

March 10, 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 2004 Operating Plan, in accordance with the agreements between NASA and the Committee, and to provide an update to the FY 2003 Operating Plan.

In formulating NASA's initial FY 2004 Operating Plan, we have taken into account: appropriations levels included for NASA in the FY 2004 Omnibus Appropriations Act (P.L. 108-199); direction included in the Conference Report (House Report 108-401) accompanying H.R. 2673, the FY 2004 Consolidated Appropriations bill, and application of a 0.59-percent rescission, as specified in Section 168, Division H, of P.L. 108-199.

Aggregate NASA funding in this Operating Plan is \$15,378.0 million, a decrease of \$91.3 million from the President's FY 2004 request. This decrease represents the net effect of a total of \$388.2 million in Congressionally directed increases (151 discrete items) in House Report 108-401, offset by Congressionally directed reductions totaling \$334.0 million and \$54.2 million in unspecified reductions required to fund the directed increases while meeting the appropriations total, and further offset by a reduction of \$91.3 million as the result of the 0.59-percent rescission. The following table compares NASA's FY 2004 budget request with NASA's initial FY 2004 Operating Plan:

**FY 2004 Budget (in millions of dollars)**

	NASA FY2004 <u>Request</u>	<u>Changes</u>	Total <u>Excluding</u> <u>Rescission</u>	0.59 % Rescis- sion	Initial <u>Op Plan</u>
Total NASA	15,469.3	--	15,469.3	-91.3	15,378.0
Science, Aeronautics & Exploration	7,660.9	+238.4	7,899.3	-46.6	7,852.7
Space Flight Capabilities	7,782.1	-239.5	7,542.7	-44.5	7,498.2
Inspector General	26.3	+1.0	27.3	-0.2	27.1

This Operating Plan is presented in a structure consistent with the appropriations and budget structure reflected in the NASA FY 2004 Integrated Budget and Performance Document (IBPD) submitted to Congress. Total funding for the Science, Aeronautics and Exploration (SAE) and Space Flight Capabilities (SFC) accounts is reflected in full cost budget authority. In this initial FY 2004 Operating Plan, NASA has made certain transfers between the SAE and SFC accounts for institutional adjustments under authority provided in P.L. 108-199. Additionally, under authority provided in P.L.

108-199, this Operating Plan reflects certain transfers between the SAE and SFC accounts to properly assign funding between the Aeronautics and Crosscutting Technology Programs, which, in prior years, were budgeted together under the Aerospace Technology Program. A comparison of the FY 2004 budget request with this initial Operating Plan is provided in Enclosure 1.

The discrete total of Congressional interest items included in the Conference Report is 151 items, a record-high total against the annual NASA appropriation, funded at a value of \$388.2 million. I am very concerned by the exponential growth in the number of earmarks in NASA's annual appropriation. As recently as FY 1997, the total number of NASA earmarks was 6 items, valued at \$74 million. The FY 2004 total represents a 25-fold increase in the absolute number of earmarks and a 5-fold increase in the cost of such earmarks. I am even more concerned that the FY 2004 appropriation funds this record-high number of earmarks totally through reductions in funding of ongoing NASA programs proposed by the President, including reductions in the International Space Station, Space Science and Earth Science programs, and Crosscutting Technology. In some instances, NASA has reassigned Congressional interest items in this Operating Plan to an Enterprise other than that designated in House Report 108-401 when it has been determined that such a reassignment is warranted based upon further information regarding intended content. NASA is in the process of reviewing the management of earmarks to ensure appropriate implementation and oversight, and will keep the Committees apprised. The Congressional interest items are displayed, by NASA program, in Enclosure 2, including any reassignments.

Enclosure 3 provides a detailed explanation of the changes within the HSF and SAT accounts, including changes to institutional support. Enclosures 4 and 5 provide an update for NASA's FY 2003 Operating Plan, and Enclosure 6 is a Return to Flight summary.

Several key features of NASA's initial FY 2004 Operating Plan are highlighted below.

### **Across-the-Board Rescission**

The effect of the across-the-board 0.59-percent rescission included in Section 168, Division H, in P.L. 108-199, is a reduction of \$91.3 million from the appropriated level. The Operating Plan reflects application of the rescission across all programs, including Congressional interest items. Specifically, implementation of the rescission has resulted in reductions in Space Flight (-\$35.0 million), Space Science (-\$23.7 million), Biological and Physical Research (-\$5.8 million), Earth Science (-\$9.5 million), Aeronautics (-\$6.2 million), Crosscutting Technology (-\$9.5 million), Education Programs (-\$1.4 million), and Inspector General (-\$0.2 million).

### **International Space Station**

This Operating Plan reflects the imposition of a Congressionally directed reduction of \$200.0 million in the International Space Station (ISS) Program, over NASA's objection. The resulting level for ISS in this Operating Plan, after the application of the rescission, is \$1,494.5 million. Although the Space Shuttle Columbia accident has resulted in ISS assembly delays, deferral of work and planned destaffing, and necessary additional work for revised assembly sequence planning, the modest near-term ISS savings from deferred work has been offset by the cost of additional work responding to new operational demands. As a result, the only source of funds to meet the Congressionally directed reduction is ISS reserves. This action places at risk the steps taken last year to address recommendations of the ISS Independent Management and Cost Evaluation (IMCE) Task Force to ensure a "credible" program and the recommendations of two independent cost estimating teams. The resulting depletion of ISS reserves will not only limit the ability of the ISS program to address risks in FY 2004-2005, but will also inhibit our ability to enhance research capabilities beyond a crew of three.

In response to this reduction, NASA's FY 2005 budget request accelerates \$100 million of out-year ISS reserves into FY 2005. However, this action does not constitute a restoration of the \$200 million reduction in ISS reserves over the runout. NASA remains concerned about the impact of the FY 2004 appropriations reduction, and is continuing to assess the matter.

### **Space Shuttle**

This Operating Plan includes NASA's updated estimates for Space Shuttle and Return to Flight (RTF) for FY 2003 and FY 2004.

The FY 2003 Operating Plan update reflects an estimate of \$93.5 million in FY 2003 for Space Shuttle RTF. This estimate includes activities that have been approved for implementation by the Space Shuttle Program Requirements Control Board (PRCB) and verified by the Return to Flight Planning Team (RTFPT). FY 2003 costs can be accommodated with Shuttle resources available as a result of suspension of flight, the addition of \$50 million in FY 2003 emergency appropriations for necessary expenses for responding to the Space Shuttle Columbia accident, provided as part of the FY 2004 Legislative Branch Appropriations Act (P.L. 108-83), and the availability of other uncommitted Shuttle resources.

The FY 2004 Operating Plan for the Space Shuttle Program is \$3,927.6 million, a reduction of \$40.8 million from the request after application of the rescission. NASA's current FY 2004 estimate for RTF is \$265 million. Of this amount, \$124 million is included in the initial FY 2004 Operating Plan, offset by a reduction of \$107 million to the Shuttle Service Life Extension Program (SLEP) funding, with the balance derived from Shuttle reserves in Flight Hardware. The \$124 million is for activities that have been approved for implementation by the PRCB and the RTFPT. Additional RTF activities, with an estimated cost of \$141 million, are under evaluation.

As we begin implementing the Vision for U.S. Space Exploration, we are evaluating the existing SLEP program and will select those safety and reliability enhancements that will improve the Shuttle during its remaining operational life. Although this Operating Plan discontinues SLEP as a distinct line item, the funds will be retained within the Shuttle program. A portion of the planned SLEP funding will be used for Return to Flight requirements, and the balance will be included within Program Integration for potential Shuttle safety and mission assurance projects utilizing a process similar to that used for SLEP. A SLEP summit was conducted February 16-17, 2004 to help establish investment priorities.

NASA will return the Space Shuttle to flight as soon as safely possible, finish 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 Congress apprised through updates of NASA's Implementation Plan for Space Shuttle Return to Flight and Beyond.

### **NASA Engineering and Safety Center (NESC)**

As previously reported, this initial FY 2004 Operating Plan identifies \$45 million in funds for this year's NESC operations as an Agencywide activity within NASA's Corporate General and Administrative (G&A) account. Establishment of the NESC is a preliminary first step based on the early recognition of the need for enhanced engineering and safety organizations to address deficiencies that led to the Columbia accident. The NESC will provide independent engineering and safety assessment not only for the Space Shuttle, but Agencywide, will augment the capabilities of NASA's Safety and Mission Assurance Enterprise, and will perform tests and analysis in support of special reviews by the newly reconstituted Aerospace Safety Advisory Panel.

## **Hubble Space Telescope**

After much deliberation and consultation with Shuttle experts regarding safety and risk considerations, I recently made the difficult decision to cancel the final Hubble Servicing Mission (SM4). The decision had to balance the world-class science that HST has produced, and would continue to produce, against the risks and complexity of preparing two Shuttle missions in support of HST and unproven rescue techniques. This decision was not made with regard to budget considerations or any question as to the significance of the science return of the HST, but rather was based on our assessment of what NASA must do to comply with the recommendations of the Columbia Accident Investigation Board for developing on-orbit inspection, repair, and contingency rescue requirements for every Shuttle flight.

SM4 would have been the sole remaining Shuttle flight not directed to the ISS. Thus, in addition to developing the procedures, technologies, and tools necessary to comply with the Columbia Accident Investigation Board recommendations for missions to the ISS, NASA would have needed to develop a unique set of procedures, technologies, and tools for SM4 because of its unique orbital inclination. In addition, a second Shuttle orbiter would have been required to be ready on the launch pad to take off in the event of a problem preventing the safe return of the SM4 orbiter. Developing these new and unique items and procedures poses a set of risks and increased complexity that would have been significant. While inspection, repair, and contingency preparations are also required for missions to the ISS, those missions provide significantly more time and options to deal with any problems due to the greater capabilities of the ISS.

Given the uncertainties of the schedule for Return to Flight, the earliest that an SM4 mission could have been launched was June 2006. Presently, the Return to Flight planning launch window is March 6-April 15, 2005, which further extends the earliest date for an SM4 mission into spring 2007. This new timeframe could easily be beyond a point where HST servicing may be useful. No astronaut crew has been assigned to an SM4 mission, and training would not begin in earnest until 18 months prior to the mission, or no earlier than January 2005. Instead, we have elected to concentrate our energies on examining options to extend the operating life of Hubble, by modifying our procedures. On February 20, 2004, NASA issued a Request for Information (RFI) to industry and the university community seeking mission concepts and/or ideas for:

- a robotic mission to capture and safely deorbit the HST sometime after end of science operations;
- a robotic mission to capture and raise the HST to a long-term, safe orbit for storage;
- various levels of robotic servicing missions, from missions as simple as one involving a spacecraft attaching to the HST to supply a long-term power source, to missions as complex as one involving robotic change-out of various HST systems, such as gyros and science instruments; and,
- new operational concepts that would extend the life of HST.

Concepts in response to the RFI are due to NASA by March 20. NASA will review the proposed concepts over a period of one month, after which presentations by parties with the most promising concepts will be scheduled before the HST Project at the Goddard Space Flight Center.

NASA is encouraged by preliminary assessments of alternative options for deploying instruments that would have been flown on an SM4 mission, and this assessment is ongoing. Funding is included in the FY 2005 NASA budget to accelerate technologies to extend the life of HST as long

as possible without a servicing mission and to undertake a safe return mission using an expendable launch vehicle, thereby ensuring its continued contributions to science.

At the same time, we are examining the contracts supporting the HST program to determine the most effective actions to take over the course of the coming months, and undertaking detailed planning to provide for continuation of HST operations and research, termination of SM4, extension of mission life to the extent possible without SM4, and implementation of a robotic mission to retire the HST safely once it can no longer conduct world-class science. We are not abruptly terminating contracts for SM4 hardware items, but we are eliminating the requirement to perform certain tests (e.g; system-level vibration, acoustics), and all SM4 mission integration activities. As science instruments are delivered, we will fully document their performance and place them in storage, for potential use by other future missions. All work on HST-unique support equipment is being closed out. There are also several support contracts, which may be reduced as a result of SM4 cancellation. At the same time, we must accommodate the added work for extension of mission life and a robotic mission to retire or extend HST. We anticipate adjustments in a future FY 2004 Operating Plan update, consistent with these actions.

### **Gravity Probe-B**

Since NASA's last update to the FY 2003 Operating Plan, the launch date for the Gravity Probe-B mission has been adjusted twice from the planned November 2003 launch date: once as a result of delaminations in the nozzles of the Delta II solid rocket motors, and again as a result of electrical problem in the Experiment Control Unit (ECU) on the GP-B spacecraft. Following replacement of the Delta II solid rocket motor and the ECU, the launch date was reset for April 17, 2004. This Operating Plan reflects funding adjustments in FY 2004, as well as the life cycle cost estimate for GP-B resulting from the necessary technical fixes and schedule modifications.

### **Education**

NASA appreciates the recent enactment of the Workforce Flexibility Act (P.L. 108-201). This legislation allows us to implement the NASA Science and Technology Scholarship Program (STSP), which has been established to address the Agency's critical needs for highly qualified engineers, scientists and other technical personnel. The primary focus of the program is to recruit the best and brightest students by offering them competitive university and college scholarships in return for service to the Agency. NASA is currently developing an implementation plan for the STSP that will include a competitive process for awarding scholarships to students that is fully articulated with the hiring needs of NASA. Implementation of the STSP will begin in the upcoming academic year, and NASA will provide regular progress reports of the program to Congress.

### **Institutional Requirements**

The initial FY 2004 Operating Plan represents an increase in funding for Corporate General and Administrative (G&A) activities for a number of Agency institutional requirements, including a series of Information Technology (IT) initiatives, new hires under the Human Capital Initiative, centralized Independent Verification and Validation activities, Space Architect planning activities which were previously funded by Aeronautics Technology, full-cost charges of corporate activities, orbital debris research, implementation of corrective actions in response to the findings from NASA's financial audit, and creation of the NESC.

## New Vision

The President's Vision for U.S. Space Exploration establishes a fundamental goal to advance U.S. scientific, security, and economic interests through a robust space exploration program. In support of this goal, the United States will:

- Implement a sustained and affordable human and robotic program to explore the solar system and beyond;
- Extend human presence across the solar system, starting with a human return to the Moon by the year 2020, in preparation for human exploration of Mars and other destinations;
- Develop the innovative technologies, knowledge, infrastructure both to explore and to support decisions about the destinations for human exploration; and,
- Promote international and commercial participation in exploration to further U.S. scientific, security, and economic interests.

To accomplish these goals, NASA will, among other things:

- Return the Space Shuttle to flight consistent with safety concerns and the recommendations of the Columbia Accident Investigation Board; the Shuttle's sole purpose over the next several years will be to finish assembly of the Space Station, and the Space Shuttle will be phased out following assembly, as planned, by the end of this decade after nearly 30 years of service;
- Focus U.S. research and use of the ISS on supporting space exploration goals, with emphasis on understanding how the space environment affects astronaut health and capabilities and developing countermeasures;
- Begin developing a new manned exploration vehicle to explore beyond our orbit to other worlds; the Crew Exploration Vehicle--Project Constellation--will be tested by 2008 and will conduct its first manned mission no later than 2014; and,
- Undertake a series of robotic missions to the Moon, Mars and other destinations across the solar system.

The President's Commission to advise on implementing the exploration vision has begun its deliberations, and this Operating Plan provides support for that 4-month activity.

NASA is in the process of examining potential steps that may be undertaken in FY 2004 to position the Agency to most effectively implement the Vision for U.S. Space Exploration. NASA's Biological and Physical Research (BPR) Enterprise has begun a systematic review of the ISS research portfolio with the objective of realigning ISS research to exploration-focused "product lines." Following an internal review, the BPR Enterprise will seek out advice and consultation from representatives of the community through the advisory committee mechanisms. The newly established Exploration Systems Enterprise is establishing an orderly transition from the ongoing Orbital Space Plane (OSP) program to the new Crew Exploration Vehicle program, including a 3-month extension of current OSP contracts to capture managerial and technical lessons learned, cancellation of future OSP Requests for Proposals (RFPs), and open solicitations for trade study analysis and technology development. The Exploration Systems Enterprise is also undertaking transitional activities in the Next Generation Launch Technology (NGLT) program, which will not be continued in the FY 2005 budget. The NGLT transition includes closeout activities on the RS-84 engine and reviews of NGLT support contracts for applicability to other Enterprise programs. The Exploration Systems Enterprise is also reviewing Mission and Science Measurement research

capabilities and planning for realignment with the exploration vision. Adjustments for all of these efforts are anticipated in the next update to the FY 2004 Operating Plan.

I look forward to working with the Committee on the implementation of NASA's initial FY 2004 Operating Plan.

Cordially,

Sean O'Keefe  
Administrator

6 Enclosures

**NASA FY 2004 Operating Plan**

**Enclosure 1  
FY 2004 Changes**

	FY 2004 Request	Earmarks*	Directed Reductions	Other Changes*	Aero to CrossCut Transfers	Other Approps Transfers	Total Excluding Rescission	Rescission	FY04 Initial Operating Plan
<b>AGENCY TOTAL</b>	<b>15,469.3</b>	<b>388.2</b>	<b>-334.0</b>	<b>-54.2</b>		<b>0.0</b>	<b>15,469.3</b>	<b>-91.3</b>	<b>15,378.0</b>
<b>SCIENCE, AERO &amp; EXPLORATION</b>	<b>7,660.9</b>	<b>339.6</b>	<b>-49.0</b>	<b>12.8</b>	<b>-56.5</b>	<b>-8.5</b>	<b>7,899.3</b>	<b>-46.6</b>	<b>7,852.7</b>
<b><u>SPACE SCIENCE</u></b>	<b><u>4,007.1</u></b>	<b><u>25.8</u></b>	<b><u>-38.0</u></b>	<b><u>25.9</u></b>		<b><u>-2.7</u></b>	<b><u>4,018.0</u></b>	<b><u>-23.7</u></b>	<b><u>3,994.3</u></b>
<b>SOLAR SYSTEM EXPLORATION (SSE)</b>	<b>1,358.6</b>	<b>13.6</b>	<b>-20.0</b>	<b>-39.8</b>		<b>-2.7</b>	<b>1,309.7</b>	<b>-7.7</b>	<b>1,301.9</b>
<b><u>DEVELOPMENT</u></b>	<b><u>176.6</u></b>			<b><u>180.5</u></b>			<b><u>357.1</u></b>	<b><u>-2.1</u></b>	<b><u>355.0</u></b>
MESSENGER	38.0			4.6			42.6	-0.3	42.3
DEEP IMPACT	13.0			33.4			46.4	-0.3	46.1
DAWN	125.6			1.6			127.2	-0.8	126.4
NEW HORIZONS (PLUTO)				140.9			140.9	-0.8	140.1
OPERATIONS	309.9			0.6			310.5	-1.8	308.7
RESEARCH	321.7	11.6		8.4		-2.7	339.0	-2.0	337.0
<b><u>TECH &amp; ADV CONCEPTS</u></b>	<b><u>550.4</u></b>	<b><u>2.0</u></b>	<b><u>-20.0</u></b>	<b><u>-229.4</u></b>			<b><u>303.0</u></b>	<b><u>-1.8</u></b>	<b><u>301.3</u></b>
Project Prometheus	279.2		-20.0	-37.2			222.0	-1.3	220.7
New Frontiers	130.2			-117.4			12.8	-0.1	12.8
Other	141.0	2.0		-74.8			68.2	-0.4	67.8
<b>MARS EXPLORATION</b>	<b>570.2</b>			<b>29.6</b>			<b>599.8</b>	<b>-3.5</b>	<b>596.3</b>
<b><u>DEVELOPMENT</u></b>	<b><u>193.8</u></b>			<b><u>-7.2</u></b>			<b><u>186.6</u></b>	<b><u>-1.1</u></b>	<b><u>185.5</u></b>
MARS RECONNAISSANCE ORBITER	183.5			3.1			186.6	-1.1	185.5
MARS SMALL MISSIONS	10.3			-10.3					0.0
OPERATIONS	44.8			3.4			48.2	-0.3	47.9
RESEARCH	56.2			16.4			72.6	-0.4	72.1
<b><u>TECH &amp; ADV CONCEPTS</u></b>	<b><u>275.4</u></b>			<b><u>17.1</u></b>			<b><u>292.5</u></b>	<b><u>-1.7</u></b>	<b><u>290.8</u></b>
Phoenix (formerly 2007 Mars Scout)	29.1			-3.5			25.6	-0.2	25.5
2009 Mars Science Laboratory	118.0			0.8			118.8	-0.7	118.1
2009 US Telesat	9.3			2.2			11.5	-0.1	11.5
Other	119.0			17.6			136.6	-0.8	135.7
<b>ASTRONOMICAL SEARCH FOR ORIGINS (ASO)</b>	<b>877.0</b>	<b>4.2</b>	<b>-8.0</b>	<b>46.0</b>			<b>919.2</b>	<b>-5.4</b>	<b>913.8</b>
<b><u>DEVELOPMENT</u></b>	<b><u>242.2</u></b>	<b><u>4.2</u></b>		<b><u>9.6</u></b>			<b><u>256.0</u></b>	<b><u>-1.5</u></b>	<b><u>254.5</u></b>
HST	136.4	4.2		-0.0			140.6	-0.8	139.8
SOFIA	54.7			9.6			64.3	-0.4	63.9
KEPLER	51.1			0.0			51.1	-0.3	50.8



**NASA FY 2004 Operating Plan**

**Enclosure 1  
FY 2004 Changes**

	<u>FY 2004 Request</u>	<u>Earmarks*</u>	<u>Directed Reductions</u>	<u>Other Changes*</u>	<u>Aero to CrossCut Transfers</u>	<u>Other Approps Transfers</u>	<u>Total Excluding Rescission</u>	<u>Rescission</u>	<u>FY04 Initial Operating Plan</u>
OPERATIONS	24.6			8.6			33.2	-0.2	33.0
RESEARCH	198.9			-1.2			197.7	-1.2	196.5
<b>TECH &amp; ADV CONCEPTS</b>	<b>411.3</b>	<b>-</b>	<b>-8.0</b>	<b>29.0</b>	<b>-</b>	<b>-</b>	<b>432.3</b>	<b>-2.6</b>	<b>429.7</b>
Space Interferometry Mission (SIM)	79.8		-8.0	16.7			88.5	-0.5	88.0
James Webb Space Telescope (JWST)	254.6						254.6	-1.5	253.1
Terrestrial Planet Finder (TPF)	44.2			-2.1			42.1	-0.2	41.8
Keck Interferometer	9.8			3.1			12.9	-0.1	12.8
Widefield Infrared Survey Explorer (WISE)				11.5			11.5	-0.1	11.4
Other	22.9			-0.2			22.7	-0.1	22.6
<b>STRUCTURE AND EVOLUTION OF THE UNIVERSE</b>	<b>431.7</b>	<b>2.0</b>	<b>-10.0</b>	<b>35.0</b>	<b>-</b>	<b>-</b>	<b>458.7</b>	<b>-2.7</b>	<b>456.0</b>
<b>DEVELOPMENT</b>	<b>173.9</b>	<b>-</b>	<b>-</b>	<b>51.4</b>	<b>-</b>	<b>-</b>	<b>225.3</b>	<b>-1.3</b>	<b>223.9</b>
GP-B				45.4			45.4	-0.3	45.1
GLAST	115.7			-12.4			103.3	-0.6	102.7
Swift				32.4			32.4	-0.2	32.2
Herschel	11.8			6.6			18.4	-0.1	18.3
Planck	12.5			1.0			13.5	-0.1	13.4
SEU SMALL PROJECTS	33.9			-21.7			12.2	-0.1	12.1
OPERATIONS	10.3			3.6			13.9	-0.1	13.8
RESEARCH	186.6	2.0		-3.8			184.8	-1.1	183.7
<b>TECH &amp; ADV CONCEPTS</b>	<b>60.9</b>	<b>-</b>	<b>-10.0</b>	<b>-16.1</b>	<b>-</b>	<b>-</b>	<b>34.8</b>	<b>-0.2</b>	<b>34.5</b>
Beyond Einstein (Con-X and LISA)	58.9		-10.0	-24.2			24.7	-0.1	24.5
EUSO				7.7			7.7	0.0	7.7
Other	2.0			0.3			2.3	0.0	2.3
<b>SUN-EARTH CONNECTION (SEC)</b>	<b>769.6</b>	<b>6.0</b>	<b>-</b>	<b>-45.0</b>	<b>-</b>	<b>-</b>	<b>730.6</b>	<b>-4.3</b>	<b>726.3</b>
<b>DEVELOPMENT</b>	<b>220.0</b>	<b>-</b>	<b>-</b>	<b>21.0</b>	<b>-</b>	<b>-</b>	<b>241.0</b>	<b>-1.4</b>	<b>239.6</b>
STEREO	99.3			12.8			112.1	-0.7	111.4
SOLAR DYNAMICS OBSERVATORY (SDO)	66.2			22.5			88.7	-0.5	88.1
AIM	40.0			-21.7			18.3	-0.1	18.2
SEC SMALL PROJECTS	14.5			7.4			21.9	-0.1	21.8
OPERATIONS	57.3			-6.6			50.7	-0.3	50.4
RESEARCH	178.3			6.1			184.4	-1.1	183.3

**NASA FY 2004 Operating Plan**

**Enclosure 1  
FY 2004 Changes**

	FY 2004 Request	Earmarks*	Directed Reductions	Other Changes*	Aero to CrossCut Transfers	Other Approps Transfers	Total Excluding Rescission	Rescission	FY04 Initial Operating Plan
<b>TECH &amp; ADV CONCEPTS</b>	<b>314.0</b>	<b>6.0</b>	-	<b>-65.5</b>	-	-	<b>254.5</b>	<b>-1.5</b>	<b>253.0</b>
New Millennium Program (NMP)	86.8			-1.8			85.0	-0.5	84.5
Future Explorers (incl THEMIS)	118.0	3.0		-15.5			105.5	-0.6	104.9
Solar Terrestrial Probes (STP)	43.5			-18.0			25.5	-0.2	25.4
Living with a Star (LWS)	49.9	3.0		-14.4			38.5	-0.2	38.2
Other	15.8			-15.8					
<b><u>EARTH SCIENCE</u></b>	<b><u>1,552.2</u></b>	<b><u>86.9</u></b>	<b><u>-11.0</u></b>	<b><u>-7.3</u></b>	-	<b><u>-5.8</u></b>	<b><u>1,615.0</u></b>	<b><u>-9.5</u></b>	<b><u>1,605.5</u></b>
<b>EARTH SYSTEM SCIENCE</b>	<b>1,477.4</b>	<b>70.5</b>	<b>-11.0</b>	<b>-8.9</b>		<b>-5.8</b>	<b>1,522.2</b>	<b>-9.0</b>	<b>1,513.2</b>
<b><u>DEVELOPMENT</u></b>	<b><u>278.5</u></b>	<b><u>45.5</u></b>	<b><u>-11.0</u></b>	<b><u>-6.1</u></b>	-	-	<b><u>306.9</u></b>	<b><u>-1.8</u></b>	<b><u>305.1</u></b>
AURA	52.5			12.4			64.9	-0.4	64.5
CALIPSO	28.4			5.2			33.6	-0.2	33.4
CLOUDSAT	16.5						16.5	-0.1	16.4
EOSDIS	98.3	45.5		-26.1			117.7	-0.7	117.0
Solar Radiation and Climate Experiment (SORCE)	2.1			0.2			2.3	0.0	2.3
GIFTS (EO-3)	27.0			-2.4			24.6	-0.1	24.5
Climate Change Research Initiative (CCRI) Polarimeter	23.2		-11.0				12.2	-0.1	12.1
Other	30.5			4.6			35.1	-0.2	34.9
OPERATIONS	322.2			1.9		-5.8	318.3	-1.9	316.4
RESEARCH	523.4	1.5		14.3			539.2	-3.2	536.0
<b><u>TECH &amp; ADV CONCEPTS</u></b>	<b><u>353.3</u></b>	<b><u>23.5</u></b>	-	<b><u>-19.0</u></b>	-		<b><u>357.8</u></b>	<b><u>-2.1</u></b>	<b><u>355.7</u></b>
TECHNOLOGY INFUSION	78.9	7.0		0.9			86.8	-0.5	86.3
NPOESS Preparatory Project (NPP)	95.6	8.5		-1.5			102.6	-0.6	102.0
Global Precipitation Mission (GPM)	28.2			1.2			29.4	-0.2	29.2
Landsat Data Continuity Mission (LDCM)	60.0			-0.9			59.1	-0.3	58.8
Ocean Surface Topography Mission (OSTM)	40.0			-16.1			23.9	-0.1	23.8
OTHER	50.6	8.0		-2.6			56.0	-0.3	55.7
<b>EARTH SCIENCE APPLICATIONS</b>	<b>74.8</b>	<b>16.4</b>		<b>1.6</b>			<b>92.8</b>	<b>-0.5</b>	<b>92.3</b>
RESEARCH	44.8	7.4		2.2			54.4	-0.3	54.1
TECH & ADV CONCEPTS	30.0	9.0		-0.6			38.4	-0.2	38.2
<b><u>BIOLOGICAL &amp; PHYS RESEARCH</u></b>	<b><u>972.7</u></b>	<b><u>19.8</u></b>	-	<b><u>-1.1</u></b>	-		<b><u>991.4</u></b>	<b><u>-5.8</u></b>	<b><u>985.6</u></b>
<b><u>BIOLOGICAL SCIENCES RESEARCH</u></b>	<b><u>358.6</u></b>	<b><u>12.0</u></b>		<b><u>-0.4</u></b>			<b><u>370.2</u></b>	<b><u>-2.2</u></b>	<b><u>368.0</u></b>
DEVELOPMENT	10.4						10.4	-0.1	10.3
OPERATIONS	129.4			-18.4			111.0	-0.7	110.3

NASA FY 2004 Operating Plan

Enclosure 1  
FY 2004 Changes

	FY 2004 Request	Earmarks*	Directed Reductions	Other Changes*	Aero to CrossCut Transfers	Other Approps Transfers	Total Excluding Rescission	Rescission	FY04 Initial Operating Plan
RESEARCH	218.8	12.0		18.0			248.8	-1.5	247.3
<b>PHYSICAL SCIENCES RESEARCH</b>	<b>353.2</b>	<b>6.6</b>		<b>-0.5</b>			<b>359.3</b>	<b>-2.1</b>	<b>357.2</b>
<u>DEVELOPMENT</u>	<u>47.8</u>	-	-	-	-		<u>47.8</u>	<u>-0.3</u>	<u>47.5</u>
MATERIAL SCI RESEARCH FACILITY 1	15.1						15.1	-0.1	15.0
FLUIDS & COMBUSTION FACILITY	22.9						22.9	-0.1	22.8
LOW TEMP MICROGRAVITY PHYSICS FAC	9.8						9.8	-0.1	9.7
OPERATIONS	159.8			-0.5			159.3	-0.9	158.4
RESEARCH	145.6	6.6					152.2	-0.9	151.3
<b>RESEARCH PARTNERSHIPS AND FLIGHT SUPPORT</b>	<b>260.9</b>	<b>1.2</b>		<b>-0.2</b>			<b>261.9</b>	<b>-1.5</b>	<b>260.3</b>
OPERATIONS	231.0			-0.2			230.8	-1.4	229.4
RESEARCH	29.9	1.2					31.1	-0.2	30.9
<b><u>AERONAUTICS</u></b>	<b><u>959.1</u></b>	<b><u>144.9</u></b>	-	<b><u>-4.4</u></b>	<b><u>-56.5</u></b>		<b><u>1,043.1</u></b>	<b><u>-6.2</u></b>	<b><u>1,036.9</u></b>
<b><u>AERONAUTICS TECHNOLOGY</u></b>	<b><u>959.10</u></b>	<b><u>87.5</u></b>	-	<b><u>-3.5</u></b>			<b><u>1,043.10</u></b>	<b><u>-6.2</u></b>	<b><u>1,036.9</u></b>
<u>TECH &amp; ADV CONCEPTS</u>	<u>959.1</u>	<u>87.5</u>	-	<u>-3.5</u>	-		<u>1,043.1</u>	<u>-6.2</u>	<u>1,036.9</u>
<u>AVIATION SAFETY PROGRAM</u>	<u>168.5</u>	<u>12.5</u>	-	<u>3.2</u>	-		<u>184.2</u>	<u>-1.1</u>	<u>183.1</u>
Vehicle Safety Technologies	74.5	4.0		-2.4			76.1	-0.4	75.7
System Safety Technologies	31.1			-0.1			31.0	-0.2	30.8
Weather Safety Tech.	42.3	1.0		5.2			48.5	-0.3	48.2
Aviation Securities Tech.	20.6	7.5		0.5			28.6	-0.2	28.4
<u>AIRSPACE SYSTEMS PROGRAM</u>	<u>217.2</u>	<u>24.3</u>	-	<u>-7.8</u>	-		<u>233.7</u>	<u>-1.4</u>	<u>232.3</u>
Advanced Air Transportation Tech.	105.6			-6.8			98.8	-0.6	98.2
Small Aircraft Transportation Sys (SATS)	30.7	1.0					31.7	-0.2	31.5
Virtual Airspace Modeling & Sim (VAMS)	33.3			-2.6			30.7	-0.2	30.5
Aviation Operations Systems	20.6			-1.4			19.2	-0.1	19.1
Next Generations Air Transportation Sys	27.0	23.3		3.0			53.3	-0.3	53.0
<u>VEHICLE SYSTEMS PROGRAM</u>	<u>573.4</u>	<u>50.7</u>	-	<u>1.1</u>	-		<u>625.2</u>	<u>-3.7</u>	<u>621.5</u>
Quiet Aircraft Technology (QAT)	60.2	5.0		0.9			66.1	-0.4	65.7
21st Century Aircraft Technology (TCAT)	42.1	25.0		-14.4			52.7	-0.3	52.4
Flight Research	85.4	1.5		-6.5			80.4	-0.5	79.9
Advanced Vehicle Concepts (AVC)	41.0			-0.1			40.9	-0.2	40.7
Breakthrough Vehicle Tech.	115.2	8.0		30.5			153.7	-0.9	152.8
Ultra-Efficient Engine Tech.	90.0	2.3		0.1			92.4	-0.5	91.9
Propulsion & Power	139.5	8.9		-18.2			130.2	-0.8	129.4
Flight & System Demonstration				8.8					

**NASA FY 2004 Operating Plan**

**Enclosure 1  
FY 2004 Changes**

	FY 2004 Request	Earmarks*	Directed Reductions	Other Changes*	Aero to CrossCut Transfers	Other Approps Transfers	Total Excluding Rescission	Rescission	FY04 Initial Operating Plan
<u>CROSSCUTTING TECHNOLOGY (to be transferred)</u>		<u>57.4</u>		<u>-0.9</u>	<u>-56.5</u>				
Earmarks		57.4			-57.4				
Share of Unspecified Congressional reduction				-5.3	5.3				
SBIR/STTR Increase				4.4	-4.4				
<b>EDUCATION PROGRAMS</b>	<b>169.8</b>	<b>62.3</b>	-	<b>-0.25</b>	-		<b>231.8</b>	<b>-1.4</b>	<b>230.4</b>
ACADEMIC PROGRAMS	78.3	61.3		-0.13			139.4	-0.8	138.6
MINORITY UNIVERSITY RESEARCH & EDUCATION	91.5	1.0		-0.13			92.4	-0.5	91.8
<b>SPACE FLIGHT CAPABILITIES</b>	<b>7,782.1</b>	<b>39.0</b>	<b>-285.0</b>	<b>-58.5</b>	<b>56.5</b>	<b>8.5</b>	<b>7,542.7</b>	<b>-44.5</b>	<b>7,498.2</b>
<b>SPACE FLIGHT</b>	<b>6,109.8</b>	<b>15.0</b>	<b>-215.0</b>	<b>6.7</b>	-	<b>8.5</b>	<b>5,925.1</b>	<b>-35.0</b>	<b>5,890.1</b>
<b>SPACE STATION</b>	<b>1,707.1</b>		<b>-200.0</b>	<b>-3.8</b>			<b>1,503.3</b>	<b>-8.9</b>	<b>1,494.5</b>
<u>DEVELOPMENT</u>	<u>153.5</u>	-	<u>-5.7</u>	<u>2.4</u>	-		<u>150.2</u>	<u>-0.9</u>	<u>149.4</u>
Flight Hardware	84.2		-5.7	-2.5			76.0	-0.448	75.552
Ops Capability Development	23.5						23.5	-0.139	23.361
ECLSS	19.4			6.4			25.8	-0.2	25.7
Node 3	26.4			-1.5			24.9	-0.1	24.8
<u>OPERATIONS</u>	<u>1,553.6</u>	-	<u>-194.3</u>	<u>-6.2</u>	-		<u>1,353.1</u>	<u>-8.0</u>	<u>1,345.1</u>
SPACECRAFT OPERATIONS	836.6		-142.3	-60.4			633.9	-3.7	630.2
LAUNCH & MISSION OPERATIONS	492.5		-39.9	14.0			466.6	-2.8	463.8
OPERATIONS PROGRAM INTEGRATION	224.5		-12.1	40.2			252.6	-1.5	251.1
<b>SPACE SHUTTLE</b>	<b>3,968.4</b>	<b>15.0</b>	<b>-15.0</b>	<b>-17.5</b>			<b>3,951.0</b>	<b>-23.3</b>	<b>3,927.6</b>
<u>DEVELOPMENT</u>	<u>96.8</u>	-	-	<u>14.6</u>	-	-	<u>111.4</u>	<u>-0.7</u>	<u>110.7</u>
SSME Adv Health Mgt Sys (AHMS)	6.3			6.5			12.8	-0.076	12.724
Cockpit Avionics Upgrade	90.5			8.1			98.6	-0.582	98.018
<u>OPERATIONS</u>	<u>3,871.6</u>	<u>15.0</u>	<u>-15.0</u>	<u>-32.1</u>	-	-	<u>3,839.6</u>	<u>-22.7</u>	<u>3,816.9</u>
PROGRAM INTEGRATION	332.1			285.9			618.0	-3.6	614.4
GROUND OPERATIONS	899.5			79.2			978.7	-5.8	972.9
FLIGHT OPERATIONS	375.4			17.3			392.7	-2.3	390.4
FLIGHT HARDWARE	1,983.2			-133.1			1,850.2	-10.9	1,839.2
SERVICE LIFE EXTENSION PROGRAM (SLEP) (RETURN TO FLIGHT, included above)	281.4	15.0	-15.0	-281.4 (124.0)			(124.0)	(-0.7)	(123.3)
<b>SPACE &amp; FLIGHT SUPPORT</b>	<b>434.3</b>			<b>28.0</b>		<b>8.5</b>	<b>470.8</b>	<b>-2.8</b>	<b>468.0</b>
<u>DEVELOPMENT</u>	<u>84.7</u>	-	-	-	-	-	<u>84.7</u>	<u>-0.5</u>	<u>84.2</u>
PLUMBROOK DECOMMISSIONING	43.7						43.7	-0.3	43.4
ENVIRONMENTAL COMPLIANCE & RESTORATION	41.0						41.0	-0.2	40.8

**NASA FY 2004 Operating Plan**

**Enclosure 1  
FY 2004 Changes**

	<u>FY 2004 Request</u>	<u>Earmarks*</u>	<u>Directed Reductions</u>	<u>Other Changes*</u>	<u>Aero to CrossCut Transfers</u>	<u>Other Approps Transfers</u>	<u>Total Excluding Rescission</u>	<u>Rescission</u>	<u>FY04 Initial Operating Plan</u>
<u>OPERATIONS</u>	<u>349.6</u>			<u>28.0</u>		<u>8.5</u>	<u>386.1</u>	<u>-2.3</u>	<u>383.8</u>
<b>CROSSCUTTING TECHNOLOGY</b>	<b>1,672.3</b>	<b>24.0</b>	<b>-70.0</b>	<b>-65.2</b>	<b>56.5</b>		<b>1,617.6</b>	<b>-9.5</b>	<b>1,608.1</b>
<b>SPACE LAUNCH INITIATIVE</b>	<b>1,064.6</b>		<b>-70.0</b>	<b>-51.1</b>	<b>0.5</b>		<b>944.0</b>	<b>-5.6</b>	<b>938.4</b>
<u>TECH &amp; ADV CONCEPTS</u>	<u>1,064.6</u>	-	<u>-70.0</u>	<u>-51.1</u>	<u>0.5</u>	-	<u>944.0</u>	<u>-5.6</u>	<u>938.4</u>
X-37	178.0						178.0	-1.1	177.0
DART	18.0			9.0			27.0	-0.2	26.8
PAD	30.0			-3.2			26.8	-0.2	26.6
OSP Design, Development & Formulation	324.2			-1.8			322.4	-1.9	320.5
NEXT GENERATION LAUNCH TECHNOLOGY	514.4		-70.0	-55.1	0.5		389.8	-2.3	387.5
<b>MSSN &amp; SCIENCE MEASUREMENT</b>	<b>438.4</b>			<b>-15.3</b>	<b>31.4</b>		<b>454.5</b>	<b>-2.7</b>	<b>451.8</b>
<u>TECH &amp; ADV CONCEPTS</u>	<u>438.4</u>	-	-	<u>-15.3</u>	<u>31.4</u>		<u>454.5</u>	<u>-2.7</u>	<u>451.8</u>
C I CT	233.2			-3.6	16.8		246.4	-1.5	244.9
ENGINEERING FOR COMPLEX SYSTEMS	44.0			-0.8	1.5		44.7	-0.3	44.4
ENABLING CONCEPTS & TECHNOLOGIES	161.2			-10.9	13.1		163.4	-1.0	162.4
<b>INNOVATIVE TECH TRANSFER PARTNERSHIPS</b>	<b>169.3</b>	<b>24.0</b>		<b>1.2</b>	<b>24.7</b>		<b>219.2</b>	<b>-1.3</b>	<b>217.9</b>
TECH & ADV CONCEPTS	37.9	24.0		-3.2	20.3		79.0	-0.5	78.5
RESEARCH	131.4			4.4	4.4		140.2	-0.8	139.4
<b>INSPECTOR GENERAL</b>	<b>26.3</b>	<b>1.0</b>					<b>27.3</b>	<b>-0.2</b>	<b>27.1</b>
<i>*Included in Corp G&amp;A; allocated to prgms in SAE &amp; SFC</i>		8.6		-8.6					

**Enclosure 2**  
**Congressional Earmarks**

<b>NASA FY 2004 CONGRESSIONAL EARMARKS</b>		Including	
Pre-Rescission		Resission	
\$s (millions)		\$s (millions)	<u>Name of Theme</u>
<b>388.150</b>	<b>AGENCY TOTAL</b>	<b>385.878</b>	
<b>39.000</b>	<b>SPACE FLIGHT CAPABILITIES</b>	<b>38.770</b>	
<b>15.000</b>	<b>SPACE FLIGHT</b>	<b>14.912</b>	
15.000	Within Space Shuttle Life Extension Program, for the development and independent assessment of concepts to increase Space Shuttle crew survivability	14.912	Space Shuttle
<b>24.000</b>	<b>CROSSCUTTING TECHNOLOGY*</b>	<b>23.858</b>	
	<i>*NOTE: See also Crosscutting Tech earmarks listed under SAE, to be transferred to SFC Appropriation</i>		
24.000	Continuation of Commercial Programs within Innovative Technology Transfer Partnerships	23.858	Innovative Technology Transfer Partnerships
<b>339.600</b>	<b>SCIENCE, AERONAUTICS &amp; EXPLORATION</b>	<b>337.614</b>	
<b>25.75</b>	<b>SPACE SCIENCE</b>	<b>25.62</b>	
2.000	In-Space Propulsion for High-Power Pulsed Inductive Thruster technology research	1.988	Solar System Exploration
1.700	Continued development of a lightweight carrier pallet to support the HST program	1.690	Astronomical Search for Origins
3.000	Solar Probe mission	2.982	Sun-Earth Connection
1.000	Utah State U, Logan, Utah for Calibration Center	0.994	Solar System Exploration
1.500	Montana State U-Bozeman, for Center for Studying Life in Extreme Environments	1.491	Solar System Exploration
0.750	Montana State U-Bozeman, for Space Science & Engineering Lab	0.746	Solar System Exploration
1.000	U Idaho in Moscow, Idaho, for advanced microelectronics and biomolecular research	0.994	Solar System Exploration
2.000	New Mexico State U for ultra-long balloon program	1.988	Structure and Evolution of the Universe
2.000	Texas Tech U in Lubbock TX, for equipment for Experimental Sciences Building	1.988	Solar System Exploration
1.000	Texas A&M U in College Station for Space Engineering Institute	0.994	Solar System Exploration
2.500	Marshall U, Bridgeport WV, for Hubble Telescope Project	2.485	Astronomical Search for Origins
2.300	U N.Dakota, Grand Forks ND, for Northern Great Plains Space Sci & Tech Center	2.286	Solar System Exploration
2.000	U MD, Baltimore County, for photonics research	1.988	Solar System Exploration
3.000	Tech development for Satellite Test of Equivalence Principle mission	3.000	Sun-Earth Connection
<b>86.900</b>	<b>EARTH SCIENCE</b>	<b>86.387</b>	
1.000	Remote sensing infrastructure @ U Miami Center for Southeastern Tropical Remote Sensing in Miami-Dade County, FL	0.994	Earth science Applications (ESA)
0.300	Fulton Montgomery Community College, Johnstown NY, for Spatial Information Technology Center	0.298	Earth science Applications (ESA)
1.000	GSFC's Clustering & Advanced Visual Environments initiative	0.994	Earth System Science (ESS)
1.500	On-going activities at Goddard Institute for Systems, Software & Technology Research	1.491	Earth System Science (ESS)
15.000	Institute of Scientific Research for development and construction of research facilities	14.912	Earth System Science (ESS)
1.500	Idaho State U for Temporal Land Cover Change Research Program	1.491	Earth System Science (ESS)
0.500	Continuation of emerging research that applies remote sensing technologies to forest management practices at the State U of NY, College of Environmental Sciences & Forestry	0.497	Earth science Applications (ESA)
1.500	Integrated Sensing Systems, Rochester Institute of Technology	1.491	Earth System Science (ESS)
2.000	Regional Application Center for the Northeast	1.988	Earth science Applications (ESA)
1.000	Little River Canyon field school	0.994	Earth science Applications (ESA)
7.500	Implementation of a remote data store at IV&V Facility for GSFC ECS Program	7.456	Earth System Science (ESS)
3.000	Transfer to Air Force Research Lab to develop dual use lightweight space radar technology	2.982	Earth System Science (ESS)
8.000	Mission formulation studies for EOS follow-on missions	7.953	Earth System Science (ESS)
23.000	EOSDIS Core System Synergy Program	22.864	Earth System Science (ESS)

**Enclosure 2  
Congressional Earmarks**

<b>NASA FY 2004 CONGRESSIONAL EARMARKS</b>		Including	
Pre-Rescission		Resission	
1.500	George Mason U, Fairfax, VA for Center for Earth Observing & Space Research Mid Atlantic Geospatial Information Consortium	1.491	Earth science Applications (ESA)
1.000	Utah State U, Logan, Utah for Intermountain Region Digital Image Archive & Processing Center	0.994	Earth science Applications (ESA)
2.500	U Mississippi for Enterprise for Innovative Geospatial Solutions	2.485	Earth science Applications (ESA)
2.000	Mississippi State U for Geospatial & Natural Resources Institute	1.988	Earth science Applications (ESA)
1.600	U New Mexico for Center for Rapid Environmental Assessment & Terrain Evaluation	1.591	Earth science Applications (ESA)
3.000	U Alaska for weather & ocean research	2.982	Earth science Applications (ESA)
8.500	NPOESS data science system	8.450	Earth System Science (ESS)
<b>19.800</b>	<b>BIOLOGICAL AND PHYSICAL RESEARCH</b>	<b>19.683</b>	
0.500	Northwestern U's Institute for Proteomics & Nanotechnology	0.497	Physical Sciences Research
0.300	Biological & Physical Research rack on ISS	0.298	Physical Sciences Research
2.500	Space Radiation Reseach at Loma Linda University Medical Center	2.485	Biological Sciences Research
0.500	NASA Specialized Center for Research & Training in Gravitational Biology at NC State U	0.497	Biological Sciences Research
4.500	National Center of Excellence in Bioinformatics, Buffalo, NY	4.473	Biological Sciences Research
0.500	U South Florida Center for Space Cellular and Macromolecular Biotechnology	0.497	Physical Sciences Research
1.000	GRC for John Glenn Biomedical Engineering Consortium	0.994	Physical Sciences Research
1.250	Space Sciences Inc for microgravity related pharmaceutical development	1.243	Research Partnerships & Flight Support
2.500	MSFC for propulsion Materials Microgravity Research project	2.485	Physical Sciences Research
2.000	U Missouri Bioinformatics Consortium for equipment purchase	1.988	Biological Sciences Research
1.500	Truman State U Life Sciences for laboratory equipment	1.491	Biological Sciences Research
0.250	Continued construction of a research & teaching facility, Rutgers Busch Campus, Piscataway NJ	0.249	Physical Sciences Research
1.000	U Texas, Austin, for nanomedicine	0.994	Biological Sciences Research
1.500	U Montana in Missoula, Montana for National Space Privatization Program	1.491	Physical Sciences Research
<b>87.500</b>	<b>AERONAUTICS</b>	<b>86.984</b>	
1.000	Aircraft engine research, including research being done in conjunction with DoD	0.994	Aeronautics Technology
0.300	National Communications, Navigation & Surveillance test bed	0.298	Aeronautics Technology
1.300	U Toledo Turbine Institute	1.292	Aeronautics Technology
1.000	Michigan SATS Incorporated	0.994	Aeronautics Technology
1.500	DFRC's Intelligent Flight Control System research project	1.491	Aeronautics Technology
0.500	Aircraft Radio Guidance System	0.497	Aeronautics Technology
2.000	To research Secure Automatic Dependent Surveillance Broadcast Surveillance data link technology for enhanced aviation	1.988	Aeronautics Technology
4.000	Adaptive Surveillance Techniques for Airport Surface Safety	3.976	Aeronautics Technology
5.000	SOCRATES	4.971	Aeronautics Technology
5.000	Development of Aeronautics Research budget for next 5 years allocated to National Institute for Aerospace for contracting with industry & academia	4.971	Aeronautics Technology
15.000	Future aircraft research with priority on supersonic flight technologies	14.912	Aeronautics Technology
15.000	Future aviation systems including priority on aviation security & air traffic management	14.912	Aeronautics Technology
15.000	Continued development of flight technologies with application to military vehicles	14.912	Aeronautics Technology
3.000	Wichita State U, Wichita Kansas, for National Center for Composite Materials Performance	2.982	Aeronautics Technology
1.000	Wichita State U, Wichita Kansas, for Critical Aircraft Icing project	0.994	Aeronautics Technology
0.900	FL Institute for Technology, Melbourne FL, for Hydrogen Production, Fuel Cell and Sensor Technology Initiative	0.895	Aeronautics Technology
8.000	FL State University System Hydrogen Research Initiative	7.953	Aeronautics Technology
8.000	Fully fund Virtual Airspace Modeling & Simulation Program and include \$8M for Display Systems Replacement	7.953	Aeronautics Technology

**Enclosure 2**  
**Congressional Earmarks**

<b>NASA FY 2004 CONGRESSIONAL EARMARKS</b>		Including	
Pre-Rescission		Resission	
<b>57.400</b>	<b>CROSSCUTTING TECHNOLOGY (Note: to be transferred to SFC Appropriation)</b>	<b>57.061</b>	
0.900	Alabama A&M U for Advanced Space Propulsion Material Research & Technology Center	0.895	Space Launch Initiative
0.300	High Temperature Nanotechology Research	0.298	Mission and Science Measurement
0.200	Bowling Green State U Hybrid Engine project	0.199	Innovative Technology Transfer Partnerships
2.000	Michigan Technology Commercialization Corporation for medical materials & technologies	1.988	Innovative Technology Transfer Partnerships
1.000	Advanced Interactive Discovery Environment engineering research, Syracuse U	0.994	Mission and Science Measurement
3.000	CICT for High Information Density Approaches to Mobile Brandband Internet Communications	2.982	Mission and Science Measurement
3.000	Transfer to Air Force Research Lab to conduct joint research with NASA on emerging areas of computing	2.982	Mission and Science Measurement
1.500	BizTech High Tech Business Incubator	1.491	Innovative Technology Transfer Partnerships
2.300	NASA-Illinois Tech Commercialization Center, DuPage County Research Park	2.286	Innovative Technology Transfer Partnerships
0.500	Industrial Technology Institute at Cleveland State U	0.497	Innovative Technology Transfer Partnerships
0.800	Glennan Microsystems Initiative	0.795	Mission and Science Measurement
1.000	Garrett Morgan Commercialization Initiative, Ohio	0.994	Innovative Technology Transfer Partnerships
0.750	NASA Goddard Commercial Technology program for Earth Alert Project	0.746	Innovative Technology Transfer Partnerships
1.500	MCNC-Research & Development Institute to establish a Laboratory for Distributed Chemical and Biological Sensors	1.491	Mission and Science Measurement
6.000	Space Alliance Technology Outreach Program, including \$2.5M for business incubators in FL and NY	5.965	Innovative Technology Transfer Partnerships
2.000	GRC for commercial technology program	1.988	Innovative Technology Transfer Partnerships
2.500	SSC for infrastructure improvements	2.485	Space Launch Initiative
1.000	SSC for relocation of visitors center	0.994	Space Launch Initiative
2.000	Wheeling Jesuit U for National Technology Transfer Center	1.988	Innovative Technology Transfer Partnerships
2.000	SSC for commercial technology program	1.988	Innovative Technology Transfer Partnerships
1.400	U New Orleans, LA, for Composites Research Center of Excellence & development of advanced metallic joining technologies	1.392	Space Launch Initiative
1.000	VA Commonwealth U, Richmond VA for advance research in batteries & fuel cells	0.994	Mission and Science Measurement
1.000	GSFC COM Simulation Architecture Project	0.994	Mission and Science Measurement
2.250	U Alabama at Huntsville Center for Modeling, Simulation & Analysis	2.237	Mission and Science Measurement
1.500	Idaho National Engineering & Environmental Laboratory for development of performance, safety and mission success tools for NASA programs	1.491	Mission and Science Measurement
2.000	Cryogenic Power Electronics Development at Sate University of New York at Albany	1.988	Mission and Science Measurement
3.000	Transfer to Air Force Research Lab to deploy & develop Interactive Data Wall technology	2.982	Mission and Science Measurement
2.500	Institute for Scientific Research Inc for research related to transversable access to orbit	2.485	Mission and Science Measurement
1.000	Pulsed Power and Energetic Research Center at U Huntsville, Alabama	0.994	Mission and Science Measurement
0.500	Montana Aerospace Development Authority	0.497	Mission and Science Measurement
4.500	National Center of Excellence in Infotonics in Rochester NY	4.473	Mission and Science Measurement
1.000	Tulane Institute for Macromoleculuar Engineering & Science for research on polymers	0.994	Mission and Science Measurement
1.500	GRC for Advance Power Systems Institute	1.491	Mission and Science Measurement
<b>62.250</b>	<b>EDUCATION PROGRAMS</b>	<b>61.883</b>	
6.225	National Space Grant Scholarship & Fellowship Program (for a total of \$25.325M)	6.188	Education
5.400	EPSCoR Program (total of \$10.M)	5.368	Education
1.000	Science, Engineering, Math & Aerospace Academy programs, Albany State College, GA	0.994	Education
0.250	National Science Center Foundation of Augusta, GA for Learning Logic Program	0.249	Education
0.150	North Alabama Planetarium Initiative	0.149	Education
0.500	Southeast Missouri State University's NASA Educator Resource Center	0.497	Education
2.200	Education Advancement Alliance in Philadelphia, PA for education grants & scholarships	2.187	Education



**Enclosure 2**  
**Congressional Earmarks**

<b>NASA FY 2004 CONGRESSIONAL EARMARKS</b>		Including	
Pre-Rescission		Resission	
0.250	Middle Tennessee State U for K-12 Science & Education Enhancements	0.249	Education
0.800	Aerospace Education Center, Cleveland, OH	0.795	Education
0.500	Ohio View Consortium	0.497	Education
0.200	Adler Planetarium, Chicago, IL for Cosmic Gateway Teacher Training program	0.199	Education
0.300	Center for Science and Mathematics, U Redlands, CA	0.298	Education
1.000	U of NC at Chapel Hill for the Morehead Planetarium and Science Center	0.994	Education
2.000	Jason Foundation	1.988	Education
4.500	New Science Center, St. Bonaventure U, NY	4.473	Education
0.300	FL State U Challenger Learning Center	0.298	Education
1.000	Alabama Supercomputer Education Outreach Program	0.994	Education
0.600	Challenger Center in Kenai, Alaska	0.596	Education
2.000	Denver Museum of Nature & Science in Denver Colorado for equipment for Space Science Museum	1.988	Education
1.500	Adventure Science Center in Nashville, TN for Sudekum Planetarium	1.491	Education
0.500	U Northern Iowa in Cedar Falls, Iowa for Existing Business Enhancement Program	0.497	Education
1.300	Iowa State U for PIPELINES project	1.292	Education
1.000	Metropolitan School District of Decatur Township Indiana for Challenger Learning Center expansion	0.994	Education
1.700	Northern Kentucky U/U of Louisville for digital science center	1.690	Education
	U Alabama, Huntsville for Center for Modeling Simulation & Analysis		Education
1.000	Oregon Museum of Science & Industry for space science education distance learning program	0.994	Education
1.000	Southeast Missouri State University for NASA's ERSC Outreach project	0.994	Education
1.500	Dominion U's Center for Science & Technology for project based learning	1.491	Education
0.200	Wheeling Jesuit U for Classroom of the Future	0.199	Education
2.000	U Connecticut for Center for Land Use Education & Research	1.988	Education
2.000	Iowa State U, Ames, Iowa for non-destructive evaluation studies	1.988	Education
0.500	Des Moines Science Center, Des Moines, Iowa	0.497	Education
2.000	School of Science & Mathematics at College of Charleston, Charleston SC	1.988	Education
3.000	U Hawaii, Hilo for Mauna Kea Astronomy Education Center	2.982	Education
1.500	Space Education Initiative, Wisconsin for Wisconsin Geoscience Education initiative	1.491	Education
1.000	Youth Achievers Committee of NJ, Burlington NJ for Youth Achievers Committee Science & Math initiative	0.994	Education
0.500	U Vermont, Burlington, Vermont for Center for Advanced Computing	0.497	Education
1.000	Wayne State U, Detroit, Michigan for Center of Smart Sensors & Integrated Microsystems	0.994	Education
1.000	Wellpinit School District in Wellpinit, WA for Virtual Classroom Project	0.994	Education
1.500	Mitchell Institute, Portland, Maine for science & engineering education	1.491	Education
1.500	Arkansas Center for Space & Planetary Sciences	1.491	Education
1.000	Dole Scholarship Program	0.994	Education
1.800	City College of NY for community-based science & technology education facility	1.789	Education
1.000	Delaware Aerospace Education & Foundation, Kent County, Delaware	0.994	Education
0.175	Astronaut Memorial Foundation for Columbia STS 107 addition to National Space Mirror Memorial, KSC	0.174	Education
1.900	Replacement and upgrade of equipment at KSC	1.889	Education
<b>8.550</b>	<b><u>INCLUDED WITHIN G&amp;A (allocated to all programs)</u></b>	<b>8.500</b>	
2.000	Demonstrate cyber-security architecture	1.988	Included within Corporate G&A
4.000	NASA's IV&V facility	3.976	Included within Corporate G&A
2.550	Fractional Ownership Test Program	2.535	Included within Corporate G&A
<b>1.000</b>	<b><u>INSPECTOR GENERAL</u></b>	<b>0.994</b>	Inspector General

SPACE SCIENCE

Solar System Exploration (SSE)

**Congressional Earmarks: +\$13.55M**

See Enclosure 2 for a listing of all Congressional earmarks.

**Directed Reductions: -\$20.0M**

- -\$20.0M, Project Prometheus
  - Absorbed by dividing the reduction among Nuclear Power, Nuclear Propulsion, and JIMO.

**NASA Changes: +\$25.9M**

Development, +\$180.5M

- +\$4.6M, MErcury Surface, Space ENvironment, GEochemistry and Ranging (MESSENGER)
  - Growth associated with launch delay from to March 2004 to May 2004
  - Total life-cycle cost is now \$362.9M, compared to \$358.3M specified in the FY05 budget request
- +\$33.4M, Deep Impact
  - Growth associated with launch delay from January 2004 to December 2004
  - Total life-cycle cost is now \$320.0M, compared to \$286.6M specified in the FY05 budget request
- +\$1.6M, Dawn
  - Increase in ELV cost
  - Total life-cycle cost is now \$368.0M, compared to \$366.4M specified in the FY05 budget request
- +\$140.9M, New Horizons
  - Mission selected as the first New Frontiers mission
  - Total life cycle cost estimate is \$619.2M; no change from the FY05 budget request

Operations: +\$0.6M

- Correction, realignment of workforce to the appropriate program and project

Research: +\$8.4M

- +\$5.0M, Cassini, to augment the Science Operations Plan (SOP) development effort
- -\$7.6M, Mars R&A program realigned to Mars Research, no change to content
- +\$11.0M, Correction, realignment of workforce to the appropriate program and project

Technology and Advanced Concepts: -\$229.4M

- -\$37.2M, Project Prometheus
  - Funding profile for the Jupiter Icy Moons Orbiter mission reshaped, consistent with the FY 2005 Budget
- -\$117.4M, New Frontiers
  - Funding realigned to New Horizons development as a result of mission being named the first New Frontiers mission
- -\$74.8M, Other SSE Technology and Advanced Concepts
  - -\$10.8M, X-2000 phased out
  - -\$28.4M, Optical Communications Technology Demonstration realigned to Mars Technology
  - -\$17.7M, delays in In-Space Propulsion (ISP) award selections process
  - -\$18.3M, approximately 4-month delay in selection of Future Discovery missions
  - +\$0.4M, other

**Other Appropriation Transfers:**

-\$2.7M, Research

- -\$2.7M, Transfer of people associated with the NASA Space Network, to the Space Flight Capability appropriation that had previously been incorrectly assigned to Space Science

<b>Mars Exploration</b>
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**NASA Changes: +\$29.6M**

Development: -\$7.2M

- +\$3.1M, Mars Reconnaissance Orbiter (MRO)
  - Correction, realignment of workforce to the appropriate program and project
  - Total life-cycle cost is now \$680.9M, compared to \$677.8M specified in the FY05 budget request
- -\$10.3M, Mars Small Missions
  - French Space Agency cancellation of the 2007 Mars Premier mission results in cancellation of U.S. contribution (NetLander)

Operations: +\$3.4M

- +\$2.0M for 2003 Mars Exploration Rovers (MER) mission extension
- +\$1.1M, Correction, realignment of workforce to the appropriate program and project
- +\$0.3M, other

Research: +\$16.4M

- +\$7.6M, reallocated to Mars Research & Analysis program from Solar System Exploration (SSE) Research
- +\$8.8M, for 2003 Mars Exploration Rovers (MER) mission extension

Technology and Advanced Concepts: +\$17.1M

- -\$3.5M, Phoenix (2007 Mars Scout)
  - Funding rephased consistent with selected Phoenix proposal
    - Includes -\$2.3M, to adjust for the institutional support at LaRC that had been incorrectly budgeted for under the Space Science Enterprise rather than Aeronautics
- +\$20.6M, Other
  - +\$28.4M, Optical Communication Technology Demonstration realigned from SSE Technology; this technology will be flown on the 2009 Mars Telesat Orbiter (MTO)
  - +\$2.6M, rephasing of Optical Communication funding; no change in total requirement
  - -\$10.4M, Program reserves reduced to fund MER extension and other requirements

<b>Astronomical Search for Origins (ASO)</b>
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**Congressional Earmarks: +\$4.2M**

See Enclosure 2 for a listing of all Congressional earmarks.

**Directed Reductions: -\$8.0M, Space Interferometry Mission (SIM)**

- One- to two-month schedule slip

**NASA Changes: +\$11.8M**

Development: +\$9.6M,

- +\$9.6M, Stratospheric Observatory For Infrared Astronomy (SOFIA):
  - Cavity door certification costs (\$7.8M)
  - Correction, realignment of workforce to the appropriate program and project

Operations: +\$8.6M

- +\$1.0M, FUSE mission extension from April 2003 to September 2004
- +\$7.4M, Realignment with Spitzer Space Telescope Data Analysis budget (no change to program content), and realignment of workforce to the appropriate program and project
- +\$0.2, other

Research: -\$1.2M

- -\$3.4M, Realignment with Spitzer Space Telescope Operations budget; no change to program content
- +\$1.2M, HST Data Analysis, pursue options to maximize HST lifetime in light of Servicing Mission 4 cancellation
- +\$0.8M, Correction, realignment of workforce to the appropriate program and project
- +\$0.2M, other

Technology and Advanced Concepts: +\$29.0M

- +\$16.7M, Space Interferometry Mission (SIM)
  - Would have maintained December 2009 launch; following Congressional reduction (see #1 above) launch may be delayed 1-2 months
  -
- -\$2.1M, Terrestrial Planet Finder (TPF)
  - work on cryocooler slightly deferred
- +\$3.1M, Keck Interferometer:
  - Ongoing schedule delays with outriggers, due to legal/environmental issues
- +\$11.5M, Widefield Infrared Survey Explorer (WISE)
  - New Explorer mission selection; funding realigned from SEC Technology/Future Explorers
- -\$0.2M, other

<b>Structure and Evolution of the Universe (SEU)</b>
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**Congressional Earmarks: +\$2.0M**

See Enclosure 2 for a listing of all Congressional earmarks.

**Directed Reductions: -\$10.0M, Beyond Einstein (Constellation-X mission)**

- Schedule impact TBD

**NASA Changes: +\$35.0M**

Development: +\$51.4M

- +\$45.4M, Gravity Probe-B Development (GP-B)
  - Supports launch slip from December 2003 to April 2004, due to an electronics issue
  - Total life-cycle cost is now \$773.0M, compared to \$727.6M specified in the FY05 budget request
- -\$12.4M, Gamma ray Large Area Space Telescope (GLAST)
  - Rephasing due to launch delay from September 2006 to May 2007 due to withdrawal of international partners
  - Total life-cycle cost is now \$739.5M, compared to \$751.9M specified in the FY05 budget request
- +\$32.4M, Swift
  - Launch delay from 9/03 to 9/04 due to various technical difficulties, particularly with Burst Alert Telescope instrument, which was finally integrated onto the spacecraft in early 1/04
  - Total life-cycle cost is now \$239.3M, compared to \$206.9M specified in the FY05 budget request
- +\$6.6M, Herschel

- Technical issues in FY 2003 (now resolved) pushed work into FY 2004; no launch delay
- +\$1.0M, Planck
  - Recover capability lost with withdrawal of Italian partners
- -\$21.7M, SEU Small Missions
  - SPIDR mission terminated, as reported in the FY03 Operating Plan update of September 4, 2003

Operations: +\$3.6M

- Galaxy Evolution Explorer (GALEX) increased operation costs

Research: -\$3.8M

- GP-B and Swift launch delays

Technology and Advanced Concepts: -\$16.1M

- -\$24.2M, Constellation-X and Laser Interferometer Space Antenna (LISA)
  - Con-X to launch no earlier than 2016; LISA to launch no earlier than 2012
- +\$7.7M, Extreme Universe Space Observatory (EUSO)
  - New Explorer mission selection; funding realigned from SEC Technology/Future Explorers
- +\$0.3M, other

<b>Sun-Earth Connection (SEC)</b>
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**Congressional Earmarks: +\$6.0M**

See Enclosure 2 for a listing of all Congressional earmarks.

**NASA Changes: -\$45.0M**

Development: +\$21.0M

- +\$12.8M, Solar-Terrestrial Relations Observatory (STEREO)
  - Launch delay from November 2005 to February 2006 due to bad thruster valves
  - Total life-cycle cost is now \$458.1M, compared to \$404.5M specified in the FY05 budget request
- +\$22.5M, Solar Dynamics Observatory (SDO)
  - +\$10.1M, Correction, Realignment of workforce to the appropriate program and project
  - +\$12.4, Maintain launch readiness date of April 2008, and accommodation of new science instrument in place of one that was not confirmed for Phase B
  - Total life-cycle cost is now \$668.6M, compared to \$646.1M specified in the FY05 budget request
- -\$21.7M, Aeronomy of Ice in the Mesosphere (AIM)
  - AIM received SPIDR funding in FY 2003, offsetting FY 2004 requirements
- +\$7.4M, SEC Small Projects:
  - Increases in Solar-B and TWINS due to technical difficulties

Operations: -\$6.6M

- Correction, realignment of workforce to the appropriate program and project

Research: +\$6.1M

- Increase in Sounding Rockets to cover increase cost associated with campaign moving from Peru to Kwajalein

Technology and Advanced Concepts: -\$65.5M

- -\$1.8M, New Millennium

- Delay of 1-2 months for Space Technology (ST)-10 mission
- -\$15.5M, Future Explorers
  - Funding for new mission selections (WISE and EUSO) realigned to ASO and SEU
  - Funding for cancelled SPIDR mission realigned back from SEU
  - New mission selections are still on schedule
- -\$18.0M, Solar Terrestrial Probes
  - Slips Geospace Electrodynamic Connections (GEC) mission one year to launch readiness date of March 2012
- -\$14.4M, Living With a Star
  - Correction, realignment of workforce to the appropriate program and project
- -\$15.8M, Other SEC Technology and Advanced Concepts
  - Deferral of CoF funding associated with Space Science Building at GSFC

### **EARTH SCIENCE**

<b>Earth System Science</b>
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**Congressional Earmarks: +\$45.5M**

See Enclosure 2 for a listing of all Congressional earmarks.

**Directed Reductions: -\$11.0M**

-\$11.0M, Global Climate Change Research Initiative

- Glory launch delayed from Dec 2006 to No Earlier Than (NET) Dec 2007
- Glory lifecycle cost impacts being assessed
- Significant risk to meeting NPOESS aerosol polarimetry requirements
- Significant risk to Solar Irradiance data continuity (gap between SORCE and National Oceanic and Atmospheric Administration (NPOESS) products)

**NASA Changes: -\$6.1M**

Development: -\$6.1M

- +\$12.4M, AURA – Launch delay from Jan 2004 to NET Jun 2004
  - High-Resolution Dynamics Limb Sounder (HIRDLS) instrument cryo-cooler failure. Failure under investigation. Actual impact TBD until fault isolation is complete
  - Lifecycle cost increased from \$767.7M to \$808.2M (Includes FY03 requested Programmatic Changes)
- -\$2.4M, GIFTS – Rephased to align with project plan
  - Lifecycle cost increase from \$121.6M to \$124.1M
- +\$5.2M, Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (Calipso) – Launch delay from Apr 2004 to NET Mar 2005
  - Cost of launch delay due to dual manifest with Cloudsat
  - Lifecycle cost increased from \$163.3M to \$168.5M
- -\$26.1M, Earth Observing System Data and Information System (EOSDIS)
  - -\$14.9M, Cost savings commensurate with evolution to next-generation data systems and adoption of new competitively awarded operations contract
  - -\$12.1M, GSFC workforce correction from EOSDIS to Research
  - +\$0.9M, Synthetic Aperture Radar (SAR) Facility REASoN CAN awards now book kept within EOSDIS
- +\$0.2M, SORCE
- +\$4.6M, Other
  - -\$2.0M, Seawinds – Funds reallocated due to loss of spacecraft
  - +\$0.7M, QuikScat – Continuity of mission operations through FY04
  - +\$2.8M, Small Projects – Additional cost across several small projects (e.g. Aqua, ICESat, CERES, SORCE)
  - +\$0.5M, Additional Remote Earth Observing Operations Center (REOC) requirements

- +\$2.6M, Defense Contract Audit Agency (DCAA) rate increase

Operations: +\$1.9M

- +\$6.2M, Continue Tropical Rainfall Measurement Mission (TRMM), Upper Atmosphere Research Satellite (UARS), and Earth Radiation Budget Satellite (ERBS) operations through FY04
- -\$1.7M, SAR Facility
  - Research Education and Applications Solutions Network (REASoN) Cooperative Agreement Notice awards now book kept within EOSDIS and full cost adjustments
- -\$21.3M, Earth Science Operations
  - Workforce correction within Operations (\$14.1M), additional operating mission requirements (\$7.2M) and realignment to scope of new competitively awarded EOSDIS Maintenance and Development (EMD) contract
- +\$18.4M, Ground Network
  - +\$12.2M, No GSFC institutional dollars were placed against this budget; this adjustment corrects that error
  - +\$6.2M, Consolidated Space Operations Contract (CSOC) termination costs
- +\$0.3M, Other

Research: +\$14.3M

- +\$12.1M, GSFC workforce correction to Research from EOSDIS
- +\$2.1M, Scientific Computing – High performance scientific computing initiatives to support critical modeling requirements
- +\$0.1M, Other

Technology and Advanced Concepts: -\$19.0M

- +\$0.9M, Technology Infusion – Correction of workforce allocations
- -\$1.5M, NPOESS Preparatory Project (NPP) – Correction of workforce allocations
- +\$1.2M, Global Precipitation Mission (GPM) – Correction of workforce allocations
- -\$0.9M, Landsat Data Continuity Mission (LDCM) – Correction of workforce allocations
- -\$16.1M, Ocean System Topography Mission (OSTM) –Rephased FY07 to FY08 (Schedule realignment with partners)
- -\$2.6M, Correction of workforce allocations
  - -\$0.6M, Ocean Winds
  - +\$1.3M, Orbiting Carbon Observatory (OCO)
  - -\$4.1M, Earth System Science Pathfinders (ESSP) support of future missions
  - +\$0.8M, Other Studies

**Other Appropriation Transfers:**

Operations: -\$5.8M

- -\$5.8M, Transfer of people associated with the NASA Space Network, to the Space Flight Capability appropriation that had previously been incorrectly assigned to Earth Science

<b>Earth Science Applications</b>
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**Congressional Earmarks: +\$16.4M**

See Enclosure 2 for a listing of all Congressional earmarks.

**NASA Changes: +\$1.6M**

Research: +\$2.2M

- +\$0.9M, Education – Correction of workforce allocations
- +\$1.1M, Fund open solicitations that support new outreach strategy
- +\$0.2M, Other

Technology and Advanced Concepts: -\$0.6M

- -\$0.6M, Correction of workforce allocations, no change to programmatic content

**BIOLOGICAL AND PHYSICAL RESEARCH**

**Biological Sciences Research**

**Congressional Earmarks: +\$12.0M**

See Enclosure 2 for a listing of all Congressional earmarks.

**NASA Changes: -\$0.3M**

Operations: -\$18.5M

- -\$18.0M, Realignment of Human Research Initiative (HRI) to Research
  - No change to program content
- -\$0.3M, Reduce operations contracts

Research: +\$18.0M

- +\$18.0, Realignment of HRI from Operations
  - No change to program content

**Physical Sciences Research**

**Congressional Earmarks: +\$6.6M**

See Enclosure 2 for a listing of all Congressional earmarks.

**NASA Changes: -\$0.5M**

Operations: -\$0.5M

**Research Partnerships & Flight Support**

**Congressional Earmarks: +\$1.2M**

See Enclosure 2 for a listing of all Congressional earmarks.

**NASA Changes: -\$0.2M**

Operations: -\$0.2M

- -\$0.7M, Reduce operations contracts
- +\$0.5M, Transfer of service pool costs associated with Space Life Sciences laboratory that had previously been incorrectly included under Space Flight

**AERONAUTICS**

**Aeronautics Technology**

**Congressional Earmarks: +\$144.9M**

- Includes \$87.5M that will remain in Aeronautics Technology plus \$57.4M for earmarks being transferred to Crosscutting Technology
- See Enclosure 2 for a listing of all Congressional earmarks.



**NASA Changes (excluding Appropriation transfers): -\$4.4M**

Technology and Advanced Concepts: -\$3.5M

- +\$3.2M, Aviation Safety & Security Program
  - -\$2.4M, Vehicle Safety Technologies
    - Delayed Safety Technology Concept Studies
  - +\$5.2M, Weather Safety Technology
    - +\$5.6M, Increase to support the flight-testing of Advanced Cockpit Weather Safety Technology.
    - -\$0.4M, Corporate G&A adjustment, no programmatic impact
  - +\$0.5M, Aviation Securities Technologies
    - Corporate G&A adjustment, no programmatic impact
  - -\$0.1M, other
  
- -\$7.8M, Airspace Systems Program
  - -\$6.8M, Advanced Air Transportation Technology realigned Technology Concept Studies
  - -\$2.6M, Virtual Airspace Modeling & Simulation realigned Technology Concept Studies
  - -\$1.4M, Aviation Operations Systems realigned Technology Concept Studies
  - +\$3.0M, Next Generation Air Transportation System
    - +\$10.5M, Realign Technology Concept Studies
      - No programmatic impact to program – this realigns all Technology Concept Studies to the Project that formulates the future of Airspace Systems
    - -\$7.8M, Descope technical integration efforts supporting Next Generation Air Transportation Systems
    - +\$0.3M, Corporate G&A adjustment, no programmatic impact
  
- +\$1.1M, Vehicle Systems Program
  - +\$0.9M, Quiet Aircraft Technology
    - Corporate G&A adjustment, no programmatic impact
  - -\$14.4M, 21<sup>st</sup> Century Aircraft Technology (TCAT)
    - -\$13.8M, Fuel cell efforts discontinued at the end of fiscal year 2003, as recommended by the recent NRC review
    - -\$0.6M, Corporate G&A adjustment, no programmatic impact
  - -\$6.5M, Flight Research
    - -\$8.8M, Realignment of Unmanned Aerial Vehicle (UAV) in the National Air Space (NAS) to Flight and Systems Demonstration. No programmatic impact to program.
    - +\$1.8M, Increase to Test Range instrumentation.
    - +\$0.5M, Corporate G&A adjustment, no programmatic impact
  - -\$0.1M, Advanced Vehicle Concepts
    - +\$25.0M, Since the initial planned flight of X-43A was unsuccessful, this funding covers the cost of a Mach 7 reflight in March 2004 that addresses a rocket booster control system issue and associated risk reduction activities.
    - -\$40.5M, Advanced Vehicle Concepts (AVC) Project, Revolutionary Airframe Concepts Research (\$20.8M) and Revolutionary Aircraft Flight Validation (\$20.2M) elements discontinued at the end of fiscal year 2003. Funds realigned in support of higher priority efforts:
      - Hyper-X (X43A) Mach-7 return to flight (\$25.0M)
      - Rotorcraft technologies activities (\$11.4M)
      - Breakthrough Vehicle Technology to support Planetary Aircraft (\$4.6M)
    - +\$15.9M, Rotorcraft technology research within the AVC Project continues in fiscal year 2004 in support of a joint research program with the Army
    - -\$0.5M, Corporate G&A adjustment, no programmatic impact.
  - +\$30.5M, Breakthrough Vehicle Technology
    - +\$21.1, increasing efforts in efficient fuel airframe configuration development which translate to reduced emissions

- +\$7.3M, Initiated Planetary Aircraft activities within the Breakthrough Vehicle Technology (BVT) Project
- Includes a \$2.3M increase to adjust for the institutional support at LaRC that had been incorrectly budgeted for under the Space Science Enterprise's Mars Scout
- +\$2.1M, Corporate G&A adjustment, no programmatic impact
- +\$0.1M, Ultra-Efficient Engine Technology
  - Corporate G&A adjustment, no programmatic impact
- -\$18.2M, Propulsion and Power
  - Reducing long-term alternative propulsion and power work
- +\$8.8M, Flight & System Demonstration
  - Realignment of Unmanned Aerial Vehicle (UAV) in the National Air Space (NAS) effort from Flight Research project. No programmatic impact to program.

Other (Appropriated under SAE, to be transferred to Crosscutting Technology): -\$0.9M

- -\$5.3M, share of Aeronautics reduction that belongs to Crosscutting Technology
- +\$4.4, Research (SBIR/STTR)
  - Budget estimate for SBIR/STTR in FY 2004 request was a placeholder used for planning purposes only
  - As directed by Congress, Congress in the reauthorization of the SBIR program, the actual SBIR funding level is based on the results of an analysis of the actual obligations for the most recent fiscal year that data is available.
  - Assessment based on the Agency's latest actual data available concludes that total funding for SBIR program for FY 2004 should be \$121.2M
    - Total SBIR/STTR of \$121.2M includes \$4.4M transfer from Science, Aeronautics and Technology, plus \$0.9M reallocated from within Crosscutting Technology

**Appropriation Transfer - Aeronautics to Crosscutting Technology: -\$56.5M**

- -\$57.4M, Transfer Congressional Earmarks to Crosscutting Technology to align with benefiting programs, as shown on Enclosure 1.
- -\$4.4M, Transfer Congressional Special Interest Items from Aeronautics to Crosscutting Technology to align with associated program within Crosscutting Technology, SBIR/STTR (Research).
- +\$5.3M, Transfer share of unspecified Congressional reductions from Aeronautics to Crosscutting Technologies.

**EDUCATION**

<b>Education</b>
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**Congressional Earmarks: +\$62.25M**

See Enclosure 2 for a listing of all Congressional earmarks.

**NASA Changes: -\$0.25M**

-\$0.25M, Education Programs

- Reallocation of Corporate G&A. See page 16 for details.

SPACE FLIGHT

Space Station

**Directed Reductions: -\$200.0M**

Development: -\$5.7M

- -\$5.7M, flight Hardware

Operations: -\$194.3M

Depletion of reserves deemed critical by two independent cost estimating teams and would limit the program's ability to address risks in FY 2004 and FY 2005, as follows:

- -\$142.3M, Spacecraft Operations
- -\$39.9M, Launch & Mission Operations
- -\$12.1M, Operations Program Integration

**NASA Changes: -\$3.8M**

Development: +\$2.4M

- -\$2.5M, Flight Hardware
  - -\$10.0M, Correction to reallocate to Operations
    - Requirements and funding for cargo mission requirements planning and unpressurized carriers mission support activities migrate to operations in FY04 with new operations contract awards.
    - No change to programmatic content
  - +\$7.5M, Correction to workforce distribution and the associated institutional costs
- +\$6.4M, ECLSS
  - Correction to workforce distribution and the associated institutional costs
- -\$1.5M, Node 3
  - Correction to workforce distribution and the associated institutional costs

**Operations: -\$6.2M**

Spacecraft Operations: -\$60.4M

- -\$9.4M, Reserves
- -\$10.0M, realigning management activity to Launch and Mission Operations
  - No change to programmatic content
- +\$5.7M, Corporate G&A Adjustment, as discussed on page 16
- -\$46.7M, Correction to workforce distribution and the reallocation of corporate G&A, as discussed on page 16

Launch and Mission Operations: +\$14.0M

- -\$6.0M, Correction to workforce distributions
- +\$10.0M, Correction to reallocate from Core Development
  - Requirements and funding for cargo mission requirements planning and unpressurized carriers mission support activities migrate from flight hardware to operations in FY04 with the new operations contract awards.
  - No change to programmatic content
- +\$10.0M, Reallocation from Launch and Mission Operations for the management responsibility of SpaceHab equitable adjustments
  - No change to programmatic content

Operations Program Integration: +\$40.2M

- +\$40.2M, Correction to workforce distribution and the reallocation of corporate G&A, as discussed on page 16.

<b>Space Shuttle</b>
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**Earmarks/Directed Reductions**

- The FY 2004 consolidated appropriations earmarked \$15.0M of Service Life Extension Program (SLEP) funds to provide independent assessment and concepts to increase Space Shuttle Crew Survivability
  - The President's New Vision for Space Exploration directs NASA to safely return the Space Shuttle to flight consistent with CAIB recommendations, finish assembly of the International Space Station, and then retire the Space Shuttle from service.
  - This direction necessitates that the Agency reevaluate the Space Shuttle Service Life Extension Program (SLEP) in the context of a new framework for Space Shuttle phase out.
  - A major modification to the Space Shuttle to install a new crew survivability capability would take many years to develop, coinciding with the phase out of the Shuttle, and reducing the effective impact to the Space Shuttle safety.
  - Based on these considerations, NASA will work with the committees to define the best approach to improve Space Shuttle safety and meet the President's new vision for phasing out the Shuttle.

**Return to Flight:**

Included below are changes to accommodate Return to Flight activities and CAIB recommendations. The FY 2004 costs, as highlighted in the February release of NASA's Implementation Plan for Return to Flight and Beyond, could reach \$265 million. Of this amount, \$124 million in activities have been approved for implementation by the Program Requirements Change Board and verified by the Return to Flight Planning Team. Additional RTF activities with an estimated cost of \$141 million are under evaluation. We will keep the committees apprised and if a reallocation of funds is required, NASA will highlight this in a future Operating Plan.

**NASA Changes:**

Development: +\$14.6M

- Correction to realign workforce into appropriate program/project
  - No change to program content for the following:
    - +\$6.5M, SSME Advanced Health Mgmt. System (AHSM)
    - +\$8.1M, Cockpit Avionics Upgrade

Operations: -\$32.0M:

- +\$285.9M Program Integration
  - +\$174.8M, redirecting funds from Space Shuttle Service Life Extension Program (SLEP), consistent with investment strategy to refocus the SLEP effort
    - Funds will be used for completing existing SLEP projects and potential mission assurance projects utilizing a process similar to that used for SLEP
  - +\$95.7M, Management realignment and consolidation of Flight Software effort from Flight Hardware
    - No change to program content
  - +\$14.0M, Additional institutional support to support Return to Flight and Columbia Accident Investigation Board (CAIB) recommendations
  - +\$1.4M, Correction to reallocate workforce from Orbital Space Plan to RTF
- +\$79.2M, Ground Operations
  - +\$22.8M, Increase contractor and civil service FTE to support Return to Flight and CAIB recommendations
  - +\$56.4M, Added institutional support to support Return to Flight and Columbia Accident Investigation Board (CAIB) recommendations
- +\$17.3M, Flight Operations

- +\$16.8M, Added institutional support to support Return to Flight and Columbia Accident Investigation Board (CAIB) recommendations
- +\$4.5M, Additional resources requirements to implement new Mission Support Operations Contract
- -\$4.0M, Delay T-38 aircraft modifications
  
- -\$133.0M, Flight Hardware
  - -\$29.4M, Reduce reserves (\$17.2M to support Return to Flight Requirements)
  - -\$95.7M, Management realignment and consolidation of Flight Software to Program Integration
    - No change to program content.
  - -\$21.2M, Reduce/slowdown hardware production due to manifest reduction
  - +\$13.8M, Added institutional support to support Return to Flight and CAIB recommendations
  - -\$0.5M, Transfer of service pool costs associated with Space Life Sciences laboratory to Biological and Physical Research Enterprise that had previously been incorrectly included under Space Flight
  
- -\$281.4M, Service Life Extension Program (SLEP),
  - -\$106.6M, Realignment of funds to support Return to Flight requirements
  - -\$174.8M, Redirecting funds to Program Integration, consistent with President's New Vision for Space Exploration that directs NASA to return the Space Shuttle to flight, and finish assembly of the International Space Station, before phase out of the Space Shuttle from service. Funding priorities to be established that reflect safety and mission assurance priorities through the end of the decade.

<b>Space Flight Support</b>
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**NASA Changes:**

Operations: +\$28.0M

- +\$24.9M, Space Communications
  - +\$10.0, To fund the backbone of NASA's Integrated Services Network
  - +\$3.9, Provide Outside the Continental United States (OCONUS) Services to Earth Sciences missions
  - +\$11.0, Contract transition requirements for Consolidated Space Operations Contract (CSOC) and Program Information Systems Mission Services (PrISMS)
  
- +\$0.6M, Rocket Propulsion Testing Corporate G&A adjustment, as discussed on page 16
  
- -\$6.0M, Miscellaneous
  - +\$2.0M, Reallocation from International Space Station to Crew Health and Safety
  - +\$0.5M, Corporate G&A Adjustment for Crew Health and Safety
  - -\$8.5M, correction to realign workforce into proper program (Advanced Systems)
  
- +\$8.5M, Advanced Systems
  - Realignment of workforce funds from "Miscellaneous"
  - No change to program content

**Other Appropriation Transfers:**

Operations: +\$8.5M

- +\$8.5M, Transfer of people associated with the NASA Space Network that had previously been incorrectly assigned to Earth Science and Space Science
  - Transfer of funds from Code S (\$2.7M) and Code Y (\$5.8M)

## CROSSCUTTING TECHNOLOGIES

### Space Launch Initiative

The newly established Exploration Systems Enterprise is conducting an orderly close-out of the Orbital Space Plane (OSP) program, including a three-month extension of current OSP contracts to capture managerial and technical lessons learned and cancellation of future OSP RFP's. Concurrently, the Enterprise is beginning solicitation planning for Project Constellation requirements generation, trade study analysis, and technology development.

The Exploration Systems Enterprise is also undertaking transitional activities in the Next Generation Launch Technology (NGLT) program, which will not be continued in the FY 2005 budget. The NGLT transition includes closeout activities on the RS-84 engine and reviews of NGLT support contracts for applicability to other Enterprise programs

#### **Directed Reductions: -\$70.0M**

- -\$70.0M, Next Generation Launch Technology
  - Eliminated from the Propulsion Technology project:
    - Rocket Engine Propulsion,
    - Auxiliary Propulsion, and
    - Contractor efforts supporting propulsion technology.
  - Eliminated Turbine-Based Combine-Cycle propulsion effort.

#### **NASA Changes (except Appropriation transfers): -\$51.1M**

##### Technology and Advanced Concepts: -\$51.1M

- +\$9.0M, Demonstration of Autonomous Rendezvous Technology (DART)
  - +\$7.7M, Increasing Project to support risk mitigation strategies.
  - +\$1.3M, Corporate G&A adjustment, no programmatic impact.
- -\$3.2M, Pad Abort Demonstration (PAD)
  - -\$4.5M, Descope the demonstration project.
  - +\$1.3M, Corporate G&A adjustment, no programmatic impact.
- -\$1.8M, OSP Design, Development & Formulation
  - -\$1.4M, Correction to reallocate workforce at JSC from Orbital Space Plan to Space Shuttle Program Integration -\$0.4M, Other
- -\$55.1M, Next Generation Launch Technology
  - -\$8.1M, Subsystem activities under Launch Systems Technology eliminated.
  - -\$3.0M, Rocket Based Combine Cycle propulsion effort eliminated.
  - -\$30.0M, X-43C Demonstrator
    - Descope to in-house technical support, with no contractors.
    - Descope to produce an USAF Single Engine Demonstrator (only).
    - Eliminates the X-43C Demonstrator Vehicle.
  - -\$11.3M, Terminate Lox/RP booster engine prototype under Propulsion Technology.
  - -\$10.4M, Terminate Propulsion Research and Technology outside contracts under Propulsion Technology.
  - +\$4.0M, Supports the President's Commission on Implementation of US Space
    - Total cost for this is \$6.0M, which includes \$2.0M from MSM
  - +\$3.7M, Corporate G&A adjustment, no programmatic impact.

#### **Appropriation Transfer - Aeronautics to Crosscutting Technology: +\$0.5M**

- +\$0.5M, Congressionally directed additions. Transfer Congressional Earmarks from Aeronautics to align with associated programs within Cross-cutting Technology

- Congressional directed actions (+\$5.8M), Transfer Congressional special interest items from Aeronautics to align with associated program within Crosscutting Technology.
- Unspecified Congressional reductions (-\$5.3M), Reductions to Crosscutting Technologies.

<b>Mission &amp; Science Measurement Technology</b>
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NASA is in the process of examining potential steps that may be undertaken in FY 2004 to position the Agency to most effectively implement the President's New Vision. The Exploration Systems Enterprise is also reviewing Mission and Science Measurement research capabilities and planning for realignment with the exploration vision. Adjustments for all of these efforts are anticipated in the next update to the FY 2004 Operating Plan.

**NASA Changes (except Appropriation transfers): -\$15.3M**

Technology and Advanced Concepts: -\$15.3M

- -\$3.6M, Computing, Information and Communications Technology (CICT) Program
  - +\$2.0M, Centennial Challenges Program
    - Establish series of prize challenges for revolutionary, breakthrough accomplishments that advance solar system exploration and ongoing NASA priorities. New program modeled on past successes, including 18th century navigation prizes, early 20<sup>th</sup> century aviation prizes, and more recent prizes offered by DARPA and the private sector. Program designed to generate innovative solutions by attracting diverse teams from academia, industry, and the public that will pursue multiple, unconventional, low-cost approaches from non-traditional sources to NASA's engineering challenges. FY 2004 prize amounts within existing authority; additional authority will be sought in NASA's 2005 authorization bill. Examples of FY04 challenges under consideration include: lunar resources processing demonstrations, highly mobile and survivable rover contests, high efficiency propellant storage demonstrations, and laser launch competitions.
  - -\$5.2, reducing the investment in distributed spacecraft control research within the Computing Network & Information Systems and Intelligent Systems in support of the Centennial Challenges Program (-\$2.0M) and Rotorcraft technology activities (-\$3.2M)
  - -\$0.4M, Corporate G&A adjustment, no programmatic impact
- -\$0.8M, Engineering for Complex Systems (ECS) Program
  - -\$1.3M, reducing the current year budget authority expected to be carried into the next fiscal year. Funds transferred in support of Rotorcraft Research
  - +\$0.5M, Corporate G&A adjustment, no programmatic impact
- -\$10.9M, Enabling Concepts and Technologies (ECT) Program
  - +2.0M, Supports the President's Commission on Implementation of US Space.
  - -\$10.0M, transferring Joint Systems Analysis Committee (JSAC) to Corporate G&A
  - -\$3.7M, delay in NASA Research Announcement (NRA) awards for NRAs.
    - The quantity of NRA awards will not be impacted.
  - +\$0.8M, Corporate G&A adjustment, no programmatic impact

**Appropriation Transfer - Aeronautics to Crosscutting Technology: +\$31.4M**

Technology and Advanced Concepts: +\$31.4M

Transferring Congressional earmarks and associated funding from Aeronautics into Crosscutting Technology, to align with associated programs.

- +\$16.8M, Computing, Information and Communications Technology (CICT) Program
- +\$1.5M, Engineering for Complex Systems (ECS) Program

- +\$13.1M, Enabling Concepts and Technologies (ECT) Program

<b>Innovative Technology Transfer Partnerships</b>
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**Congressional Earmarks: +\$24.0M**

- See Enclosure 2 for a listing of all Congressional earmarks.

**NASA Changes (except Appropriation transfers): +\$1.2M**

Technology and Advanced Concepts: -\$3.2M

- -\$3.2M, Technology Transfer
  - Correction to realign institutional support to Research

Research: +\$4.4M

- +\$3.2M, Correction to realign institutional support from Technology Transfer
- +\$0.9M, Research (SBIR/STTR)
  - Budget estimate for SBIR/STTR in FY 2004 request was a placeholder used for planning purposes only
  - As directed by Congress, Congress in the reauthorization of the SBIR program, the actual SBIR funding level is based on the results of an analysis of the actual obligations for the most recent fiscal year that data is available.
  - Assessment based on the Agency's latest actual data available concludes that total funding for SBIR program for FY 2004 should be \$121.2M
  - Total SBIR/STTR of \$121.2M includes \$0.9M reallocated from within Crosscutting Technology, plus \$4.4M transfer from Science, Aeronautics and Technology (shown below)
- +\$0.3M, Other

**Appropriation Transfer - Aeronautics to Crosscutting Technology: +\$24.7M**

Technology and Advanced Concepts: +\$20.3M

- +\$20.3M, Technology Transfer
  - Congressionally directed addition for Commercial Programs. Transfer from Aeronautics to align with associated programs *[part of the total +\$24.7M transfer from Aeronautics to Crosscutting Technology]*.

Research (SBIR/STTR): +\$4.4M

Budget estimate for SBIR/STTR in FY 2004 request was a placeholder used for planning purposes only *[part of the total +\$24.7M transfer from Aeronautics to Crosscutting Technology]*.

- As directed by Congress, Congress in the reauthorization of the SBIR program, the actual SBIR funding level is based on the results of an analysis of the actual obligations for the most recent fiscal year that data is available.
- Assessment based on the Agency's latest actual data available concludes that total funding for SBIR program for FY 2004 should be \$121.2M
  - Total SBIR/STTR of \$121.2M includes \$4.4M transfer from Science, Aeronautics and Technology, plus \$0.9M reallocated from within Crosscutting Technology

<b>INSTITUTIONAL CROSSCUTS</b>
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**Corporate G&A**

**Congressional Earmarks: +\$8.55M**

See Enclosure 2 for a listing of all Congressional earmarks.



**NASA Changes: +\$188.0M**

New Corporate G&A Activities: +\$139.0M

- +\$45.0M, NASA Engineering and Safety Center (NESC)
  - Independent capability for engineering and safety reviews and assessments, research and data analysis
- +\$10.0M, New Hires (Human Capital Initiative)
  - Includes funding to hire recent college graduates and to hire difficult to fill positions
- +\$26.5M, software Independent Verification and Validation (IV&V) facility activities
  - IV&V activity at the West Virginia facility had previously been funded by individual users; those activities are now being funded and managed corporately
- +\$17.4M, Space Architect
  - Previously funded by Aeronautics Technology and will now be funded corporately
- +\$40.1M, Chief Information Officer Information Technology (IT) initiatives
  - +\$21.3M, new initiatives including IT security enhancements (\$10.6M), wide area network technology modernization (\$8.6M), data interoperability (XML) (\$1.4), and Enterprise Architecture (\$0.8M), which are all critical to successful implementation of PMA/E-Government activities, related PMA goals, and achieving One NASA objectives.
    - Note: IT enhancement initiative also satisfies the FY04 appropriations conference report earmark.
  - +\$18.8M, for new requirements including transfers for initial E-Gov activities (\$4M) and NASA web portal (\$4M), added DOI E-Payroll implementation (\$8M), and increased center personnel (\$3M)

Full Cost Adjustments: +\$41.4M

- Internal realignment of Centers' G&A and Service Pool charges to corporate activities performed at the Centers

Other Changes: +\$7.6M

- +\$3.0M, Orbital Debris
- +\$7.0M, Rephased FY03 requirements for Corporate IFM and Corporate Security
- +\$4.0M, Financial Management
  - To implement corrective actions in response to the findings from NASA's financial audit
  - Includes \$3.2M for contractor support in the area of risk assessment and reconciliations; \$50K for training; and \$750K travel
- -\$6.4M, Other miscellaneous changes

The following table compares the Corporate G&A that was proposed in NASA's FY04 request with the current estimate for Corporate G&A:

	FY04				FY04
	<u>Request</u>	<u>Changes*</u>	<u>Subtotal</u>	<u>Rescission</u>	<u>Op Plan</u>
Corporate G&A Total*	612.7	188.0	800.7	-4.8	795.9

*\*Corporate G&A is allocated to all programs, based on dollars. When the FY04 President's Budget was submitted, corporate G&A dollars had not been allocated properly. Therefore, in addition to the \$188M of added activity, the "changes" column on Enclosure 1 also includes a reallocation of the originally proposed \$612.7M.*

**Other Institutional Cross-cuts (Agency-wide)**

**Personnel: +\$75.3M**

Personnel funds are included within each project, including services pools, Center G&A and Corporate G&A.

- + \$56.8M, to accommodate additional payraises
- +\$2.6M, for training and awards

**Enclosure 3**  
**FY 2004 Initial Operating Plan**

- +\$10.0M, for new hires (Human Capital Initiative) This funding will be used to hire recent college graduates and to hire difficult to fill positions
- +\$5.9M, for repricing of personnel salaries and benefits

	FY04	NASA			FY04
	<u>Request</u>	<u>Changes</u>	<u>Subtotal</u>	<u>Rescission</u>	<u>Op Plan</u>
Personnel	2,107.1	75.3	2,182.4	-12.8	2,169.6

Travel: +\$3.7M

Travel funds are included within each project, including services pools, Center G&A and Corporate G&A.

- +\$3.7M for Corporate travel, as follows:
  - +\$0.6M, Redirecting programmatic funds from within Codes R, S and U to accommodate expected travel requirements
  - +\$0.8M, increased travel requirements associated with the implementation of corrective actions associated with NASA's financial audit
  - +\$1.1M to accommodate expected travel requirements at Headquarters for management oversight of major programs
  - +\$1.2M to accommodate expected travel requirements at JSC, KSC, MSFC and SSC due to Return to Flight activities

	FY04	NASA			FY04
	<u>Request</u>	<u>Changes</u>	<u>Subtotal</u>	<u>Rescission</u>	<u>Op Plan</u>
Travel	63.1	3.7	66.8	-0.4	66.4

Non-Programmatic Construction of Facilities (CoF): +\$0.6M

Non-programmatic CoF is included within each Center's G&A. The funding increase of +\$0.6M includes \$0.4M reallocated from within JSC G&A and \$0.2M reallocated from OSF program reserves. The following summarizes the changes to the Agency's non-programmatic CoF:

- +\$9.2M, "Repair/Replace Steam System, Tunnel # 4" at LaRC
  - This project was originally planned in the FY05 budget request.
  - It needs to be accomplished earlier because Steam Tunnel #4 has degraded to the point where there are serious hazards to personnel and may fail at anytime.
- -\$9.2M, "Consolidation of Business Functions into Building 1194" at LaRC
  - This project is being deferred to FY05 to fund the above project
- +\$5.0M, "Construct Consolidated Engineering Building" at WFF
  - The existing facility does not have adequate space, cannot not maintain acceptable environmental control for engineering research and development functions, is in need of major renovation, and is more economical to replace than continually repair
    - This new Consolidated Engineering Building will result in a significantly more cost effective, more accessible (ADA compliant), more energy efficient, and more environmentally friendly building.
  - Project cost estimate increased from \$4.0M to \$9.0M. Scope of project increased from construction of engineering laboratories to construction of a new consolidated engineering replacement facility.
    - The Wallops Flight Facility (WFF) originally planned to construct a new \$4M engineering laboratory, plus \$2.4M to renovate two World War II era buildings (E 107 & E 108) used for office space.
    - After additional studies and considerations, an alternative plan was formulated that combines the new engineering lab (\$4.0M) with new (rather than renovated) office space (\$5.0M)
- +\$1.2M, "Construct Astronaut Quarantine Facility" at JSC
  - Cost increase to FY03 project

**Enclosure 3**  
**FY 2004 Initial Operating Plan**

- Total cost is \$4.9M (FY03 & Prior = \$3.7M; FY04=\$1.2M)
- Initial estimate funded in FY03 was \$3.0M but lowest responsive bid received was \$4.9M
- Cost increase due to extremely active construction market in Houston area, unique requirement for circadian lighting systems, and new state of the art air quality and energy recovery systems to meet LEED requirements
- - \$5.6M, Minor Revitalization and Construction at Various Locations
  - Cancel project, "Repair Building Foundations and Slabs, Various Locations" at JSC
  - Defer project "Repair Storm Drainage System" at WFF
  - Cancel project "Modifications to E-Complex" at WFF
  - Defer project "Repairs to HVAC, Bldg F-10" at WFF

	<u>FY04</u>	<u>NASA</u>			<u>FY04</u>
	<u>Request</u>	<u>Changes</u>	<u>Subtotal</u>	<u>Rescission</u>	<u>Op Plan</u>
Non-Programmatic CoF	184.0	0.6	184.6	-1.1	183.5

**Enclosure 4**  
**FY 2003 Operating Plan**

	9/30/03 <u>Total</u>	Feb 2004 <u>Changes</u>	Feb 2004 <u>Total</u>
<b>Total NASA FY 2003</b>	<b><u>15,388.8</u></b>		<b><u>15,388.8</u></b>
<b>Human Space Flight</b>	<b><u>6,148.8</u></b>		<b><u>6,148.8</u></b>
<u>International Space Station</u>	<u>1,462.4</u>		<u>1,462.4</u>
<u>ISS Development</u>	<u>231.9</u>		<u>231.9</u>
ISS Capability Upgrades	31.8		31.8
ISS Core Development	200.1		200.1
<u>ISS Operations</u>	<u>1,230.5</u>		<u>1,230.5</u>
Spacecraft Ops	658.6		658.6
Launch & Mission Ops	289.6		289.6
Ops Program Integration	282.3		282.3
<u>Space Shuttle</u>	<u>3,301.4</u>		<u>3,301.4</u>
Ground Ops	569.3		579.3
(Return to Flight, included above)		(11.1)	(11.1)
Flight Ops	268.3		268.3
Flight Hardware	1,866.3		1,906.3
(Return to Flight, included above)	(40.0)	(40.7)	(80.7)
Program Integration	547.5		547.5
(Columbia Recovery/Investigation included above)	(148.5)	(0.5)	(149.0)
(Return to Flight, included above)	(0.5)	(1.2)	(1.7)
<u>RTF (Emergency Supplemental - 9/30/03)</u>		<u>-50.0</u>	
<u>Payload &amp; ELV Support</u>	<u>84.4</u>		<u>84.4</u>
<u>HEDS Investment &amp; Support</u>	<u>1,136.5</u>		<u>1,136.5</u>
Investments	103.7		103.7
HEDS Institutional Support	1,032.8		1,032.8
(Columbia Recov/Invest Travel, incl'd above)	(3.9)		(3.9)
<u>Space Communications &amp; Data Systems</u>	<u>115.3</u>	-	<u>115.3</u>
<u>Safety, Mission Assurance &amp; Engineering</u>	<u>48.8</u>	-	<u>48.8</u>
<b>Science, Aeronautics &amp; Technology</b>	<b><u>9,214.5</u></b>		<b><u>9,214.5</u></b>
<u>Space Science</u>	<u>3,530.6</u>		<u>3,530.6</u>
Major Development Programs	525.7		526.2
GP-B	(65.0)		(65.0)
HST	(140.7)		(140.7)
SOFIA	(46.6)		(46.6)
SIRTF	(148.3)		(148.3)
STEREO	(67.8)	(0.5)	(68.3)
GLAST	(57.3)		(57.3)
New Frontiers Program	123.6		123.6
Payload & Instrument Development	54.3		54.3
Explorer Program	121.6		121.6
Mars Exploration Program	458.0		458.0
Discovery Program	212.5		212.5
Mission Operations	360.5		360.5
Technology Programs	563.1	-0.5	562.6
Research Programs	687.1		687.1
Space Sci Institutional Support	424.1		424.1

**Enclosure 4**  
**FY 2003 Operating Plan**

	9/30/03	Feb 2004	Feb 2004
	<u>Total</u>	<u>Changes</u>	<u>Total</u>
-			
<u>Biological &amp; Physical Research</u>	<u>882.6</u>	-	<u>882.6</u>
Biological, Physical Research & Technology	294.4		294.4
Biastronautics Research	122.7		122.7
Fundamental Space Biology	50.1		50.1
Physical Sciences Research	90.1		90.1
Space Product Development	31.6		31.6
Agency Health and Medical (Code AM)	3.9		3.9
ISS Research Capability	381.8		381.8
B&PR Institutional Support	202.6		202.6
<u>Earth Science</u>	<u>1,716.8</u>	<u>0.0</u>	<u>1,716.8</u>
Earth Observing System Program	619.1	0.2	619.3
Aqua Project	15.6		15.6
Aura Project	98.3	16.5	114.8
Special Spacecraft Projects	37.0		37.0
EOS Follow-On Projects	201.2	-21.5	179.7
EOS Algorithm Devpmt Project	72.0		72.0
Landsat Project	1.7		1.7
EOSDIS Project	122.6		122.6
Earth Explorers Program	70.8	5.2	76.0
Research & Technology	513.9	-0.2	513.7
Earth Science Program Science	338.4	-0.2	338.2
Applications	78.0		78.0
Technology Infusion	78.7		78.7
Computational Technologies	18.9		18.9
Mission Operations	249.1		249.1
Total Ozone Mapping Spectrometer	2.5		2.5
Ocean Tropography Experiment	0.7		0.7
Tropical Rainfall Measuring Mission	14.0		14.0
Earth Science	14.1		14.1
Earth Science Operations	217.6		217.6
Earth Sci Institutional Support	334.7		334.7
<u>Aerospace Technology</u>	<u>2,886.0</u>	-	<u>2,886.0</u>
<u>Revolutionize Aviation</u>	<u>599.1</u>	-	<u>599.1</u>
<u>Aviation Safety</u>	<u>93.6</u>	-	<u>93.6</u>
<u>Vehicle Systems</u>	<u>360.1</u>	-	<u>360.1</u>
Quiet Aircraft Technology (QAT)	19.2		19.2
21st Century Aircraft Technology (TCAT)	26.7		26.7
Flight Research	58.3		58.3
Advanced Vehicle Concepts	48.5		48.5
Breakthrough Vehicle Technologies	56.8		56.8
Ultra-Efficient Engine Technology (UEET)	67.1		67.1
Propulsion & Power	83.6		83.6
<u>Airspace Systems (Capacity, SATS, and AOS)</u>	<u>145.3</u>	-	<u>145.3</u>
Advanced Air Transportation Technology (AATT)	82.5		82.5
Small Aircraft Transportation System (SATS)	26.8		26.8
Virtual Airspace Modeling & Simulation (VAMS)	25.6		25.6

**Enclosure 4**  
**FY 2003 Operating Plan**

	9/30/03	Feb 2004	Feb 2004
	<u>Total</u>	<u>Changes</u>	<u>Total</u>
- Aviation Operations Systems	10.4		10.4
<i>Space Launch Initiative</i>	<i>815.4</i>		<i>815.4</i>
<u>Orbital Space Plane</u>	<u>367.8</u>	-	<u>367.8</u>
Technology and Demonstrations	218.9		218.9
Design & Development	148.9		148.9
<u>Next Generation Launch Technology</u>	<u>447.6</u>	-	<u>447.6</u>
Propulsion Technology	237.4		237.4
Systems Engineering and Analysis	60.6		60.6
Launch Systems Technology	145.5		145.5
Alternate Access & SLI Architecture	4.0		4.0
<u>Pioneer Revolutionary Technology</u>	<u>304.4</u>	-	<u>304.4</u>
CICT (Computing, Info, & Comm Technology)	152.7		152.7
Eng'g For Complex Systems (Design For Safety)	27.4		27.4
Enabling Concepts and Technologies	124.3		124.3
<u>Commercial Technology Programs</u>	<u>161.5</u>	-	<u>161.5</u>
<u>Aerospace Tech Institutional Support</u>	<u>1,005.7</u>	-	<u>1,005.7</u>
<u>Academic Programs</u>	<u>198.6</u>	-	<u>198.6</u>
<u>Inspector General</u>	<u>25.4</u>	-	<u>25.4</u>
 <b>INSTITUTIONAL SUMMARY ( included within each Enterprise):</b>			
<u>Total Institutional Support</u>	<u>2,999.9</u>	-	<u>2,999.9</u>
Research & Program Mgmt	2,742.0	-0.5	2,741.5
Construction of Facilities	257.9	0.5	258.4

**Space Shuttle**

Ground Operations: +\$11.1M

- +\$11.1M, adjustment for Return to Flight activities as funds are allocated from the RTF (Emergency Supplemental), See RTF Enclosure 6 for more information.

Flight Hardware: +\$40.7M

- +\$40.7M, adjustment for Return to Flight activities as funds are allocated from the RTF (Emergency Supplemental). See RTF Enclosure 6 for more information.

Program Integration: No change

- -\$1.7M, reduction of reserves
- +\$1.2M, adjustment for Return to Flight activities. See RTF Enclosure 6 for more information.
- +\$0.5M, adjustment for Columbia Recovery and Investigation for additional contractor support related to the closeout of Columbia Accident Investigation Board.

RTF (Emergency Supplemental): -\$50.0M

- Return to Flight activities reallocated from a single line item to Ground Operations and Flight Hardware, as shown above. See RTF Enclosure 6 for more information.

Columbia Recovery and Investigation and Return to Flight FY 2003 Operating Plan Update -- Summary			
	<u>Sept 2003</u>	<u>Delta</u>	<u>Feb. 2004</u>
Return to Flight:			
Ground Operations		\$10.0M	\$11.1M
Flight Hardware	\$40.0M	\$40.7M	\$80.7M
<u>Program Integration</u>	<u>\$0.5M</u>	<u>\$1.2M</u>	<u>\$1.7M</u>
Return to Flight	\$40.5M	\$53.0M	\$93.5M
Columbia Recovery/Investigation	\$148.0M	\$0.5M	\$149.0M
Travel, incl'd in HEDS Investment	<u>\$ 3.9M</u>	--	<u>\$3.9M</u>
Columbia Recovery/Investigation	\$152.4M	\$0.5M	\$152.9M
<b>Total Recovery, Investigation, RTF</b>	<b>\$192.9M</b>	<b>\$ 53.5M</b>	<b>\$246.4M</b>

Columbia Recovery and Investigation

As reported in NASA's initial FY 2003 Operating Plan, following the Columbia accident, NASA established separate accounting codes within Space Shuttle Program Integration for Columbia Recovery and Investigation expenses. For accounting purposes, NASA accumulated all recovery and investigation activities against these accounting codes, including civil service travel and civil service labor that had been redirected to Columbia Recovery and Investigation. Subsequently, NASA excluded civil service labor costs from the total Columbia Recovery and Investigation estimate, as these costs were already reflected in the FY 2003 budget.

The Columbia Recovery and Investigation costs are being covered using the \$50M appropriated as part of the FY 2003 Omnibus Appropriations Act (P.L. 108-7), in February 2003, to the Space Shuttle Program for Columbia Recovery and Investigation, and resources resulting from savings in planned Shuttle Operations funding as a result of suspension of Shuttle flight. NASA's plan for covering the Columbia Recovery and Investigation costs was outlined in the FY 2003 Operating Plan end-of-year update, submitted to the Committee on September 4, 2003.

Return to Flight Status

NASA began to incur costs in FY 2003, originally estimated at approximately \$40.5M, to initiate corrective actions based on preliminary CAIB recommendations, as well as internal Shuttle Program actions. In November 2003 the figures identified those activities for RTF that had reached a level of maturity allowing reasonable cost estimates, and had been approved for funding by the Space Shuttle Program Requirements Control Board (PRCB) and verified by the RTF Planning Team (RTFPT). Since that time, additional corrective actions have been initiated based on the final CAIB report recommendations and internal Shuttle Program actions. The total amount is increased to \$93.5M and has been reflected in the January 30, 2004 update to NASA's Implementation Plan for Space Shuttle Return to Flight and Beyond.

The source of funding for this additional work was the \$50M received from the FY 2003 emergency supplemental (P.L. 108-83) and \$3.0M of FY 2003 reserves that has become available from savings associated with the suspension of Shuttle flights.

<b>Space Science</b>
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STEREO Development

- +\$0.5M, Program growth resulted in insufficient funding to cover contract requirements through September 2003
- Changes were slightly less than \$500K and were implemented in September 2003 due to the urgency of the situation
- Total life-cycle cost is now \$458.1M, compared to \$404.5M specified in the FY 05 Budget request

Technology Programs

- -\$0.5M, Sun-Earth Connection Focused Technology
- Funding was available due to the Magnetospheric Multiscale mission Announcement of Opportunity being delayed by six months

<b>Earth System Science</b>
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Development: +\$0.2M

- +\$16.5M, AURA
  - Launch delay from Jan 2004 to NET Jun 2004
  - HIRDLS instrument cryo-cooler failure. Failure under investigation. Actual impact TBD until fault isolation is complete.
  - Life-cycle cost increased from \$767.7M to \$808.2M (Includes FY03 previously approved Programmatic Changes and FY04 requested Programmatic Changes)
- -\$21.5, LDCM
  - Re-allocation of FY03 funds from LDCM to other Enterprise priorities will have no effect on LDCM activities.
  - Funds were originally planned to fund early mission concept and design development through progress payments to the LDCM industry partner. When the procurement was cancelled, these funds were not required; out-year funds will be necessary to fund LDCM in the future, and these will be reflected in future budget submissions.
- +\$5.0M, Cloudsat – Launch delay from Apr 2004 to NET Mar 2005
  - High Voltage Power Supply (HVPS) failure during thermal testing is being investigated
  - Life-cycle cost increased from \$141.8M to \$145.2M
- +\$0.2M, Other

Research: -\$0.2M



Institutional Cross-Cut

+\$0.5M, Non-Programmatic Construction of Facilities (CoF)

- +\$0.5M, "Construct Astronaut Quarantine Facility" at JSC
  - Total cost of this project increased from \$3.0M to \$4.9M, as follows:
    - +\$0.5M, FY03
      - funds reallocated from Research Operations Support
    - \$1.2M, FY04 funding (included in Enclosure 3, FY 2004 Changes)
    - \$0.2M, prior year residual funding
  - Initial estimate funded in FY03 was \$3.0M but lowest responsive bid received was \$4.9M.
    - Cost increase due to extremely active construction market in Houston area, unique requirement for circadian lighting systems, and new state of the art air quality and energy recovery systems to meet Leadership in Energy and Environmental Design (LEED) requirements.
  - FY03 funding transferred from OSF reserves
- +\$0.7M, "Repair Airfield" at WFF
  - Project cost increased from \$2.0M to \$2.7M due to high cost of asphalt at the remote WFF location.
- +\$0.7M, "Construct Child Development Center" at MSFC
  - Project cost increased from \$2.1M to \$2.8M to include sustainability items that will reduce the overall facility life-cycle cost.
- -\$0.4M, "Construct Replacement Office Building, 4600 Area" at MSFC.
  - Total project cost decreased from \$23.0M to \$22.6M (FY03=\$7.0M; FY04=\$15.7M) based on bids received.
- +\$0.6M, "Construct Project Support Facility" at WFF
  - Project cost estimate increased from \$1.3M to \$1.9M and project title changed from "Construct Auditorium/Conference/Training Facility".
  - Scope of project modified to construct a separate facility consistent with Center's new master plan. Original plan was to construct addition between two buildings now slated for demolition.
- -\$1.6M, Minor Revitalization and Construction at Various Locations

-\$0.5M, Research Operations Support

**Return to Flight Cost Summary**

NASA began to incur costs in FY 2003, originally estimated at approximately \$40.5M, to initiate corrective actions based on preliminary CAIB recommendations, as well as internal Shuttle Program actions. In November 2003 the figures identified those activities for RTF that had reached a level of maturity allowing reasonable cost estimates, and had been approved for funding by the Space Shuttle Program Requirements Control Board (PRCB) and verified by the RTF Planning Team (RTFPT). Since that time, additional corrective actions have been initiated based on the final CAIB report recommendations and internal Shuttle Program actions. The total amount is increased to \$93.5M and has been reflected in the January 30, 2004 update to NASA's Implementation Plan for Space Shuttle Return to Flight and Beyond.

The source of funding for this additional work was the \$50M received from the FY 2003 emergency supplemental (P.L 108-83) and \$3M of FY 2003 reserves that has become available from savings associated with the suspension of Shuttle flights.

	(\$ Millions)		
	09/04/03 Op. Plan	11/20/2003 Implementation Plan for RTF	03/10/04 Op. Plan
	<u>40.5</u>	<u>60.0</u>	<u>93.5</u>
<b><u>Ground Operations</u></b>		<u>7.3</u>	<u>11.1</u>
Ground Operations		<u>7.3</u>	<u>11.1</u>
- Ground Based Ascent Camera		6.2	10.0
- Other		1.1	1.1
<b><u>Flight Hardware</u></b>	<u>40.0</u>	<u>51.6</u>	<u>80.7</u>
External Tank (ET)	<u>13.0</u>	<u>17.0</u>	<u>26.2</u>
- Bipod Ramp Retrofit	7.0	17.0	17.0
- Protuberance Air Load (PAL) Ramp/ET Closeout Flange	6.0	0.0	9.2
Solid Rocket Booster	<u>3.0</u>	<u>6.0</u>	<u>0.1</u>
- External Tank Attach (ETA) Ring Bolt Catcher/Investigation and Camera	3.0	6.0	0.1
Orbiter	<u>22.0</u>	<u>7.0</u>	<u>43.9</u>
- Reinforced Carbon Carbon (RCC) Inspections & RCC-2 Shipsets Spares	4.0	1.0	4.0
- Thermal Protection System Hardening, Return to Flight Cert/Verification, Flight Crew Equipment and On-orbit TPS Inspection/Repair	18.0	6.0	39.9
Extra Vehicular Activity (EVA)	<u>2.0</u>	<u>19.0</u>	<u>10.5</u>
- On-Orbit Tile Repair Capability and EVA Hardware	2.0	19.0	10.5
Space Shuttle Main Engine (SSME) Production		<u>2.6</u>	
- SSME Tech. Assess.		2.6	
<b><u>Program Integration</u></b>	<u>0.5</u>	<u>1.1</u>	<u>1.7</u>
Program Management Support	<u>0.5</u>	<u>1.1</u>	<u>1.7</u>
- Return to Flight Stafford-Covey Task Group	0.5	1.0	1.7
- System Integration		0.1	