOGY	**1,588.1**		**1,588.1**
SPACE LAUNCH INITIATIVE	**911.5**		**911.5**
TECH & ADV CONCEPTS	911.5		911.5
X-37	177.0		177.0
DART	42.5		42.5
PAD	7.6		7.6
OSP Design, Development & Formulation	256.8	-51.6	205.2
Exploration Advance Studies	75.0	53.1	128.1
Next Generation Launch Technology	352.6	-1.5	351.1
MSSN & SCIENCE MEASUREMENT	**458.7**		**458.7**
TECH & ADV CONCEPTS	458.7		458.7
C I CT	250.9		250.9
ENGINEERING FOR COMPLEX SYSTEMS	44.4		44.4
ENABLING CONCEPTS & TECHNOLOGIES	160.4		160.4
TECHNOLOGY MATURATION	3.0		3.0
INNOVATIVE TECH TRANSFER PARTNERSHIPS	**217.9**		**217.9**
TECH & ADV CONCEPTS	78.5		78.5
RESEARCH	139.4		139.4
INSPECTOR GENERAL	**27.1**		**27.1**

Totals may not add due to rounding

SCIENCE MISSION DIRECTORATE

Earth System Science

Offsets and other Changes:

- +$12.9M, Development
  - +$8.2M, Calipso
    - Launch delay from April 2005 to no earlier than July 2005
    - Life Cycle Costs increase to $188.3M
  - +$5.8M, CloudSat
    - Launch delay from April 2005 to no earlier than July 2005
    - Life Cycle Costs increase to $169.0M
  - -$1.1M, Geosynchronous Imaging Fourier Transform Spectrometer (GIFTS)
    - Unable to obligate these funds by September 30, 2005, when they will expire
    - No change to life cycle costs; funds will be replenished in future years
- -$12.9M, Technology & Advanced Concepts
  - -$12.9M, Landsat Data Continuity Mission (LDCM)
    - Requirements rephased to reflect development of two Operational Landsat Imager (OLI) instruments for the National Polar-orbiting Operational Environmental Satellite System (NPOESS)
    - No change to life cycle costs; funds will be replenished in future years

Education

Offsets and other Changes:

- + 4.5M, Academic programs
  - To continue ongoing activities within the Aerospace Education Services Program, Experimental Program to Stimulate Competitive Research Program, and the Center for Distance Learning.

- -$4.5M, Minority University Research & Education Program (MUREP)
  - Reduction in funding available for unsolicited proposals in FY04; no impact to ongoing programs.

EXPLORATION SYSTEMS MISSION DIRECTORATE

Crosscutting Technology

Technology and Advanced Concepts: +$0.0M

- -$51.6M, Orbital Space Plane (OSP)
  - Transition and closeout activities associated with OSP projects were efficiently managed to produce greater savings than anticipated.

- -$1.5M, Next Generation Launch Technology (NGLT)
  - Transition and closeout activities associated with NGLT projects were efficiently managed to produce greater savings than anticipated.

- +$53.1M, Exploration Advanced Studies
  - Available funding from OSP and NGLT will be applied towards early Transportation Systems (Constellation) design activities, including NGLT projects that are ongoing in FY 05, NASA Center support, and the Crew Exploration Vehicle contract.

SPACE OPERATIONS MISSION DIRECTORATE

Space Shuttle

Offsets and other Changes:

Development: +$0.8M

- +$0.8M, SSME Adv Health Management (AHM)
  - Reassessment of AHM Phase I costs for FY 2004, no impact
  - No schedule implications
  - Life Cycle-Cost have not changed from the initial baseline, total project costs remain unchanged

Operations: -$0.8M

- -$0.8M, Program Integration
  - Redirect Service Life Extension Program funding due to reassessment of AHM Phase I costs for FY 2004, no programmatic impact
  - no schedule implications

- $0.0M, Infrastructure/Construction of Facilities (CoF) Projects
  The Shuttle Program reassessed the amount of Infrastructure and CoF repairs and upgrades conducted during FY 2004 including:
  - +$1.0M, reassessed Vehicle Assembly Building (VAB) repair estimates for FY 2004
  - +$0.8M, reassessment of numerous CoF minor revitalization projects to support essential upgrades
  - +$0.8M, reassessment of CoF Planning and Design activity for FY 2004
  - -$2.6M, reduced scope of LC39A repairs to reflect early phase-out of Shuttle

INSTITUTIONAL CROSS CUT

Institutional Construction of Facilities (CoF)

Center G&A

- $0.0M Institutional Construction of Facilities
  - Net zero change as a result of minor internal adjustments between Minor Revitalization and Construction at various locations