FY 2004 Budget Request

February 3, 2003

Key Points:
Our Message

- **Establishing Our Blueprint** 
- Strengthening the Foundation
- Linking Investments to Our Strategic Plan
- Pursuing Critical New Opportunities

Vision and Mission:
Our New Starting Point

New Exploration Strategy:
A Flexible Approach

Past/Apollo Approach: A Giant Leap

- Cold War competition set goals, National Security justified the investment
- Singular focus on the Moon
- Humans in space an end unto itself
- Robotic exploration secondary to crewed missions
- Rigid timeframe for completion with unlimited resources
- Technologies are destination- and system-specific
- Inspirational education secondary to programs

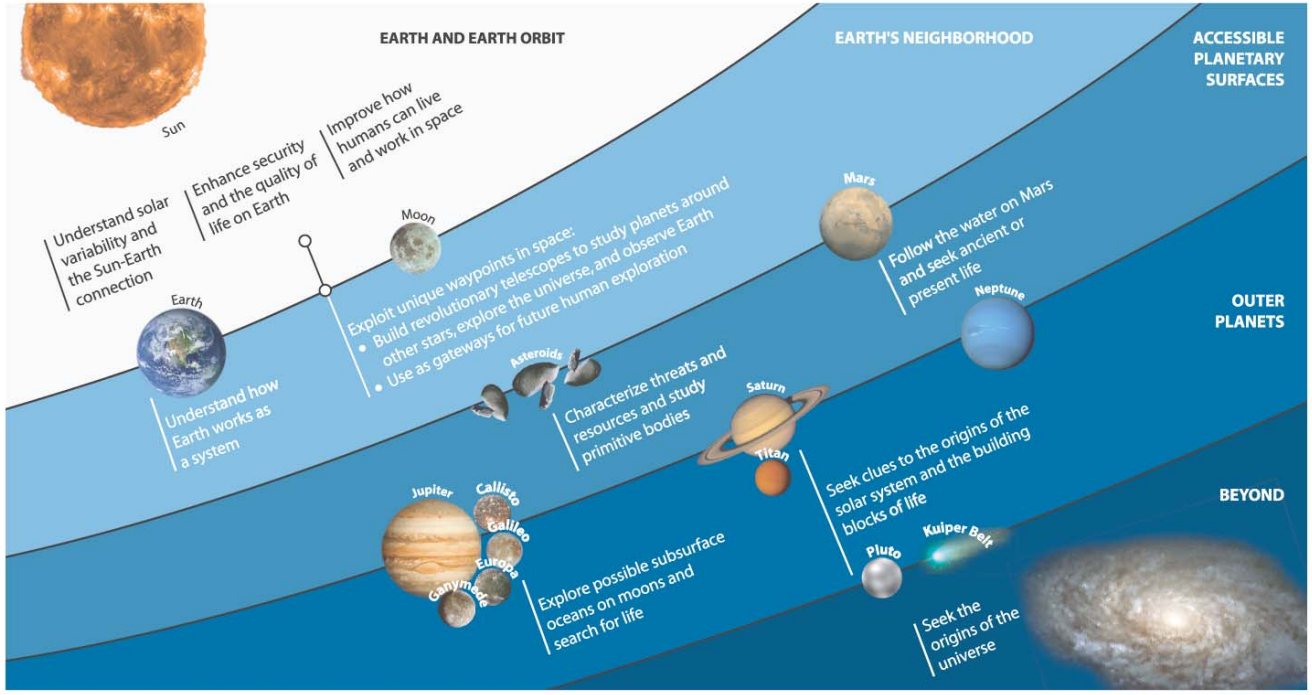
In today's environment, this approach to exploration is high-risk with limited vision beyond demonstrating a technology capability.

New Strategy: Stepping Stones and Flexible Building Blocks

- NASA Vision and Mission drive goals and must justify investment
- Robust and flexible capability to visit several potential destinations
- Human presence is a means to expand our capability in space
- Integrate/optimize human-robotic mix to maximize discovery
- Timeframe paced by capabilities and affordability
- Key technologies enable multiple, flexible capabilities
- Inspirational education integral to programs

This approach is robust and flexible, driven by discovery, and firmly set in the context of national priorities.

Robust Strategy for Scientific Discovery:
Stepping Stones to Human and Robotic Exploration



How did we get here? Study the origins of the universe and the evolution of galaxies, stars and planets

Where are we going? Determine how the sun and Earth are changing and predict future changes

Are we alone? Seek evidence of life on planets and moons in our solar system and on planets around distant stars

A robust integrated strategy, rather than a single course of investigation, yields greater opportunities for discovery

Strategic Building Block Investments:
High-Leverage, Broadly Enabling Capabilities

Technological Barriers

Power:
Providing ample power for propulsion and science

Transportation:
Providing safe, reliable and economical transportation to and from space and throughout the solar system

Human Capabilities:
Understanding and overcoming human limitations in space

Communications:
Providing efficient data transfer across the solar system

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Nuclear Systems Initiative
- Greatly increased power for space science and exploration

Integrated Space Transportation Plan
- Orbital Space Plane
- Extended Shuttle Operations
- Next Generation Launch Systems

In-Space Propulsion Program
- Efficient Solar System Transportation

Space Station Restructuring
- Research Priority Focused
- Management Reforms
- Sound Financial Base

Bioastronautics Program
- Roadmap to address human limitations

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Project Prometheus
- Nuclear power and propulsion for revolutionary science and orbital capabilities
- First mission to Jupiter's Moons

Human Research Initiative
- Accelerate research to expand capabilities
- Enable 100-plus day missions beyond low-Earth orbit

Optical Communications
- Vastly improve communication to transform science capability
- First demonstration from Mars

Transforming NASA:
Strategy for Change

- **All investments will contribute to our goals and traceable to the Vision and Mission**
  - Every NASA program and project must be relevant to one or more of the goals, and perform successfully against measures
- **Human space flight capabilities will be expanded to enable research and discovery**
  - Continue to expand human presence in space — not as an end in itself, but as a means to further the goals of exploration, research, and discovery
- **Technology developments will be crosscutting**
  - Emphasize technologies with broad applications, such as propulsion, power, computation, communications, and information technologies.
- **Education and inspiration will be an integral part of all our programs**
  - Create a new NASA Enterprise and track performance of our education programs like that of any other NASA activity
- **We will operate as One NASA in pursuit of our Vision and Mission**
  - Reinforce the shared commitment of all NASA employees to our common goals
- **As Only NASA Can**
  - Pursue activities unique to our Mission -- if NASA does not do them, they will not get done -- if others are doing them, we should question why NASA is involved

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President's Management Reforms:
Providing Us the Needed Tools

Scores as of 12/31/02	Human Capital	Competitive Sourcing	Financial Performance	E-Government	Budget and Performance Integration
Status	Y	R	R	R	Y
Progress	G	G	G	G	G

Human Capital: Begun to implement its strategic human capital plan, including a tracking system to identify workforce deficiencies across the agency.

Competitive Sourcing: Achieved the government-wide, 15 percent competitive sourcing goal, but is still working on a plan to achieve the long-term, 50 percent goal.

Financial Performance: Addressed all issues contained in the disclaimer opinion on NASA's 2001 audit and given a clean opinion for 2002.

E-Government: Addressing information technology security issues and reviewing and enhancing other IT investments.

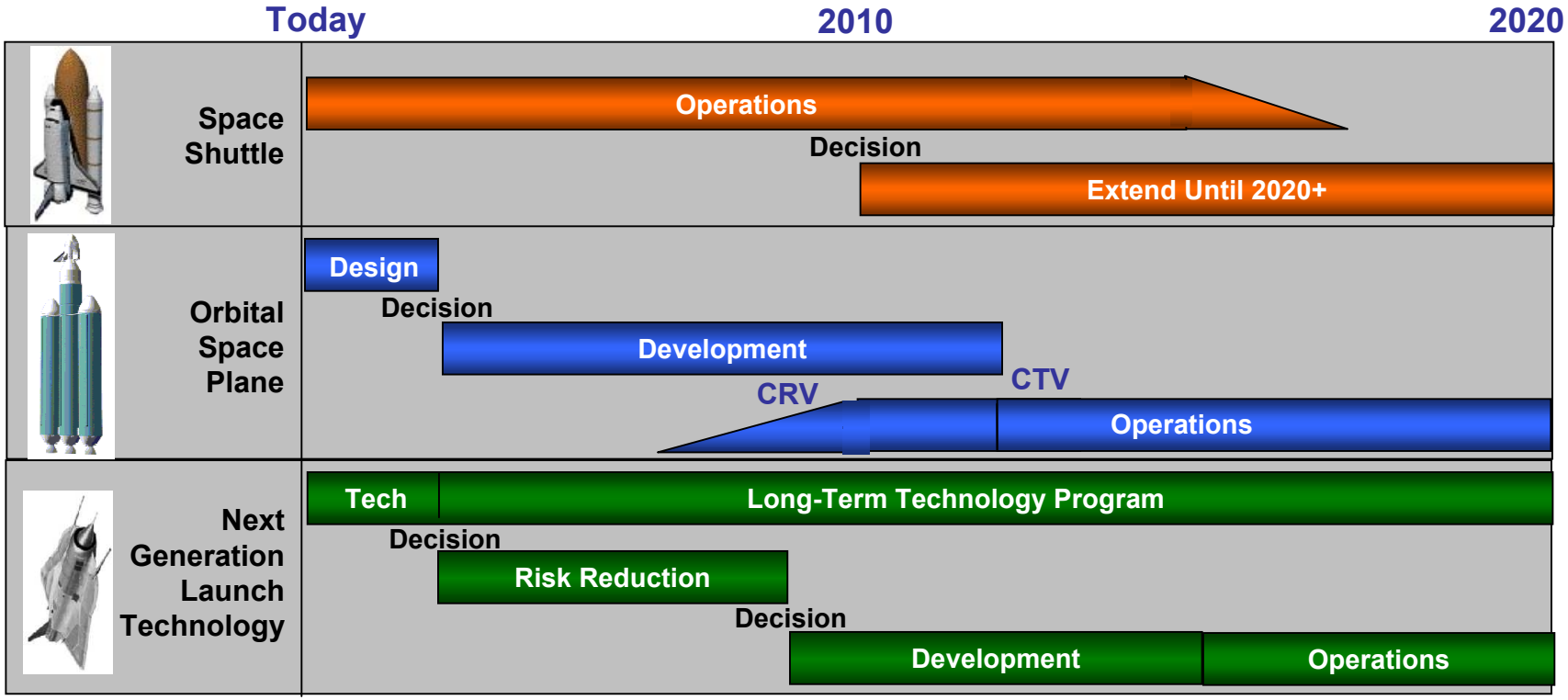
Budget & Performance Integrations: Now budgeting for the full cost of its programs and has integrated its budget and performance reports starting with FY 2004 Budget.

International Space Station:
Delivering on Our Promises

- Program remains within cost and on schedule for achieving U.S. core complete by spring 2004.
- Recent endorsement by Young panel and two independent cost teams that program is “credible”
- Science priorities revamped based on ReMAP study
- New management team in place to control program content, ensure science requirements, and refocus program from development to operations
- Implementation of NASA’s integrated financial management core system and a management information system progressing on schedule.

Integrated Space Transportation Plan:
Strengthening the Coordination and Planning

- **Shuttle Service Life Extension Program**: Undertaken "summit" review of potential projects with prioritized projects established by May.
- **Orbital Space Plane:** Identified top-level requirements, awarded technology contracts, and established program organization
- **Next Generation Launch Technology:** Strengthened coordination with DOD hypersonic research



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Budget Strategy:
A Three Pronged Approach

- **Responsible**
  - Sets priorities within constrained budget
- **Credible**
  - Ensures executable programs with sound management practices and adequate budget reserves built on President's Management Agenda and Freedom-to-Manage.
- **Compelling**
  - Pursues high priority, exciting, and well-integrated programs aligned with new Vision/Mission

Budget/Performance Integration:
An Unprecedented Achievement

- **Restructured Budget**:
  - Appropriation Accounts: 2 new accounts aligned with Strategic Plan
  - Themes: 18 “Themes” areas accountable for performance
  - Full Cost: First-ever full cost of all programs.

- **Integration**:
  - Merged 1,500 pages in disconnected performance and budget documents into a single 500 page, well-integrated, informative document.

- **Financial Management**:
  - Successfully bringing on-line a new Integrated Financial Management system with unprecedented capability.

Strategic Organization
A Whole New Approach

PREVIOUS

Enterprises

- Human Exploration & Dev. Of Space
- Space Science
- Earth Science
- Bio & Phys Res
- Aerospace Technology

NEW

Mission-Driven

- Space Science
- Earth Science
- Bio & Phys Res
- Aeronautics
- Education

Space Flight Capabilities

- Space Flight
- Crosscutting Technology
- Safety & Mission Assurance
- Institutional Support

FY 2004 Budget Request:
Significant Increase in a Tight Budget Environment

($ in millions)	Budget ($m) FY03	FY04
Science, Aeronautics & Exploration	**7,101**	**7,661**
Space Science	3,468	4,007
Earth Science	1,610	1,552
Biological & Physical Research	913	973
Aeronautics Technology	949	959
Education	160	170
Space Flight Capabilities	**7,875**	**7,782**
Space Flight	6,107	6,110
Crosscutting Technologies	1,768	1,673
Inspector General	**25**	**26**
TOTAL	**15,000**	**15,469**

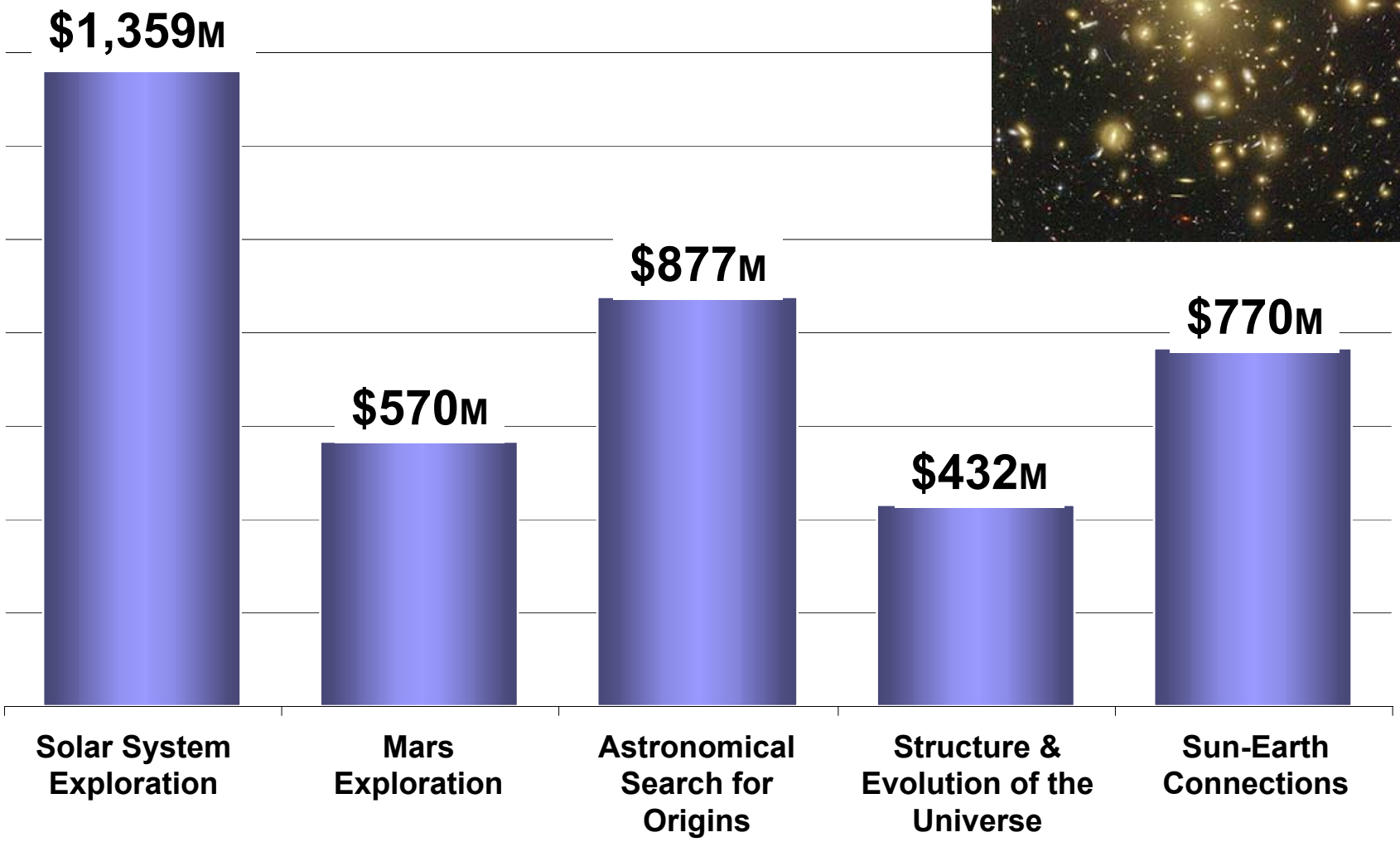
Note: FY03 estimate is shown in full cost for illustrative purposes only and based on Pres. FY03 Request

FY 2004 Budget Request by Theme:
Our 18 Strategic Areas

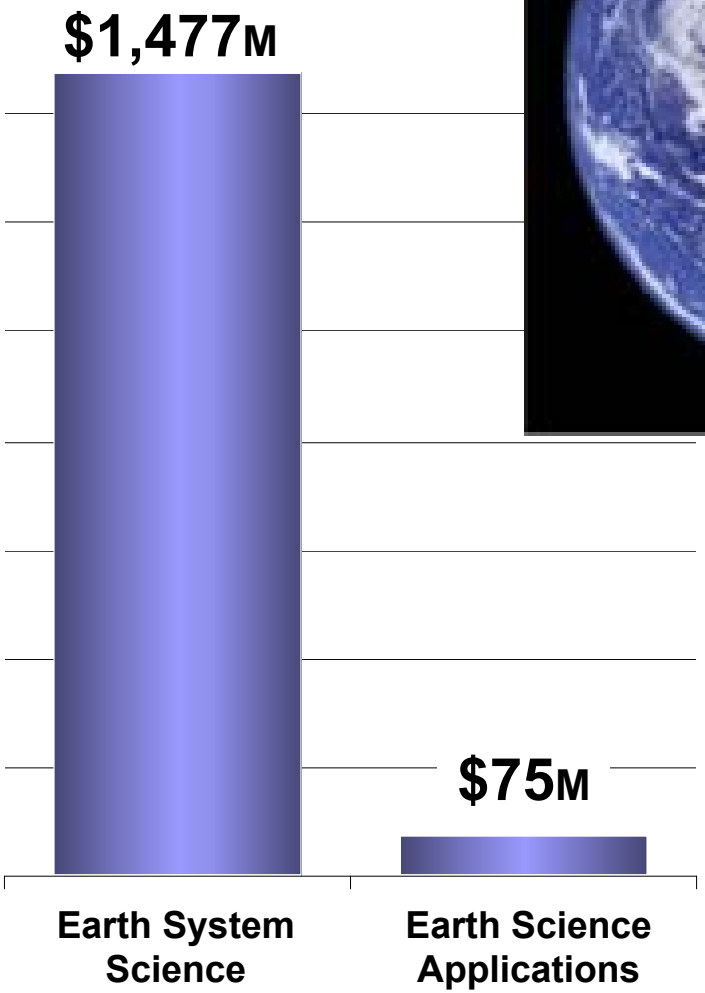
ENTERPRISE	Theme	Budget ($m)*	
		FY03	FY04
Space Science	Solar System Exploration	1,046	1,359
	Mars Exploration	551	570
	Astronomical Search for Origins	799	877
	Structure & Evolution of the Univ.	398	432
	Sun-Earth Connections	674	770
Earth Science	Earth System Science	1,529	1,477
	Earth Science Applications	81	75
Biological & Physical Research	Biological Sciences Research	304	359
	Physical Sciences Research	351	353
	Research Partnership & Flt Supt	254	261
Aerospace Technology	Aeronautics Technology	949	959
	Space Launch Initiative	1,150	1,065
	Mission & Sci. Measurement Tech	434	438
	Innovative Tech Xfer Partnerships	183	169
Education	Education	160	170
Space Flight	Space Station	1,851	1,707
	Space Shuttle	3,786	3,968
	Space Flight Support	471	434

*Note: FY03 estimate is shown in full cost for illustrative purposes only and based on Pres. FY03 Request

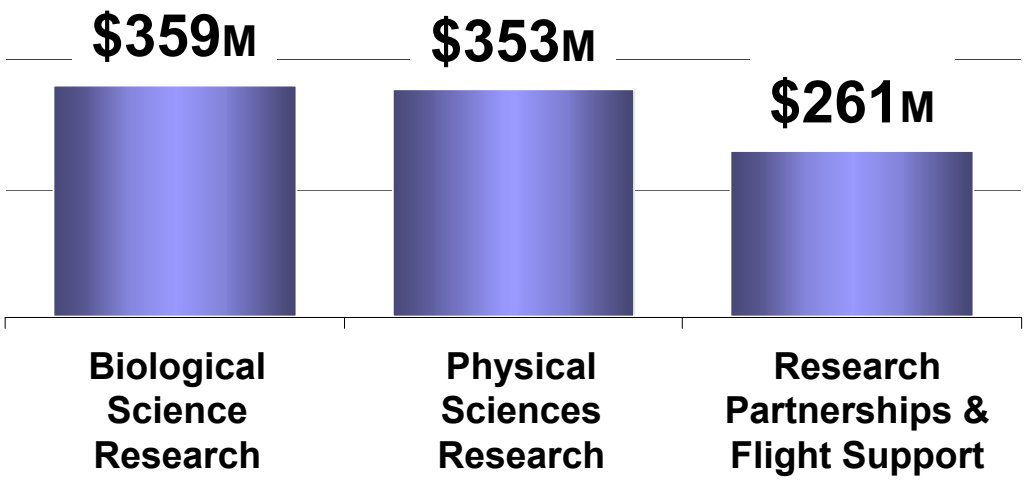
Space Science:
FY 2004 Budget Request



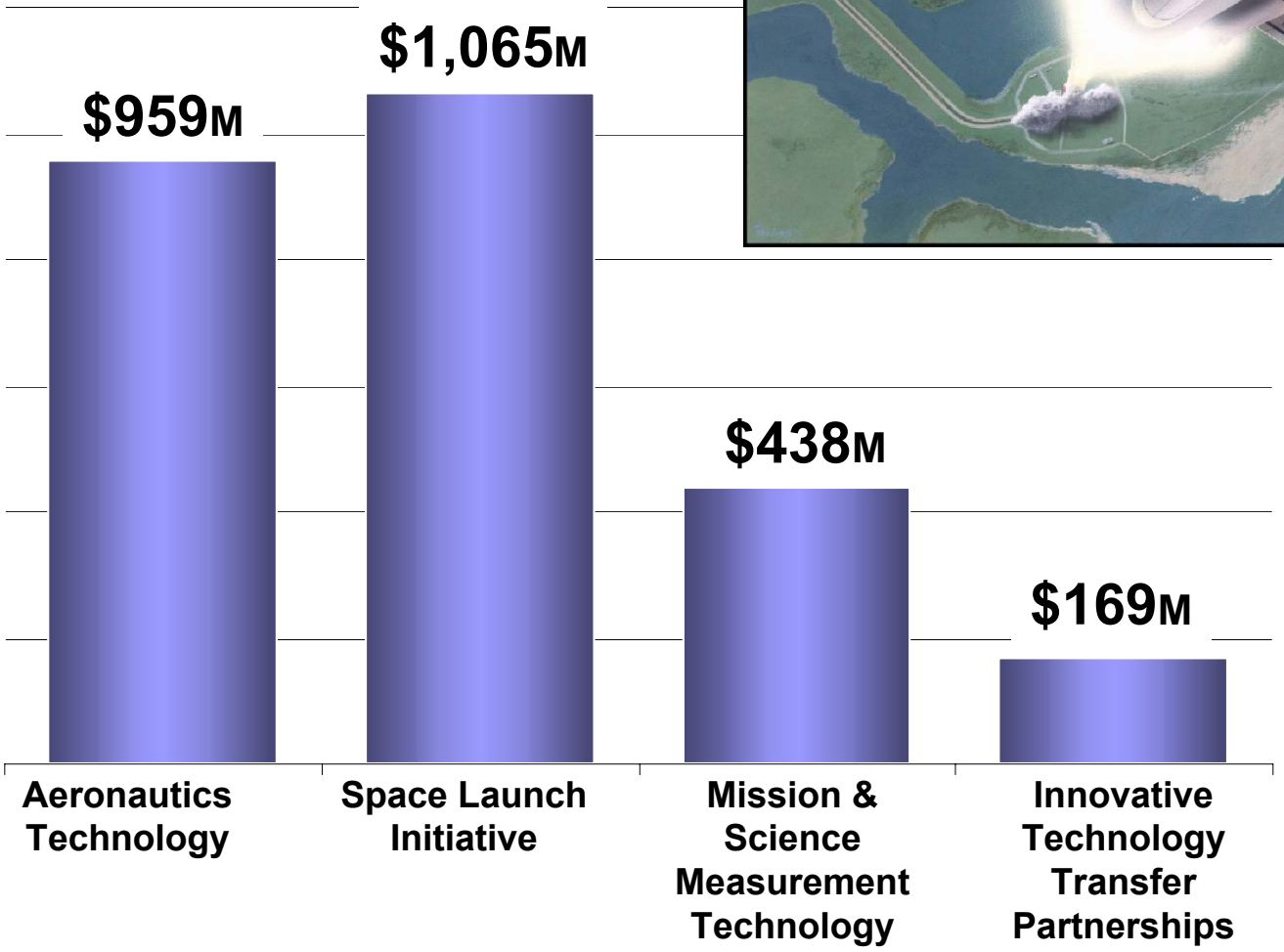
Earth Science:
FY 2004 Budget Request



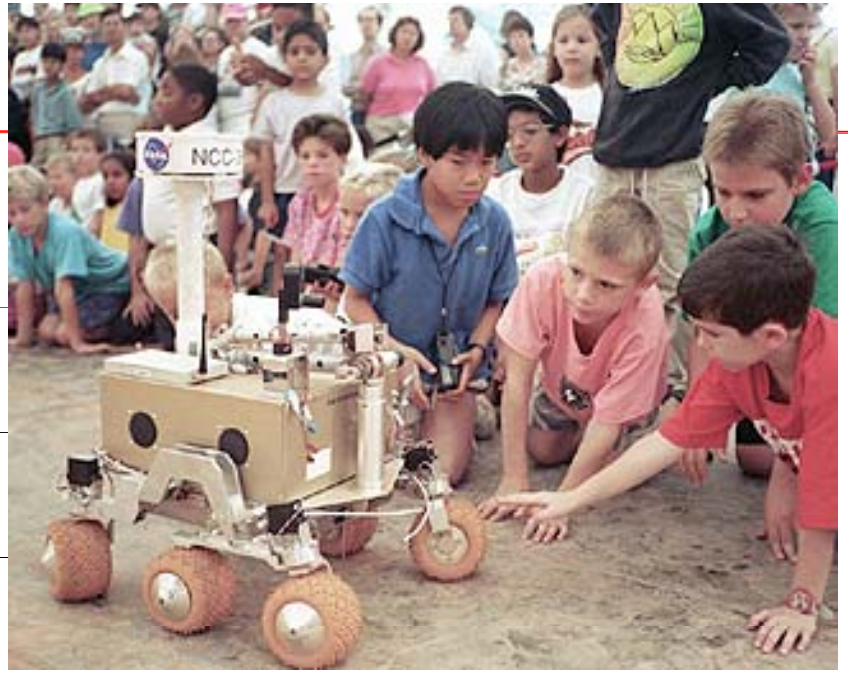
Biological and Physical Research:
FY 2004 Budget Request



Aerospace Technology:
FY 2004 Budget



Education:
FY 2004 Budget Request

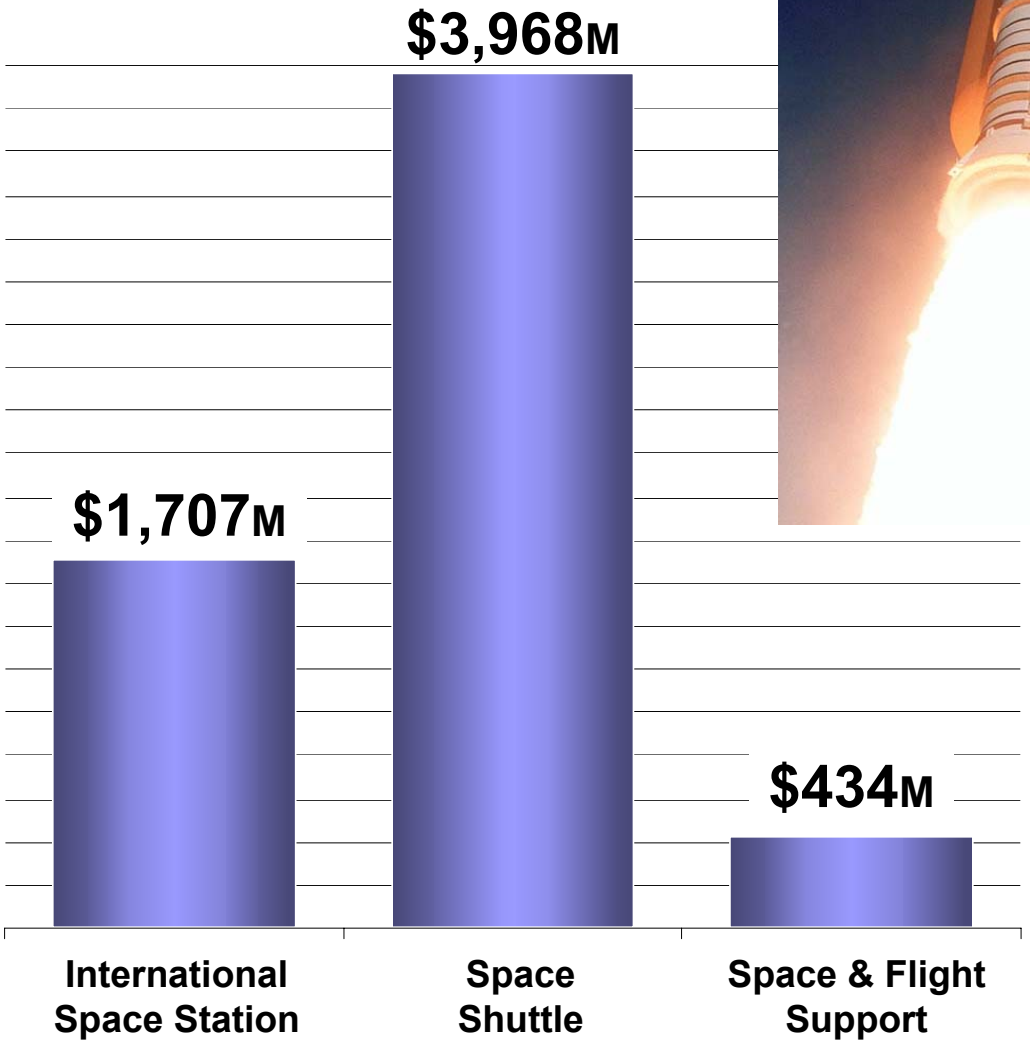


$170M *

Education Programs

***Does not include additional est. $55m education-related funding in other Enterprises**

Space Flight:
FY 2004 Budget Request



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New Initiatives:
Building on Our New Vision/Mission

($ in millions)	2004	2004-08 Total
To Understand & Protect Our Home Planet		
Climate Change Research Acceleration	26	72
Aviation Security	21	196
National Airspace System Transition	27	100
Quiet Aircraft Technology	15	100
To Explore the Universe & Search for Life		
Project Prometheus *	93	2,070
Optical Communications	31	233
Beyond Einstein Initiative	59	765
Human Research Initiative	39	347
To Inspire the Next Generation of Explorers		
Education Initiative	26	130
TOTAL for Initiatives	**337**	**4,013**

* Note: Amount shown is in addition to $1 billion from Nuclear Systems Initiative

Project Prometheus:
Pursuing New Capabilities & Revolutionary Science

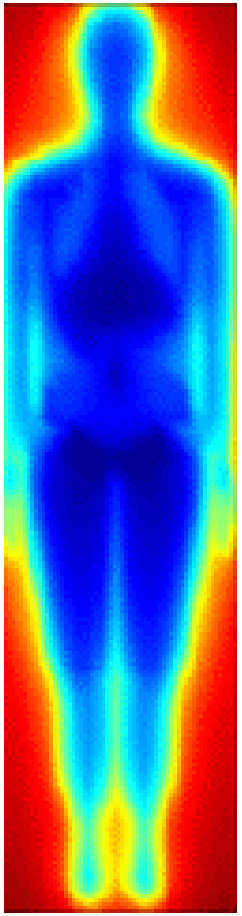
- **Revolutionary capabilities for nuclear propulsion and power**
  - Much greater ability to power instruments, change speed, and transmit science data
  - No launch constraint to use gravity assists
  - Can orbit multiple objects or moons with vastly greater, persistent observation time
  - Can change target mid-mission (to support change in priorities)

- **First use: Jupiter Icy Moon Orbiter**
  - Search for evidence of global subsurface oceans on Jupiter's three icy Galilean moons: Europa, Ganymede, and Callisto. These oceans may harbor organic material.
  - Nuclear technology will enable unprecedented science data return through high power science instruments and advanced communications tech

Human Research Initiative:
Enabling Longer Duration Human Spaceflight

- **For future missions beyond low Earth orbit**
  - Improved therapies to prevent bone and muscle loss in space
  - New technology for quickly and accurately monitoring crew health
  - Improved performance and reliability of microgravity systems for power, propulsion, and environmental control
  - Reduce, by a factor of three, the time to conduct critical research to certify crew safety for missions beyond low Earth orbit over 100 days
  - Results from space will have applications for improved health care on Earth

- **For efficiency of life support in space**
  - Enables knowledge and technology to reduce mass to orbit and beyond for life support by a factor of 3 by 2010
  - Improve fire prevention, detection and suppression in space
  - Research can be translated into methods for monitoring and identification of biological and chemical agents



Optical Communications Initiative:
Opening the Bottleneck to Science Productivity

- **Offers many orders of magnitude improvement in communications data rate.**
  - For example, in support of Mars Reconnaissance Orbiter, could enable mapping entire Mars surface in 4 months instead of 20 percent of surface in 21 months using conventional radio waves.
- **Plan first demonstration at Mars in 2009 using telecom satellite**
  - Balloon receiver technology will be demonstrated by the middle of this decade.
- **Promises dramatic reduction in cost per byte of data returned**
  - Could ultimately replace Deep Space Network.

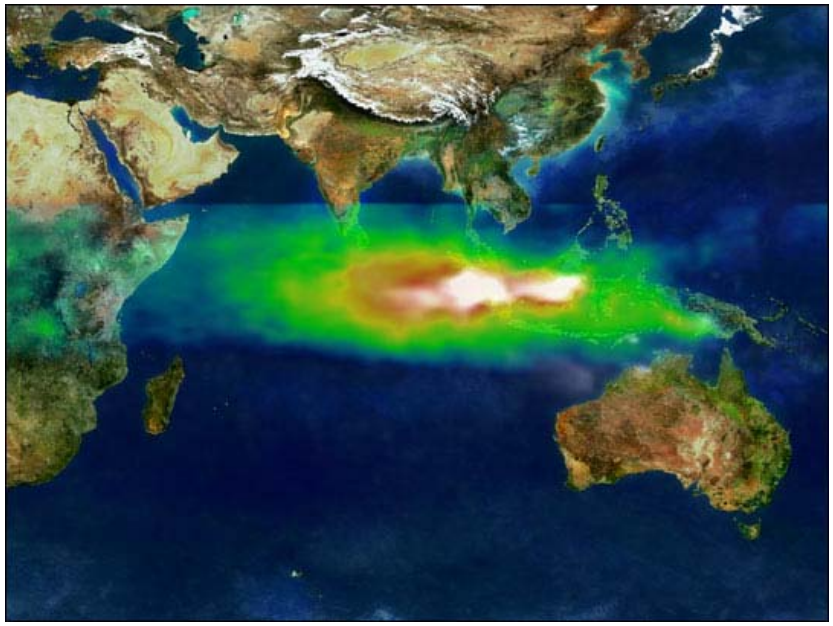
Beyond Einstein Initiative:
Offering Grand Scientific Breakthroughs

- **Offers potential to answer three questions left unanswered by Albert Einstein's theories**
  - What powered the Big Bang?
  - What happens to space, time, and matter at the edge of a black hole?
  - What is the mysterious dark energy expanding the universe?

- **Funding for two major missions**
  - Laser Interferometer Space Antenna (LISA) mission to observe the distortion of space due to gravity waves
  - Constellation-X mission to observe black holes, investigate "recycled" stellar material, and search for the "missing matter" in the universe

Climate Change Research Initiative:
Supporting National Scientific Priorities

- **Accelerate evaluation of climate change factors other than carbon dioxide (CO_2) such as methane, aerosols, black carbon and tropospheric ozone. Non-CO2 could:**
  - Have more climate influence than CO_2
  - Be reduced with far less economic impact also aid public health and agriculture



- **Advanced polarimeter instrument**
  - Greatly facilitates evaluation of non-CO_2 forcings
  - Will be launched in the 2007 timeframe, about four years earlier than planned

- **Accelerate reduction in uncertainties in polar climate feedbacks**
  - Polar regions showing most dramatic changes
  - Exert strong influence on overall Earth system

Aeronautics Initiatives:
Applying NASA Unique Capabilities to Solving Problems

- **Aviation Security Initiative**
  - Develops technologies which reduce the vulnerability of aviation to terrorist and criminal attacks

- **National Airspace System Transformation Augmentation**
  - Accelerates the development of the technology base for the transformation of the National Airspace System required to address efficiency, capacity and security needs

- **Quiet Aircraft Technology Acceleration**
  - Technology implemented throughout the aviation system would significantly reduce community noise impact and save $M's in amelioration programs

Education Initiative:
Making a Difference

- **Educator Astronaut Program**
  - Select teachers and transport them into space to inspire and motivate students
- **NASA Explorer Schools Program**
  - Target middle schools with learning environment using NASA's exciting content to garner greater interest in science and engineering careers.
- **Scholarship for Service Program**
  - Link scholarship with service at a NASA Center and help NASA better attract top students into our workforce
- **NASA Explorer Institutes Program**
  - Link with the informal education community (science centers and museums) through openly competed grants

The Result:
A Plan Worthy of Investment

- **Establish Our Blueprint**
  - Developed a new Strategic Plan from which to transform NASA
- **Strengthen the Foundation**
  - Demonstrated major progress in our management reforms
- **Link Investments to Our Strategic Plan**
  - Formulated a *responsible*, *credible*, and *compelling* budget request of $15.5 billion for FY 2004 tied to our Vision/Mission
- **Pursue Critical New Opportunities**
  - Created nine new exciting initiatives for taking us forward