

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



December 23, 2004

The Honorable Christopher S. Bond  
Chairman  
Subcommittee on VA-HUD-  
Independent Agencies  
Committee on Appropriations  
United States Senate  
Washington, DC 20510

Dear Mr. Chairman:

The purpose of this letter is to submit to the Committee NASA's initial FY 2005 Operating Plan, in accordance with the agreements between NASA and the Committee, and to provide an update to the FY 2004 Operating Plan.

In formulating NASA's initial FY 2005 Operating Plan, we have taken into account: appropriations levels included for NASA in Division B—Emergency Supplemental Appropriations for Hurricane Disasters Assistance Act, 2005, as part of the FY 2005 Military Construction Appropriations Act (P.L. 108-132); appropriations levels included for NASA in the FY 2005 Consolidated Appropriations Act (P.L. 108-447); direction included in the Conference Report (House Report 108-792) accompanying H.R. 4818, the FY 2005 Consolidated Appropriations bill; and application of a 0.80-percent rescission against the regular FY 2005 appropriations act, as specified in Section 122, Division J, of P.L. 108-447.

Aggregate NASA funding in this Operating Plan is \$16,196.4 million, an overall net decrease of \$47.6 million from the President's FY 2005 request. Within this total is:

- FY 2005 emergency supplemental appropriations totaling \$126.0 million for repair of assets damaged and to take other emergency measures due to the effects of hurricanes at NASA's Kennedy Space Center;
- FY 2005 regular appropriations totaling of \$16,200.0 million, a reduction of \$44.0 million from the President's request, including within the total \$426.0 million in Congressionally-directed projects (167 discrete items), which requires offsets from ongoing or planned NASA science and technology programs; and,
- A reduction of \$129.6 million in the FY 2005 regular appropriations total due to the 0.80-percent rescission against all programs, projects and activities, resulting in a regular appropriation for FY 2005 of \$16,070.4 million, a reduction of \$173.6 million below the President's FY 2005 request.

NASA is very appreciative of the action by the Committees on Appropriations and Congress in fully funding the President's emergency supplemental request for hurricane damage to the Kennedy Space Center (KSC). Efforts are well underway to provide damage recovery and

repair for KSC facilities, infrastructure, and equipment and to address relocation and housing needs.

NASA is also very appreciative of the action by the Committees on Appropriations and Congress in providing regular FY 2005 appropriations for the Agency at \$16.2 billion, essentially the level of the President's request, as well as the transfer authority between appropriations accounts that will provide flexibility in adjusting funding levels to meet critical requirements. This funding level will permit NASA to pursue Space Shuttle Return to Flight (RTF) as the first step in the Vision; maintain key milestones for the 2008 Constellation flight demonstration; support exploration technologies required for early spiral decisions; preserve the path for a Project Prometheus demonstration in the next decade; protect robotic Lunar and Mars missions in 2008 and 2011, respectively; and support early opportunities for International Space Station (ISS) cargo/crew services—all in accordance with the President's direction.

The following table compares NASA's FY 2005 budget request with NASA's initial FY 2005 Operating Plan:

**FY 2005 Budget (in millions of dollars)**

	FY 2005		FY 2005		0.8% Rescis- sion***	Other NASA Changes	Initial Operating Plan
	Budget Request	Emergency Supp. Change	Regular Approps General Reduction*	Regular Approps Total Prior to Rescission**			
<b><u>TOTAL NASA</u></b>	<b><u>16,244.0</u></b>	<b><u>126.0</u></b>	<b><u>-44.0</u></b>	<b><u>16,200.0</u></b>	<b><u>-129.6</u></b>		<b><u>16,196.4</u></b>
Science, Aeronautics & Exploration	7,760.0		-20.0	7,740.0	-61.9	2.7	7,680.9
Exploration Capabilities	8,456.4	126.0	-28.0	8,428.4	-67.4	-2.7	8,484.2
Inspector General	27.6		4.0	31.6	-0.3		31.3

\* as distributed by NASA.

\*\* reflects general reduction as distributed by NASA.

\*\*\* rescission not applied against emergency supplemental.

This Operating Plan is presented in a structure consistent with the appropriations and budget structure reflected in the NASA FY 2005 Budget Estimates submitted to Congress, with the nomenclature for appropriations accounts consistent with that reflected in the FY 2005 Consolidated Appropriations Act. Total funding for the Science, Aeronautics, and Exploration (SAE) and Exploration Capabilities (EC) accounts is reflected in full cost budget authority. A comparison of the FY 2005 budget request with this initial Operating Plan is provided in Enclosure 1, which reflects:

- Emergency supplemental appropriations for hurricane relief;
- General reduction included in the regular appropriations bill, as distributed by NASA;
- Application of 0.80 percent across-the-board rescission;
- NASA adjustments for emergent requirements and other urgent program requirements;
- Redirection of an intended augmentation of \$100.0 million in Corporate General and Administrative (G&A) funds to address emergent requirements for Shuttle RTF;
- Distribution of funds budgeted for Space Launch Initiative Termination Activities for priority requirements; and,

- A net transfer of \$0.3 million from the EC appropriation to the SAE appropriation, using as a basis for comparison the post-rescission values for the EC and SAE appropriation accounts.

The discrete total of Congressional interest items, both site-specific and programmatic, included in the Conference Report is 167 items, a record-high total against the annual NASA appropriation, at a value of \$426.0 million, an increase over last year's level. I am very concerned by the continuing growth in the number of earmarks in NASA's annual appropriation, and their severely adverse impact upon ongoing and planned Agency programs. As recently as FY 1997, the total number of NASA earmarks was 6 items, valued at \$74 million. The FY 2005 total represents a 28-fold increase in the absolute number of earmarks and a 5-fold increase in the cost of such earmarks. I am very concerned that the FY 2005 appropriation funds this record-high number of earmarks totally through reductions in funding of ongoing NASA programs proposed by the President. I am disappointed that the Conference Report directs that NASA not charge administrative expenses to Congressionally directed spending on specific projects, which is an appropriate business practice for full-cost budget management employed widely by Departments and agencies within the Executive Branch. If NASA were to absorb the full cost for administering all FY 2005 earmarks, the Agency would be forced to divert approximately \$30 million from other NASA programs in addition to the absorption of \$426 million to meet Congressional intent.

The Congressional interest items are displayed in Enclosure 2, by NASA Mission Directorate, including the effect of the across-the-board rescission. Given the magnitude of the challenge to identify appropriations offsets for these unanticipated initiatives, NASA will identify sources of funding for these earmarks within Mission Directorates as proposals are received and as the Directorates become more informed as to potential sources. We expect to outline these sources, by Mission Directorate, in future Operating Plan updates. As previously indicated to the Committees, NASA is implementing a policy in FY 2005 to apply uniform evaluation criteria for all non-competitive proposals, including unsolicited proposals, grant renewals, and Congressional earmarks. These criteria will be modeled after those reflected in NASA's Unsolicited Proposal Guide and include: relevance to the NASA mission; intrinsic merit; and cost realism. NASA is committed to working with FY 2005 earmark recipients to maximize the likelihood that proposals submitted will meet these criteria and contribute to Agency priorities.

Enclosure 3 provides a detailed explanation of the changes within the SAE and EC accounts. Enclosure 4 provides an update for NASA's FY 2004 Operating Plan.

Several key features of NASA's initial FY 2005 Operating Plan are highlighted below.

### **Space Shuttle Return to Flight**

This Operating Plan is based upon NASA's updated estimates for Space Shuttle Return to Flight (RTF) and RTF-related requirements for FY 2005. NASA has estimated that the emergent FY 2005 RTF and RTF-related funding requirements could total up to \$762.0 million. This Operating Plan accommodates \$474.8 million in FY 2005 for RTF requirements that have been approved for implementation by the Program Requirements Change Board and verified by the RTF Planning Team, as identified in the December 6, 2004, update to NASA's Implementation Plan for Space Shuttle Return to Flight and Beyond. The tasks associated with the remaining \$287.2 million in FY 2005 RTF and RTF-related activities are still under technical review; funds will be provided to RTF as Control Board action is taken, and reflected in future Operating Plans.

NASA expects to establish updated FY 2005 RTF requirements as early as February 2005, and will communicate the revised estimates to the Committee as soon as they are available.

The \$474.8 million in emergent RTF requirements addressed in this Operating Plan have been accommodated through reductions in International Space Station Operations (-\$160.0 million) and Space Shuttle Development and Operations (-\$170.0 million) and other Agency programs. As NASA has previously reported to the Committee, the Space Operations Mission Directorate has undertaken an evaluation of the Shuttle Service Life Extension Program (SLEP) to identify only those enhancements that can be effectively implemented during the Shuttle's remaining operational life to improve safety and reliability. Other upgrades that would yield returns on investment beyond the scheduled service life of the Shuttle fleet have been or will be terminated. Among the Shuttle offsets identified for RTF requirements are funds derived from termination of the following:

- Advanced Health Management System (AHMS) Phase II;
- Cockpit Avionics Upgrade; and,
- Vehicle Health Monitoring System Upgrade.

Decisions to pursue these upgrades were made prior to the policy decision as part of the Vision for Space Exploration to phase out the Space Shuttle program following completion of assembly of the International Space Station, targeted for the end of this decade. Based upon the decision to refocus the Shuttle program and the exigencies of RTF planning and execution, these upgrades are no longer considered effective.

NASA will return the Space Shuttle to flight as soon as safely possible, complete assembly of the ISS, and phase out the Space Shuttle when its role in ISS assembly is complete, planned for the end of this decade. The Agency will continue to keep the Committee apprised through updates of NASA's Implementation Plan for Space Shuttle Return to Flight and Beyond.

### **Hubble Space Telescope**

NASA is continuing to monitor the Hubble Space Telescope (HST) batteries and other subsystems for refined life prediction and is assessing improved techniques for maintaining scientific operations should further subsystems fail. This Operating Plan includes a total of \$175.0 million for early design activities for HST de-orbit and ongoing assessment of alternative servicing options. This amount is made up of \$86.0 million within the Science Mission Directorate and \$89.0 million from the Exploration Systems Mission Directorate. NASA's assessment will take into account the findings of the recently issued final report of the National Academy of Sciences, "Assessment of Options for Extending the Life of the Hubble Space Telescope." This funding level is sufficient to support FY 2005 expenses to date, near-term design work required to safely de-orbit HST, and, as appropriate, continued assessment of the feasibility of enhancing the de-orbit mission with a robotic servicing capability. Other servicing or rehosting options may also be assessed. The actual FY 2005 funding necessary for the Agency's assessment and early design work will be reflected in a future Operating Plan update.

### **Lunar Reconnaissance Orbiter**

This Operating Plan includes \$52.0 million in funding for the Lunar Reconnaissance Orbiter (LRO), the very high-priority, first mission in the Robotic Lunar Exploration Program, which is slated for launch in the fall of 2008. This amount is \$18.0 million below the President's FY 2005 request and is in addition to the \$17.0 million identified for the LRO program in the September 2004 update of NASA's FY 2004 Operating Plan. This funding will support initial

development of the recently selected suite of LRO instruments, as well as planned progress toward the Preliminary Design Review (PDR) in May 2005, and a full-scale development decision in late 2005.

The suite of LRO instruments is consistent with guidance from the Committees on Appropriations that fundamental lunar science questions be addressed in a significant fashion through the selected LRO instruments. As a result of contributions by the planetary science community to the LRO Announcement of Opportunity (AO), all eight measurement sets solicited via the LRO AO are traceable to basic science issues enumerated in the National Academy of Sciences "New Frontiers in the Solar System," the Academy's decadal survey of solar system science objectives. The data sets include global topographic mapping of the Moon at scales relevant to major remaining science issues associated with the origin and evolution of the Moon, as well as polar resource assessment to improve understanding of the source of volatiles in the Earth-Moon system. Such issues represent some of the most important science questions about the inner solar system that can be treated from lunar orbit. Furthermore, several of LRO's lunar measurement sets are "enablers" that will allow NASA to adapt its strategies for conducting both robotic and human lunar exploration, in much the same way that maps created by the Mars Global Surveyor informed NASA's decisions about where to land the Mars Exploration Rovers. NASA seeks to use this successful approach as well in conducting science-driven reconnaissance of the Moon. Science data from LRO will be archived in the Planetary Data System for use by the entire planetary science community, in addition to LRO's instrument teams. NASA also plans to hold a competitive selection for a team of Guest Observer scientists to work with the datasets produced by LRO to ensure that their science value is maximized.

The LRO instruments are a real demonstration of the philosophy of the Vision for Space Exploration, in which both exploration relevance and scientific impact are maximized. In order to meet the targeted 2008 launch date, NASA is initiating funding of the LRO instruments now.

### **Explorations Systems**

Within Exploration Systems, several evaluations currently underway will be used to finalize acquisition strategies for FY 2005, in forthcoming Operating Plan updates, and in future years.

Through eleven Concept Exploration and Refinement (CE&R) study contracts, Constellation Systems has teamed with industry and academia to refine requirements and architectural approaches for lunar and Mars exploration. The initial results of those studies were completed in November 2004, with final reports due in February 2005. Recommendations from this analysis will be incorporated into an updated strategy for the Crew Exploration Vehicle and other components of Constellation.

Project Prometheus is currently engaged in an analysis of alternatives that will determine the optimal use of nuclear propulsion and power in a flight mission with relevance to exploration and science. The completion of the analysis in early 2005 will serve as the basis for updating the funding profile.

Potential rebalancing of the Biological and Physical Research portfolio is dependent on an ongoing review 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 Station. This review will prioritize our needs for each phase (or "spiral") of the planned

exploration strategy. Review results are scheduled for completion in early 2005 and will be used to update the research portfolio.

### Centennial Challenges

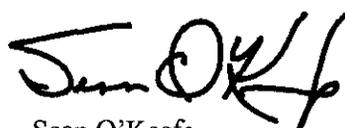
This Operating Plan includes a total of \$10.0 million for the Centennial Challenges Program. This funding will enable NASA to continue to pursue small prizes within existing authorities pending Congressional enactment of NASA's proposed authorization for larger prizes. NASA looks forward to working with the Committees as the Centennial Challenges program is implemented, and, as requested in the Conference Report, will provide the Committees on Appropriations a detailed implementation plan as soon as possible.

### Buyouts

The competency mix within the NASA workforce is evolving. In a continuing effort to shape an efficient workforce with competencies necessary to meet the challenges of our mission, five NASA Centers have developed plans to offer voluntary separation incentives (buyouts) to a portion of their workforce, using the government-wide buyout authorities available to NASA. Buyouts are an efficient tool among others to enable the proper management of NASA's valuable human capital assets. The Office of Personnel Management, in consultation with the Office of Management and Budget, has approved specific incentive plans for NASA's Ames Research Center, Langley Research Center, Glenn Research Center, Dryden Flight Research Center, and Marshall Space Flight Center. To support rebalancing at these Centers, incentives may also be offered at any NASA location to create placements for employees in excess competency areas. Incentives will be concentrated in the December 2004-January 2005 timeframe, but could continue, as needed, throughout FY 2006. Under separate cover, I am submitting, in accordance with Section 420 of Division I of the FY 2005 Consolidated Appropriations Act, my certification to the Committees on Appropriations that payments under these approved buyout plans will not result in the loss of skills related to the safety of the Space Shuttle or the International Space Station or to the conduct of independent safety oversight in NASA.

I look forward to working with the Committee on the implementation of NASA's initial FY 2005 Operating Plan.

Cordially,



Sean O'Keefe  
Administrator

4 Enclosures

	FY05 Budget Request	Emergency Hurricane Supp	General Reduction*	Subtotal (Pre- rescission)	0.8% Rescission	Redirection of Corporate G&A	Other NASA Changes	Initial Operating Plan
<b>TOTAL</b>	<b>16,244.0</b>	<b>126.0</b>	<b>-44.0</b>	<b>16,326.0</b>	<b>-129.6</b>	<b>-100.0</b>	<b>100.0</b>	<b>16,196.4</b>
<b>SCIENCE, AERONAUTICS AND EXPLORATION</b>	<b>7,760.0</b>	<b>-</b>	<b>-20.0</b>	<b>7,740.0</b>	<b>-61.9</b>	<b>-47.9</b>	<b>50.6</b>	<b>7,680.8</b>
<b>SPACE SCIENCE</b>	<b>4,138.3</b>	<b>-</b>	<b>-12.0</b>	<b>4,126.3</b>	<b>-33.0</b>	<b>-25.5</b>	<b>-</b>	<b>4,067.8</b>
<b>SOLAR SYSTEM EXPLORATION (SSE)</b>	<b>1,187.0</b>		<b>-8.0</b>	<b>1,179.0</b>	<b>-9.4</b>	<b>-7.3</b>	<b>-37.2</b>	<b>1,125.0</b>
<u>DEVELOPMENT</u>	<u>209.7</u>	<b>-</b>	<b>-</b>	<u>209.7</u>	<u>-1.7</u>	<u>-1.3</u>	<u>15.2</u>	<u>222.0</u>
MESSENGER DEVELOPMENT								
DEEP IMPACT DEVELOPMENT	9.5			9.5	-0.1	-0.1	15.2	24.6
DAWN DEVELOPMENT	84.4			84.4	-0.7	-0.5		83.2
NEW HORIZONS/PLUTO DEVELOPMENT	115.8			115.8	-0.9	-0.7		114.2
OPERATIONS	277.0			277.0	-2.2	-1.7		273.1
RESEARCH	366.6		-4.0	362.6	-2.9	-2.3	-1.3	356.1
<u>TECHNOLOGY AND ADVANCED CONCEPTS</u>	<u>333.7</u>	<b>-</b>	<b>-4.0</b>	<u>329.7</u>	<u>-2.6</u>	<u>-2.1</u>	<u>-51.1</u>	<u>273.9</u>
FUTURE DISCOVERY	48.7			48.7	-0.4	-0.3	-15.2	32.8
FUTURE NEW FRONTIERS	100.7			100.7	-0.8	-0.6		99.3
IN-SPACE POWER & PROPULSION (ISP)	163.6		-4.0	159.6	-1.3	-1.0	-24.0	133.3
OTHER TECHNOLOGY	20.7			20.7	-0.2	-0.1	-11.9	8.5
<b>MARS EXPLORATION</b>	<b>690.9</b>			<b>690.9</b>	<b>-5.5</b>	<b>-4.3</b>		<b>681.1</b>
<u>DEVELOPMENT</u>	<u>104.2</u>	<b>-</b>	<b>-</b>	<u>104.2</u>	<u>-0.8</u>	<u>-0.6</u>	<b>-</b>	<u>102.7</u>
MARS RECONNAISSANCE ORBITER DEV	104.2			104.2	-0.8	-0.6		102.7
OPERATIONS	9.9			9.9	-0.1	-0.1		9.8
RESEARCH	61.2			61.2	-0.5	-0.4		60.3
<u>TECHNOLOGY AND ADVANCED CONCEPTS</u>	<u>515.6</u>	<b>-</b>	<b>-</b>	<u>515.6</u>	<u>-4.1</u>	<u>-3.2</u>	<b>-</b>	<u>508.3</u>
MARS 2007 SCOUTS	102.8			102.8	-0.8	-0.6		101.3
MARS 2009 SCIENCE LABORATORY	174.6			174.6	-1.4	-1.1		172.1
2009 U.S. TELESAT	25.1			25.1	-0.2	-0.2		24.7
OPTICAL COMM	55.8			55.8	-0.4	-0.3		55.0
MARS PROGRAM PLANS & ARCHITECTURE & OTHER	125.6			125.6	-1.0	-0.8		123.8
OTHER TECHNOLOGY	31.7			31.7	-0.3	-0.2		31.3
<b>LUNAR EXPLORATION</b>	<b>70.0</b>			<b>70.0</b>	<b>-0.6</b>	<b>-0.4</b>	<b>-17.0</b>	<b>52.0</b>
<u>TECHNOLOGY AND ADVANCED CONCEPTS</u>	<u>70.0</u>	<b>-</b>	<b>-</b>	<u>70.0</u>	<u>-0.6</u>	<u>-0.4</u>	<u>-17.0</u>	<u>52.0</u>
LUNAR EXPLORATION	70.0			70.0	-0.6	-0.4	-17.0	52.0
<b>ASTRONOMICAL SEARCH FOR ORIGINS (ASO)</b>	<b>1,066.8</b>		<b>-2.0</b>	<b>1,064.8</b>	<b>-8.5</b>	<b>-6.6</b>	<b>86.0</b>	<b>1,135.7</b>
<u>DEVELOPMENT</u>	<u>156.9</u>	<b>-</b>	<b>-</b>	<u>156.9</u>	<u>-1.3</u>	<u>-1.0</u>	<u>138.5</u>	<u>293.2</u>
HST DEVELOPMENT	29.7			29.7	-0.2	-0.2	86.0	115.3
KEPLER DEVELOPMENT	127.2			127.2	-1.0	-0.8		125.4

FY 2005 Operating Plan  
Enclosure 1

	FY05 Budget Request	Emergency Hurricane Supp	General Reduction*	Subtotal (Pre- rescission)	0.8% Rescission	Redirection of Corporate G&A	Other NASA Changes	Initial Operating Plan
SOFIA DEVELOPMENT							52.5	52.5
OPERATIONS	56.6			56.6	-0.5	-0.3	-33.4	22.4
RESEARCH	232.3			232.3	-1.9	-1.4	-19.1	209.9
<u>TECHNOLOGY AND ADVANCED CONCEPTS</u>	<u>621.0</u>	—	<u>-2.0</u>	<u>619.0</u>	<u>-5.0</u>	<u>-3.8</u>	—	<u>610.2</u>
SIM	155.1			155.1	-1.2	-1.0		152.9
JAMES WEBB SPACE TELESCOPE (JWST)	318.1			318.1	-2.5	-2.0		313.6
TPF	52.5			52.5	-0.4	-0.3		51.8
KECK INTERFEROMETER	12.4			12.4	-0.1	-0.1		12.2
OTHER ASO TECH. & ADV CONCEPT	82.9		-2.0	80.9	-0.6	-0.5		79.7
<b>STRUCTURE &amp; EVOLUTION OF THE UNIVERSE</b>	<b>377.7</b>		<b>-2.0</b>	<b>375.7</b>	<b>-3.0</b>	<b>-2.3</b>	<b>7.1</b>	<b>377.5</b>
<u>DEVELOPMENT</u>	<u>123.0</u>	—	—	<u>123.0</u>	<u>-1.0</u>	<u>-0.8</u>	<u>3.1</u>	<u>124.4</u>
GLAST DEVELOPMENT	103.2			103.2	-0.8	-0.6		101.7
SEU SMALL DEVELOPMENT PROJECTS	19.8			19.8	-0.2	-0.1		19.5
SWIFT							3.1	3.1
OPERATIONS	4.3			4.3	-0.0	-0.0		4.2
RESEARCH	210.0		-2.0	208.0	-1.7	-1.3	4.0	209.0
<u>TECHNOLOGY AND ADVANCED CONCEPTS</u>	<u>40.4</u>	—	—	<u>40.4</u>	<u>-0.3</u>	<u>-0.2</u>	—	<u>39.8</u>
CONSTELLATION-X	12.0			12.0	-0.1	-0.1		11.8
LISA	19.0			19.0	-0.2	-0.1		18.7
OTHER SEU TECH. & ADV CONCEPTS	9.4			9.4	-0.1	-0.1		9.3
<b>SUN-EARTH CONNECTION (SEC)</b>	<b>745.9</b>			<b>745.9</b>	<b>-6.0</b>	<b>-4.6</b>	<b>-38.9</b>	<b>696.4</b>
<u>DEVELOPMENT</u>	<u>277.1</u>	—	—	<u>277.1</u>	<u>-2.2</u>	<u>-1.7</u>	—	<u>273.2</u>
STEREO DEV	73.8			73.8	-0.6	-0.5		72.8
SOLAR DYNAMICS OBSERVATORY DEV	158.4			158.4	-1.3	-1.0		156.2
SEC SMALL DEVELOPMENT PROJECTS	44.9			44.9	-0.4	-0.3		44.3
OPERATIONS	33.9			33.9	-0.3	-0.2		33.4
RESEARCH	194.6			194.6	-1.6	-1.2		191.8
<u>TECHNOLOGY AND ADVANCED CONCEPTS</u>	<u>240.3</u>	—	—	<u>240.3</u>	<u>-1.9</u>	<u>-1.5</u>	<u>-38.9</u>	<u>198.0</u>
NEW MILLENNIUM PROGRAM	82.0			82.0	-0.7	-0.5	-15.0	65.8
SOLAR-TERRESTRIAL PROBES (STP)	15.1			15.1	-0.1	-0.1		14.9
LIVING WITH A STAR (LWS)	46.9			46.9	-0.4	-0.3		46.2
FUTURE EXPLORERS/OTHER	96.3			96.3	-0.8	-0.6	-23.9	71.0
<b><u>EARTH SCIENCE</u></b>	<b><u>1,485.4</u></b>	—	<b><u>-5.0</u></b>	<b><u>1,480.4</u></b>	<b><u>-11.8</u></b>	<b><u>-9.2</u></b>	—	<b><u>1,459.4</u></b>
<b>EARTH SYSTEM SCIENCE</b>	<b>1,408.5</b>		<b>-5.0</b>	<b>1,403.5</b>	<b>-11.2</b>	<b>-8.7</b>		<b>1,383.6</b>
<u>DEVELOPMENT</u>	<u>242.4</u>	—	—	<u>242.4</u>	<u>-1.9</u>	<u>-1.5</u>	<u>9.0</u>	<u>248.0</u>

	FY05 Budget Request	Emergency Hurricane Supp	General Reduction*	Subtotal (Pre- rescission)	0.8% Rescission	Redirection of Corporate G&A	Other NASA Changes	Initial Operating Plan
EOS/AURA	4.5			4.5	-0.0	-0.0	4.7	9.1
EP/CALIPSO	10.1			10.1	-0.1	-0.1	5.3	15.2
NPP (from Formulation)	141.1			141.1	-1.1	-0.9		139.1
EP/CLOUDSAT	3.1			3.1	-0.0	-0.0	5.1	8.1
EOSDIS	40.2			40.2	-0.3	-0.2		39.6
EO/GIFTS	16.5			16.5	-0.1	-0.1	-8.6	7.6
OTHER DEVELOPMENT	26.9			26.9	-0.2	-0.2	2.6	29.1
OPERATIONS	307.2			307.2	-2.5	-1.9	3.8	306.6
RESEARCH	560.0			560.0	-4.5	-3.5	-3.8	548.3
TECHNOLOGY AND ADVANCED CONCEPTS	298.9		-5.0	293.9	-2.4	-1.8	-9.0	280.7
<b>EARTH SCIENCE APPLICATIONS</b>	<b>76.9</b>			<b>76.9</b>	<b>-0.6</b>	<b>-0.5</b>		<b>75.8</b>
RESEARCH	44.9			44.9	-0.4	-0.3		44.3
TECHNOLOGY AND ADVANCED CONCEPTS	32.0			32.0	-0.3	-0.2		31.5
<b><u>BIOLOGICAL AND PHYSICAL RESEARCH</u></b>	<b><u>1,048.6</u></b>	<b><u>-</u></b>	<b><u>-3.0</u></b>	<b><u>1,045.6</u></b>	<b><u>-8.4</u></b>	<b><u>-6.5</u></b>	<b><u>-</u></b>	<b><u>1,030.8</u></b>
<b>BIOLOGICAL SCIENCES RESEARCH</b>	<b>491.5</b>		<b>-3.0</b>	<b>488.5</b>	<b>-3.9</b>	<b>-3.0</b>		<b>481.6</b>
DEVELOPMENT	3.5			3.5	-0.0	-0.0		3.5
OPERATIONS	119.0			119.0	-1.0	-0.7		117.3
RESEARCH	369.0		-3.0	366.0	-2.9	-2.3		360.8
<b>PHYSICAL SCIENCES RESEARCH</b>	<b>300.1</b>			<b>300.1</b>	<b>-2.4</b>	<b>-1.9</b>		<b>295.8</b>
<u>DEVELOPMENT</u>	<u>33.7</u>	<u>-</u>	<u>-</u>	<u>33.7</u>	<u>-0.3</u>	<u>-0.2</u>	<u>-</u>	<u>33.2</u>
MATERIALS SCIENCE RESEARCH RACK - 1	7.5			7.5	-0.1	-0.0		7.4
FLUIDS & COMBUSTION FACILITY	17.0			17.0	-0.1	-0.1		16.8
LO TEMP MICROGRAVITY PHYSICS FACILITY	9.2			9.2	-0.1	-0.1		9.1
OPERATIONS	107.0			107.0	-0.9	-0.7		105.5
RESEARCH	159.4			159.4	-1.3	-1.0		157.1
<b>RESEARCH PARTNERSHIPS &amp; FLIGHT SUPT</b>	<b>257.0</b>			<b>257.0</b>	<b>-2.1</b>	<b>-1.6</b>		<b>253.4</b>
OPERATIONS	233.4			233.4	-1.9	-1.4		230.1
RESEARCH	23.6			23.6	-0.2	-0.1		23.3
<b><u>AERONAUTICS</u></b>	<b><u>919.2</u></b>	<b><u>-</u></b>	<b><u>-</u></b>	<b><u>919.2</u></b>	<b><u>-7.4</u></b>	<b><u>-5.7</u></b>	<b><u>-</u></b>	<b><u>906.2</u></b>
<b>AERONAUTICS TECHNOLOGY</b>	<b>919.2</b>			<b>919.2</b>	<b>-7.4</b>	<b>-5.7</b>		<b>906.2</b>
<u>TECHNOLOGY AND ADVANCED CONCEPTS</u>	<u>919.2</u>	<u>-</u>	<u>-</u>	<u>919.2</u>	<u>-7.4</u>	<u>-5.7</u>	<u>-</u>	<u>906.2</u>

	FY05 Budget Request	Emergency Hurricane Supp	General Reduction*	Subtotal (Pre- rescission)	0.8% Rescission	Redirection of Corporate G&A	Other NASA Changes	Initial Operating Plan
<b>AVIATION SAFETY &amp; SECURITY PROGRAM</b>	<b>188.0</b>	-	-	<b>188.0</b>	<b>-1.5</b>	<b>-1.2</b>	-	<b>185.3</b>
Vehicle Safety Technologies	77.8			77.8	-0.6	-0.5		76.7
System Safety Technologies	21.4			21.4	-0.2	-0.1		21.1
Weather Safety Technologies	44.3			44.3	-0.4	-0.3		43.7
A/C & Systems Vulnerability Mitigation	35.5			35.5	-0.3	-0.2		35.0
Other	9.0			9.0	-0.1	-0.1		8.9
<b>VEHICLE SYSTEMS PROGRAM</b>	<b>576.8</b>	-	-	<b>576.8</b>	<b>-4.6</b>	<b>-3.6</b>	-	<b>568.6</b>
Quiet Aircraft Technology	72.1			72.1	-0.6	-0.4		71.1
Ultra Efficient Engine Technology	88.2			88.2	-0.7	-0.5		87.0
Low Emissions Alternative Power	120.9			120.9	-1.0	-0.7		119.2
Efficient Aerodynamic Shapes & Integration	68.0			68.0	-0.5	-0.4		67.0
Integrated Tailored Aerostructure	71.4			71.4	-0.6	-0.4		70.4
Autonomous Robust Avionics	20.4			20.4	-0.2	-0.1		20.1
Flight & System Demonstration	112.9			112.9	-0.9	-0.7		111.3
Strategic Vehicle Architecture	22.9			22.9	-0.2	-0.1		22.6
<b>AIRSPACE SYSTEMS PROGRAM</b>	<b>154.4</b>	-	-	<b>154.4</b>	<b>-1.2</b>	<b>-1.0</b>	-	<b>152.2</b>
Small Aircraft Transportation System	16.6			16.6	-0.1	-0.1		16.4
Virtual Airspace Modeling & Simulation	29.9			29.9	-0.2	-0.2		29.5
Efficient Aircraft Spacing	35.4			35.4	-0.3	-0.2		34.9
Efficient Flight Path Management	14.0			14.0	-0.1	-0.1		13.8
Strategic Airspace Usage	7.1			7.1	-0.1	-0.0		7.0
Space-Based Technologies	18.6			18.6	-0.1	-0.1		18.3
Human Measures & Performance	18.1			18.1	-0.1	-0.1		17.8
Technical Integration	14.7			14.7	-0.1	-0.1		14.5
<b>EDUCATION PROGRAMS</b>	<b>168.5</b>	-	-	<b>168.5</b>	<b>-1.3</b>	<b>-1.0</b>	<b>50.6</b>	<b>216.7</b>
ACADEMIC PROGRAMS	77.7			77.7	-0.6	-0.5	50.3	126.9
MINORITY UNIV RESEARCH & EDUCATION	90.8			90.8	-0.7	-0.6	0.3	89.8
<b>EXPLORATION CAPABILITIES</b>	<b>8,456.4</b>	<b>126.0</b>	<b>-28.0</b>	<b>8,554.4</b>	<b>-67.4</b>	<b>-52.1</b>	<b>49.4</b>	<b>8,484.2</b>
<b>EXPLORATION SYSTEMS</b>	<b>1,782.4</b>	-	<b>-8.0</b>	<b>1,774.4</b>	<b>-14.2</b>	<b>-11.0</b>	<b>-95.4</b>	<b>1,653.8</b>
<b>HUMAN AND ROBOTIC TECHNOLOGY</b>	<b>1,093.7</b>		<b>-5.0</b>	<b>1,088.7</b>	<b>-8.7</b>	<b>-6.7</b>	<b>54.0</b>	<b>1,127.2</b>
<b>TECHNOLOGY AND ADVANCED CONCEPTS</b>	<b>1,093.7</b>		<b>-5.0</b>	<b>1,088.7</b>	<b>-8.7</b>	<b>-6.7</b>	<b>54.0</b>	<b>1,127.2</b>
TECHNOLOGY MATURATION	114.9		-3.3	111.6	-0.9	-0.7	-10.0	100.0
PROJECT PROMETHEUS	437.9			437.9	-3.5	-2.7		431.7
ADVANCED SPACE TECHNOLOGY	359.5		-1.7	357.8	-2.9	-2.2	-15.0	337.7
INNOVATIVE TECH TRANS PARTNERSHIPS (ITTP)	161.4			161.4	-1.3	-1.0		159.1
CENTENNIAL CHALLENGE	20.0			20.0	-0.2	-0.1	-10.0	9.7
HUBBLE SERVICING MISSION							89.0	89.0
<b>TRANSPORTATION SYSTEMS</b>	<b>688.7</b>		<b>-3.0</b>	<b>685.7</b>	<b>-5.5</b>	<b>-4.2</b>	<b>-149.4</b>	<b>526.5</b>
<b>TECHNOLOGY AND ADVANCED CONCEPTS</b>	<b>688.7</b>		<b>-3.0</b>	<b>685.7</b>	<b>-5.5</b>	<b>-4.2</b>	<b>-149.4</b>	<b>526.5</b>
CREW EXPLORATION VEHICLE	428.0			428.0	-3.4	-2.6		421.9

FY 2005 Operating Plan  
Enclosure 1

	FY05 Budget Request	Emergency Hurricane Supp	General Reduction*	Subtotal (Pre- rescission)	0.8% Rescission	Redirection of Corporate G&A	Other NASA Changes	Initial Operating Plan
SPACE LAUNCH INITIATIVE (SLI)	260.7		-3.0	257.7	-2.1	-1.6	-149.4	104.6
<b>SPACE FLIGHT</b>	<b>6,674.0</b>	<b>126.0</b>	<b>-20.0</b>	<b>6,780.0</b>	<b>-53.2</b>	<b>-41.2</b>	<b>144.8</b>	<b>6,830.4</b>
<b>SPACE STATION</b>	<b>1,862.7</b>			<b>1,862.7</b>	<b>-14.9</b>	<b>-11.5</b>	<b>-160.0</b>	<b>1,676.3</b>
<u>DEVELOPMENT</u>	<u>99.0</u>	-	-	<u>99.0</u>	<u>-0.8</u>	<u>-0.6</u>	<u>34.2</u>	<u>131.8</u>
ISS CORE DEVELOPMENT	69.4			69.4	-0.6	-0.4	34.2	102.6
ISS CAPABILITY UPGRADES	29.6			29.6	-0.2	-0.2		29.2
<u>OPERATIONS</u>	<u>1,763.7</u>	-	-	<u>1,763.7</u>	<u>-14.1</u>	<u>-10.9</u>	<u>-194.2</u>	<u>1,544.5</u>
SPACECRAFT OPERATIONS	812.0			812.0	-6.5	-5.0	-114.2	686.3
LAUNCH & MISSION OPERATIONS	458.3			458.3	-3.7	-2.8		451.8
OPERATIONS PROGRAM INTEGRATION	353.4			353.4	-2.8	-2.2	-40.0	308.4
ISS CARGO/CREW SERVICES	140.0			140.0	-1.1	-0.9	-40.0	98.0
<b>SPACE SHUTTLE</b>	<b>4,319.2</b>	<b>126.0</b>	<b>-20.0</b>	<b>4,425.2</b>	<b>-34.4</b>	<b>-26.6</b>	<b>304.8</b>	<b>4,669.0</b>
<u>DEVELOPMENT</u>	<u>87.2</u>	-	-	<u>87.2</u>	<u>-0.7</u>	<u>-0.5</u>	<u>-26.0</u>	<u>60.0</u>
SSME ADV HEALTH MANAGEMENT (AHM)	3.3			3.3	-0.0	-0.0	-1.6	1.7
COCKPIT AVIONICS UPGRADE (CAU)	83.9			83.9	-0.7	-0.5	-24.4	58.3
<u>OPERATIONS</u>	<u>4,232.0</u>	<u>126.0</u>	<u>-20.0</u>	<u>4,338.0</u>	<u>-33.7</u>	<u>-26.1</u>	<u>330.8</u>	<u>4,609.0</u>
PROGRAM INTEGRATION	793.0		-20.0	773.0	-6.2	-4.9	-75.0	686.9
GROUND OPERATIONS	1,055.5			1,055.5	-8.4	-6.5		1,040.5
FLIGHT OPERATIONS	405.4			405.4	-3.2	-2.5	7.0	406.7
FLIGHT HARDWARE	1,978.1			1,978.1	-15.8	-12.2	398.8	2,348.9
KSC Hurricane Damages		126.0		126.0				126.0
<b>SPACE &amp; FLIGHT SUPPORT</b>	<b>492.1</b>			<b>492.1</b>	<b>-3.9</b>	<b>-3.0</b>		<b>485.1</b>
<u>DEVELOPMENT</u>	<u>76.5</u>	-	-	<u>76.5</u>	<u>-0.6</u>	<u>-0.5</u>	-	<u>75.4</u>
PLUMBROOK	30.5			30.5	-0.2	-0.2		30.1
ENVIRONMENTAL COMPLIANCE & RESTORATION	46.0			46.0	-0.4	-0.3		45.3
OPERATIONS	415.6			415.6	-3.3	-2.6		409.7
<b>INSPECTOR GENERAL</b>	<b>27.6</b>		<b>4.0</b>	<b>31.6</b>	<b>-0.3</b>			<b>31.3</b>

\*as distributed by NASA

<b>FY 2005 Congressional Earmarks</b>		Pre-	Total
		Rescission	less 0.8%
		<u>Total</u>	<u>Rescission</u>
		<b>426.04</b>	<b>422.63</b>
<b>Exploration, Science &amp; Aeronautics*</b>		<b>333.54</b>	<b>330.87</b>
<b>SPACE SCIENCE</b>		<b>71.55</b>	<b>70.98</b>
	Lunar Exploration mission		
	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
	Up to 8 FTEs for NASA program office @ APL	2.00	1.98
	TPF		
	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
<b>EARTH SCIENCE</b>		<b>91.34</b>	<b>90.61</b>
	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 \$1.5M 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]	5.00	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 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
Transfer to Air Force Research Lab to begin development of miniature synthetic radar technology	3.00	2.98
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
<b>BIOLOGICAL &amp; PHYSICAL RESEARCH</b>	<b>26.80</b>	<b>26.59</b>
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 Bioinformatics, 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 Proj 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 Biotechnology 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
<b>AERONAUTICS</b>	<b>92.80</b>	<b>92.06</b>
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
Validated Probabilistic Wing Tools	0.35	0.35
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
	Glenn Research Center for the commercial technology program	4.00	3.97
	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
	<b>EDUCATION PROGRAMS</b>	<b>51.05</b>	<b>50.64</b>
	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 Campbell 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
	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
	<b>EXPLORATION CAPABILITIES</b>	<b>86.00</b>	<b>85.31</b>
	<b>EXPLORATION SYSTEMS</b>	<b>86.00</b>	<b>85.31</b>
	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 Environmental Laboratory for development 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
	Centennial Challenges		
	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 Development Institute (RDI) for continued funding for a Laboratory 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 Internet 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 grid 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
	<b>Corporate G&amp;A (to be allocated to each program)</b>	<b>2.50</b>	<b>2.48</b>

	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
<b>INSPECTOR GENERAL</b>		<b>4.00</b>	<b>3.97</b>
	To conduct the annual audit of NASA's financial statements	3.80	3.77
	Unspecified	0.20	0.20

**Redirection of Corporate G&A:**

NASA has redirected an intended augmentation of \$100.0M in Corporate General and Administrative (G&A) funds to address emergent requirements for Shuttle RTF. The \$100M was allocated to each line item, as shown on Enclosure 1.

**General Reduction and Other NASA Changes:**

The NASA appropriation directed an increase of \$4.0M to the Inspector General and included a general reduction of \$48M to the remaining NASA programs. Changes to accommodate both the Congressional total and Other NASA Changes (which are also shown on Enclosure 1) are discussed below.

**SCIENCE MISSION DIRECTORATE**

**Space Science**

**Solar System Exploration (SSE)**

**General Reduction:**

- Research
  - -\$4.0M, Solar System R&A
    - Reduction to Reserves
- Technology and Advanced Concepts
  - -\$4.0M, Radioisotope Power Systems
    - Reduction in reserves, no impact on schedule or cost

**Other NASA Changes:**

- Technology and Advanced Concepts
  - +\$15.2M, Deep Impact
    - Additional funds to resolve technical and schedule problems and to support a January 2005 launch. Total life cycle cost is \$341.7M, compared to \$326.5M specified in the Final FY04 Operating Plan
- Research
  - -\$1.3M, Solar System Research
    - Reduction to Reserves
- Technology and Advanced Concepts
  - -\$24.0M, In Space Power and Propulsion
    - Slows ramp-up of program and defers work on advanced propulsion technologies
  - -\$11.9 Other SSE Technology
    - Defers start of high power instrument technology and fundamental science by one year
  - -\$15.2M, SSE Tech and Advanced Concept/Future Discovery
    - Applied Discovery program reserves to cover Deep Impact launch slip

### Lunar Exploration

#### Other NASA Changes:

- Technology and Advanced Concepts
  - -\$17.0M, Lunar Exploration
    - Adjustment for funds available from final FY04 Operating Plan will enable plans to proceed toward 2008 launch date

### Astronomical Search for Origins (ASO)

#### General Reduction:

- Technology and Advanced Concepts
  - -\$2.0M, Other ASO Tech and Advanced Concepts (Next Decade)
    - Ramp down of activities

#### Other NASA Changes:

- Development
  - +\$86.0 M, Hubble Space Telescope (HST), for early design activities for HST de-orbit and ongoing assessment of alternative servicing options
    - This amount, in combination with funds from the Exploration Systems Mission Directorate, will provide \$175M to support FY05 expenses to date, near term design work required to safely de-orbit HST, and, as appropriate, continued assessment of the feasibility of enhancing the de-orbit mission with a robotic capability. Other servicing or rehosting options may also be assessed.
    - Actual FY05 funding for the Agency's assessment and early design work will be reflected in a future Operating Plan update.
    - Lifecycle costs and schedule have not been determined at this time
  - +\$52.5.M, Stratospheric Observatory for Infrared Astronomy (SOFIA)
    - Realignment of funds from MO&DA into Development due to delay in start of Science Operations until FY06
- Operations: -\$33.4M
  - -\$33.4M, ASO Operations
    - Reallocated to SOFIA Development to cover delay in start of SOFIA science operations
- Research: -\$19.1M
  - -\$19.1M, ASO Research
    - Reallocated to SOFIA Development to cover delay in start of SOFIA science operations

### Structure and Evolution of the Universe (SEU)

#### General Reduction:

- Research
  - -\$2.0M, SEU Research (MO&DA)

- Astro E2 MO&DA has been delayed until late FY 2005 or early 2006, which mitigates the effect of this reduction in this fiscal year

**Other NASA Changes:**

- +\$3.1M Development
  - +\$3.1M, Swift Gamma Ray Burst Explorer Swift Development
    - Swift mission was successfully launched on November 17, 2004. Additional funding is required due to the technical difficulties with the BAT instrument, observatory I&T delays and impacts of the hurricanes in Florida. These funding are for additional costs due to launch delay. The previous LCC for Swift as disclosed in the FY 04 Initial Operating Plan was \$239.3M with a launch date of Sept 2004. This increase covers a two month delay to a new LCC of \$246.4M
- +\$4.0M, Research
  - +\$4.0M, Swift MO&DA
    - Swift MO&DA funding was reallocated to Development due to the timing of the launch early in the fiscal year of FY 2005. The previous LCC for Swift as disclosed in the FY 04 Initial Operating Plan was \$239.3M with a launch date of September 2004. This increase covers a two month delay to a new LCC of \$246.4M

<b>Sun-Earth Connection (SEC)</b>
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**Other NASA Changes:**

- Technology and Advanced Concepts
  - -\$15.0M, New Millennium Program
    - Delays next AO cycle by approximately 18 months
  - -\$23.9M, Future Explorers
    - -\$16.8M to extend Phase B for SMEX-10, 11 and delay launches by about 6 months; delay next AO by approximately one year; limits number of selections in FY08-10 timeframe
    - -\$7.1M realigned to Swift Development (\$3.1M) and Swift MO&DA (\$4M) to cover launch delay. MO&DA funding was used to cover Development costs until an operating plan can be put into place. Delay a SMEX selection by two months.

**EARTH SCIENCE**

<b>Earth System Science</b>
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**General Reduction:**

- Technology and Advanced Concepts
  - -\$5.0M, Orbiting Carbon Observatory (OCO) Mission
    - Launch impact and Life Cycle Cost (LCC) impacts being assessed
    - OCO mission under review for possible termination due to cost performance issues.

**Other NASA Changes:**

- Development
  - +\$4.7M, Aura

- Post Launch On-Orbit Award Fee and sustaining engineering support requirements
- LCC increased from \$810.3 (9/04 Op Plan Change) to \$815.0
  
- +\$5.3M, Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO)
  - Launch delay from no earlier than (NET) March 2005 to NET May 2005
  - Additional LCC requirements identified via final assessment of rebaselined mission
  - LCC increased from \$175.9 (9/04 Op Plan Change) to \$181.2
  
- +\$5.1M, Cloudsat
  - Launch delay from NET March 2005 to NET May 2005
  - LCC increased from \$158.1(9/04 Op Plan Change) to \$163.2
  
- -\$8.6M, Geosynchronous Imaging Fourier Transform Spectrometer (GIFTS)
  - Reprogramming remaining funds of terminated mission as disclosed in June 04 operating plan.
  
- +\$2.6M, Other Development (Gravity Recovery and Climate Experiment (GRACE))
  - Continued development of satellite flight software and ground processing software.
  - LCC increased from \$102.5 (FY05 Congressional Submit) to \$105.1
  
- Operations
  - +\$3.8M, Operations – Tropical Rainfall Measuring Mission (TRMM)
    - Funds are needed for extended operations of TRMM satellite until January 1, 2005 and re-entry no later than mid-FY07
  
- Research
  - -\$3.8M, Research
    - Decrease funds in order to support extended operations of TRMM satellite until January 1, 2005 and re-entry no later than mid-FY07
  
- Technology and Advanced Concepts: -\$9.0M
  - -\$6.1M, Integrated Development Program Team (IDPT)
    - New Millennium Program office support no longer necessary.
  
  - -\$2.9M Future Earth System Science Pathfinder (ESSP) Support
    - Requirements rephased to more accurately reflect planned support requirements

<b>Education</b>
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**Other NASA Changes:**

- +\$50.6M, reallocation of funds associated with SLI Termination Activities, to enable Education to fund Congressional earmarks
  - Agency management has determined that the Education Program cannot accommodate \$50.6M of Congressional earmarks within the existing program

**EXPLORATION SYSTEMS MISSION DIRECTORATE**

**BIOLOGICAL AND PHYSICAL RESEARCH**

**Biological Sciences Research**

**General Reduction:**

- Biological Sciences Research
  - -\$3.0M, BSR Research
    - Reduce number or delay award of new research grants to be selected in FY05
    - Potential rebalancing of the Biological and Physical Research portfolio is dependent on two ongoing reviews scheduled for completion in January 2005

**AERONAUTICS MISSION DIRECTORATE**

**AERONAUTICS**

**Aeronautics Technology**

**Other NASA Changes:**

- Technology and Advanced Concepts
  - \$0.0M, Vehicle Systems
    - Within Efficient Aerodynamic Shapes & Integration and Flight & System Demonstration, \$10M was redirected to fund the X-43A Mach 10 Flight
    - As previously discussed with the Committees on Appropriations, NASA expended \$5M a month (for two months October and November 2004) toward X-43A flight demonstration, which successfully flew on November 16, 2004
      - NASA's X-43A research vehicle Mach 10 Flight, demonstrating an air-breathing engine can fly at nearly 10 times the speed of sound. Preliminary data from the scramjet-powered research vehicle show its revolutionary engine worked successfully at approximately Mach 10, nearly 7000 mph, as it flew at an altitude of approximately 110,000 feet
  - Redirection of funds came from within the following
    - -\$3.0M, Efficient Aerodynamic Shapes & Integration
      - Delay in preliminary planning activities for Hypersonics Foundation Research
    - -\$7.0M, Flight & System Demonstration
      - Delay in intelligent flight control activities for flight verification and validation associated with the F-15 and C-17

**EXPLORATION SYSTEMS MISSION DIRECTORATE**

**EXPLORATION SYSTEMS**

**Human and Robotic Technology**

**General Reduction:**

- Technology and Advanced Concepts
  - -\$3.3M, Technology Maturation
    - Reduce number of future Technology Maturation projects to be selected in FY 2005
  - -\$1.7M, Advanced Space Technology
    - Reduce number of future Advanced Space Technology projects to be selected in FY 2005

**Other NASA Changes:**

- Technology and Advanced Concepts
  - +\$89.0M, Hubble Space Telescope (HST), for early design activities for HST de-orbit and ongoing assessment of alternative servicing options Initial funding for a Robotic Servicing Mission to develop autonomous rendezvous and docking capabilities and robotic efforts
    - This amount, in combination with funds from the Science Mission Directorate, will provide \$175M to support FY05 expenses to date, near term design work required to safely de-orbit HST, and, as appropriate, continued assessment of the feasibility of enhancing the de-orbit mission with a robotic capability. Other servicing or rehosting options may also be assessed.
    - Actual FY05 funding for the Agency's assessment and early design work will be reflected in a future Operating Plan update.
    - Lifecycle costs and schedule have not been determined at this time
  - -\$10.0M, Technology Maturation
    - Reduce number of future Technology Maturation projects to be selected in FY 2005
  - -\$15.0M, Advanced Space Technology
    - Reduce number of future Advanced Space Technology projects to be selected in FY 2005
  - -\$10.0M, Centennial Challenges
    - Will conduct competitions to the maximum allowable limit, pending Authorization to increase prize amounts
  - Innovative Technology Transfer Partnerships
    - NASA is implementing Congressional direction to continue commercial programs

**Transportation Systems**

**General Reduction:**

- -\$3.0M, SLI Activities

**Other NASA Changes:**

- -\$149.4M, Technology and Advanced Concepts
  - -\$149.4M, Space Launch Initiative Termination Liability
    - -\$50.6M, Reallocating funds to Education, to pay for Congressional earmarks

- Agency management has determined that the Education Program cannot accommodate Congressional earmarks within the existing program
- -\$98.8M, Reallocation of funds to Space Shuttle, for Return to Flight activities

### **SPACE OPERATIONS MISSION DIRECTORATE**

#### **SPACE FLIGHT**

<b>Space Station</b>
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**Other NASA Changes:**

- -\$194.2M, Operations
  - -\$40.0M, ISS Cargo/Crew Services
    - ISS Cargo/Crew requirements still under review. RFP for ISS services will be released in 2005
  - -\$114.2M, Spacecraft Operations
    - -\$80.0M, Reduce ISS program reserves and defer program content
      - Candidate content deferrals or deletions, and associated impacts, still being evaluated
    - -\$34.2M, Reserves held in Spacecraft Operations reallocated to ISS Core Development to fund the Space Station Power Transfer System (SSPTS)
  - -\$40.0M, Operations Program Integration
    - Reduce ISS program reserves and defer program content.
    - Candidate content deferrals or deletions and associated impacts, still being evaluated
- +\$34.2M, Development
  - +\$34.2M, ISS Core Development
    - Funding for Space Station Power Transfer System (SSPTS)

<b>Space Shuttle</b>
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**General Reduction:**

- -\$20.0M, Operations
  - -\$20.0M, reduction to Program Integration (Service Life Extension Program)
- **Other NASA Changes: +\$330.8M, Operations**
  - -\$75.0M, Program Integration
    - +\$69.0M, redirecting funds from Service Life Extension Program (SLEP) to continue supporting Return to Flight and CAIB recommendations
    - -\$144.0M Service Life Extension Program (SLEP)
      - -\$99.0M Improvements Programs
        - Due to the phasing out of the Shuttle Program, several planned upgrade projects will be canceled, and funding for Sustainability and Obsolescence requirements will be reduced
        - An evaluation of the Shuttle Service Life Extension Program (SLEP) will identify only those safety and reliability enhancements that improve the Shuttle during its remaining operational life

- Upgrades that will not yield returns on investment within the scheduled service life of the Shuttle fleet have been or will be terminated.
- -\$45.0M 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:
    - -\$3.1 M, CoF Planning and Design planning activity deferred into FY 2006 for future projects
    - -\$24.9M, Reduce scope of numerous CoF minor revitalization projects to essential upgrades
    - -\$17.0M, Reduce scope of numerous R&D minor revitalization projects to essential upgrades
- +\$7.0M, Flight Operations
  - Reallocating funds from SLEP within Program Integration to continue supporting Return to Flight and CAIB recommendations
- +\$398.8M, Flight Hardware
  - +\$94.0M, reallocating funds from SLEP within Program Integration to continue supporting Return to Flight and CAIB recommendations
  - +\$304.8M, reallocating/transferring funds from the following agency programs to continue supporting Return to Flight and CAIB recommendations
    - \$160.0M, International Space Station
    - \$98.8M, Space Launch Initiative
    - \$46.0M, Other agency programs
- -\$26.0M, Development
  - -\$1.6M, SSME Advanced Health Management System (AHMS)
    - Deleted reserves and reduced the level of sustaining support for AHMS Phase 1 Program
  - -\$24.4M, Cockpit Avionics Upgrade (CAU)
    - Due to the phasing out of the Shuttle Program, several planned upgrade projects will be canceled, and funding for Sustainability and Obsolescence requirements will be reduced
      - An evaluation of the Shuttle Service Life Extension Program (SLEP) will identify only those safety and reliability enhancements that improve the Shuttle during its remaining operational life
      - Other upgrades that will not yield returns on investment within the scheduled service life of the Shuttle fleet have been or will be terminated

<b>Inspector General</b>
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**General Reduction:**

- +\$4.0M, Inspector General

## INSTITUTIONAL CROSS-CUT

### Non-Programmatic Construction of Facilities (CoF): +\$0.0M

Non-programmatic CoF is included within each Center's G&A. The following summarizes the changes to the Agency's non-programmatic CoF:

- +\$0.6M, Minor Revitalization and Construction at Various Locations
  - Project cost estimate for "Construct Health and Fitness Center" at White Sands Test Facility increased from \$1.3M to \$1.9M
  - Cost increase due to rising cost of construction materials, especially steel
  - Cost estimate based on negotiated price with 8A contractor
- -\$0.6M, Facility Planning and Design
  - Residual funding from Facility Planning and Design is reallocated to fund the cost increase listed above