



NASA FY 2005 Budget

“This cause of exploration and discovery is not an option we choose; it is a desire written in the human heart.” – President Bush



February 3, 2004

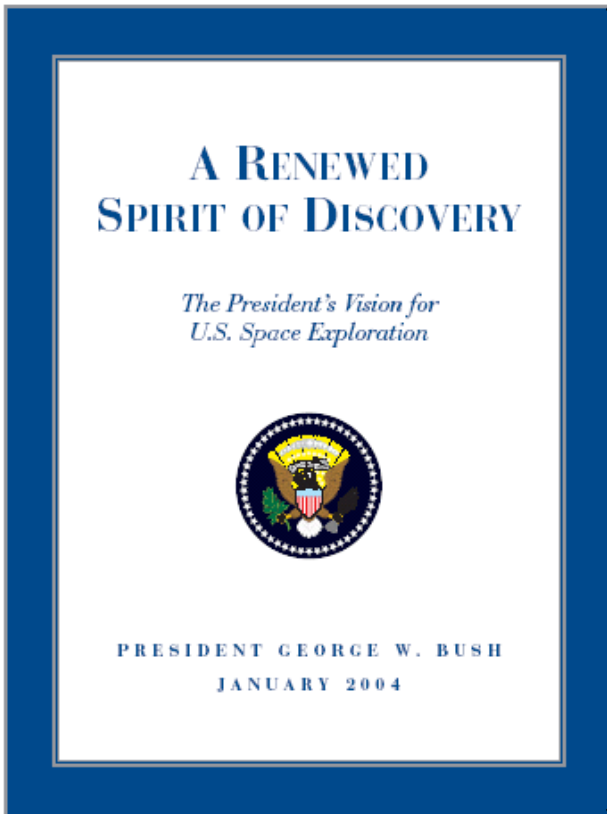


Background

- **After months of White House and NASA interagency meetings, and exchanges of ideas and visions, a new comprehensive exploration vision has been developed**
- **New exploration vision builds on NASA's vision and mission statements**
 - Other NASA activities remain an important element of NASA's mission such as aeronautics and climate change research
- **New exploration vision enabled by NASA's progress in strengthening our management foundation and agency credibility**
 - NASA received top scores in key areas of the President's Management Agenda
 - NASA successfully implemented management reforms as demonstrated in key programs such as the International Space Station



Vision for Space Exploration



Goal and Objectives

The fundamental goal of this vision is 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, and infrastructures 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.



Implications

- **Affirms the nation's commitment to space exploration and provides a clear direction for the civil space program**
 - Vision responds to concerns expressed by the CAIB, Congress, and elsewhere on the need for a long-term vision for human space exploration
 - Vision encompasses human and robotic missions and includes pursuit of multiple destinations, including the return of humans to Moon
 - Activities will be paced by experience, technology readiness, and affordability
 - Implementation begins now with key missions that are already in progress such as Mars exploration, visits to other solar system targets, and Origins activities
- **Pursue Presidential Space Commission**
 - Commission being formed under chairmanship of Edward (Pete) C. Aldridge, Jr, to examine the implementation of the vision.
 - Report due in four months
- **Realign NASA organization**
 - NASA will organize as necessary to implement the vision
 - A new enterprise, Office of Exploration Systems, has been created and is responsible for R&T and development of human systems for exploration
 - Office of Aeronautics formed to maintain focus on aeronautical research



Guiding Principles for Exploration

- **Pursue Compelling Questions**
 - Exploration of the solar system and beyond will be guided by compelling questions of scientific and societal importance.
 - NASA exploration programs will seek profound answers to questions of our origins, whether life exists beyond Earth, and how we could live on other worlds.
- **Across Multiple Worlds**
 - NASA will make progress across a broad front of destinations, starting with a return to the Moon to enable future human exploration of Mars and other worlds.
 - Consistent with recent discoveries, NASA will focus on possible habitable environments on Mars, the moons of Jupiter, and in other solar systems.
 - Where advantageous, NASA will also make use of destinations like the Moon and near-Earth asteroids to test and demonstrate new exploration capabilities.
- **Employ Human and Robotic Capabilities**
 - NASA will send human and robotic explorers as partners, leveraging the capabilities of each where most useful.
 - Robotic explorers will visit new worlds first, to obtain scientific data, assess risks to our astronauts, demonstrate breakthrough technologies, identify space resources, and send tantalizing imagery back to Earth.
 - Human explorers will follow to conduct in-depth research, direct and upgrade advanced robotic explorers, prepare space resources, and demonstrate new exploration capabilities



Guiding Principles for Exploration (cont.)

- **For Sustainable Exploration**

- NASA will pursue breakthrough technologies, investigate lunar and other space resources, and align ongoing programs to develop sustainable, affordable, and flexible solar system exploration strategies.
- The vision is not about one-time events and, thus, costs will be reduced to maintain the affordability of the vision

- **Starting Now**

- NASA will pursue this vision as our highest priority.
- Consistent with the FY 2005 Budget, NASA will immediately begin to realign programs and organization, demonstrate new technical capabilities, and undertake new robotic precursor missions to the Moon and Mars before the end of the decade.



Key Elements of New Space Policy

- **Space Shuttle**
 - Return the Space Shuttle to flight and plan to retire it by the end of this decade, following the completion of its role in the construction of the International Space Station
- **International Space Station**
 - Complete assembly,
 - Refocus research to exploration factors affecting astronaut health, and
 - Acquire crew and cargo systems, as necessary, during and after availability of Shuttle.
- **Crew Exploration Vehicle**
 - Develop a CEV to travel beyond low Earth orbit, the first new U.S. human space flight vehicle since the 1980s.
 - Undertake first automated test flight by the end of this decade in order to provide an operational capability to support human exploration missions no later than 2014.
- **Lunar Exploration**
 - Begin a series of robotic missions to the Moon by 2008, followed by a period of evaluating lunar resources and technologies for exploration.
 - Begin human expeditions to the Moon in the 2015 – 2020 timeframe.



Key Elements of New Space Policy (cont.)

- **Mars Exploration**
 - Conduct robotic exploration of Mars to search for evidence of life, to understand the history of the solar system, and to prepare for future human exploration.
 - Timing of human missions to Mars based on available budget, experience and knowledge gained from lunar exploration, discoveries by robotic missions at Mars and other solar system locations, and development of required technologies and know-how.
- **Other Solar System Exploration**
 - Conduct robotic exploration across the solar system for scientific purposes and to support human exploration.
 - In particular, explore Jupiter's moons, asteroids and other bodies to search for evidence of life, to understand the history of the solar system, and to search for resources;
- **Exploration Beyond**
 - Conduct advanced telescope searches for Earth-like planets and habitable environments around other stars;
- **Enabling Capabilities**
 - Develop and demonstrate power generation, propulsion, life support, and other key capabilities required to support more distant, more capable, and/or longer duration human and robotic exploration of Mars and other destinations.
 - Separate to the maximum practical extent crew from cargo launches

Identify Key Targets

Robotic Trailblazers

Human Missions to the Moon

Go Beyond

Exploration Testbeds, Resources, and Solar System History

Past and Present Water and Life; Testbeds and Resources

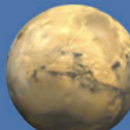
Underground Oceans, Biological Chemistry, and Life

Earth-Like Planets and Life

Moon



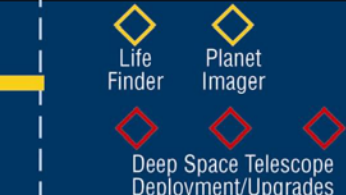
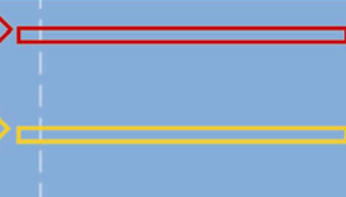
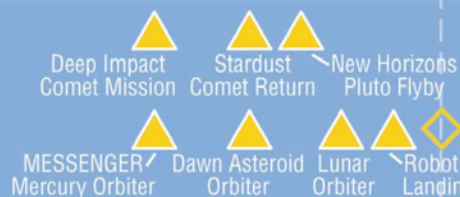
Mars



Outer Moons

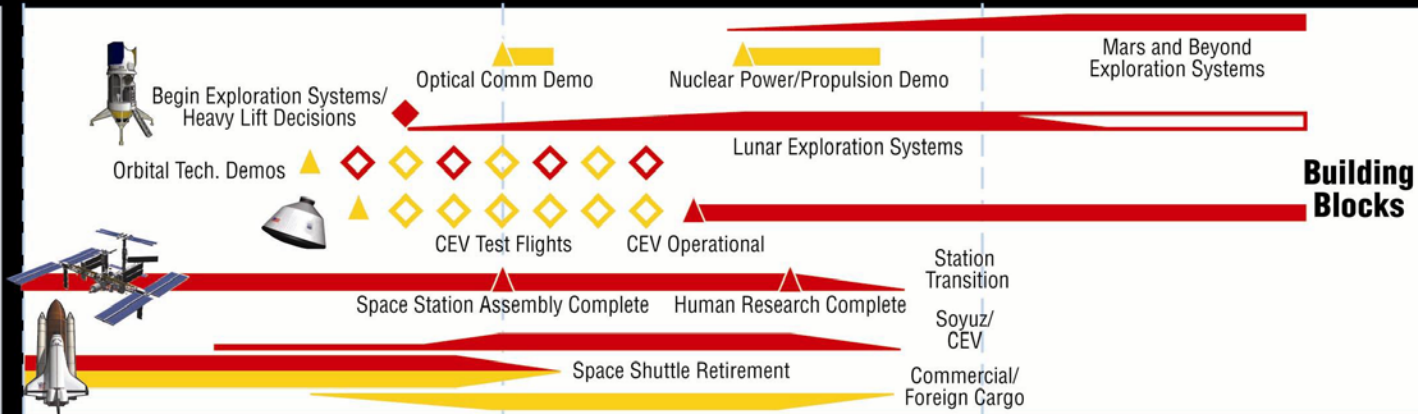


Extrasolar Planets



Key

- Planned Robotic Mission
- Potential Robotic Mission/Decision*
- Robotic Operations
- Planned Human Mission
- Potential Human Mission/Decision*
- Human Operations
- * Earliest estimated date



2000

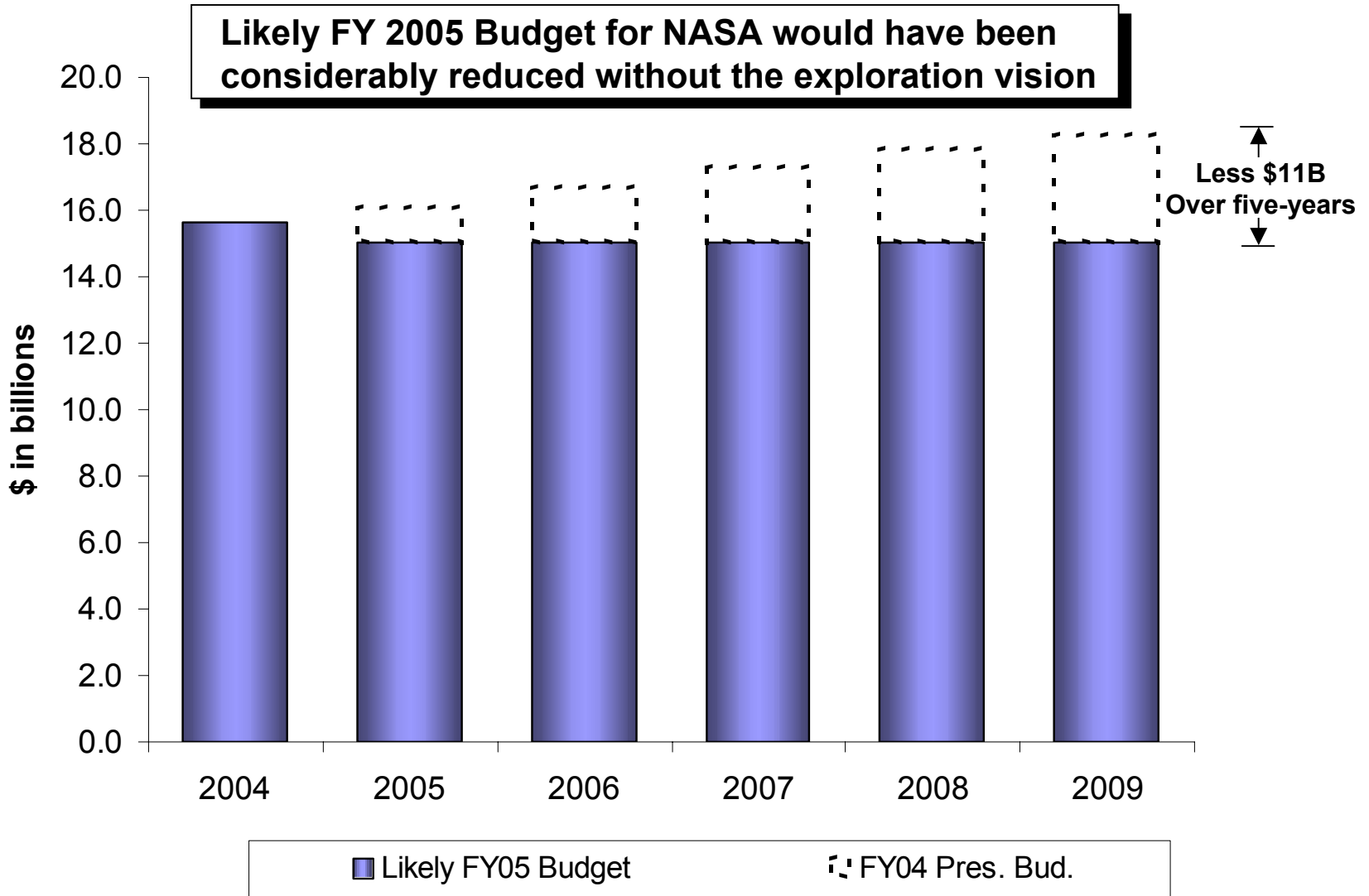
2010

2020

Building Blocks

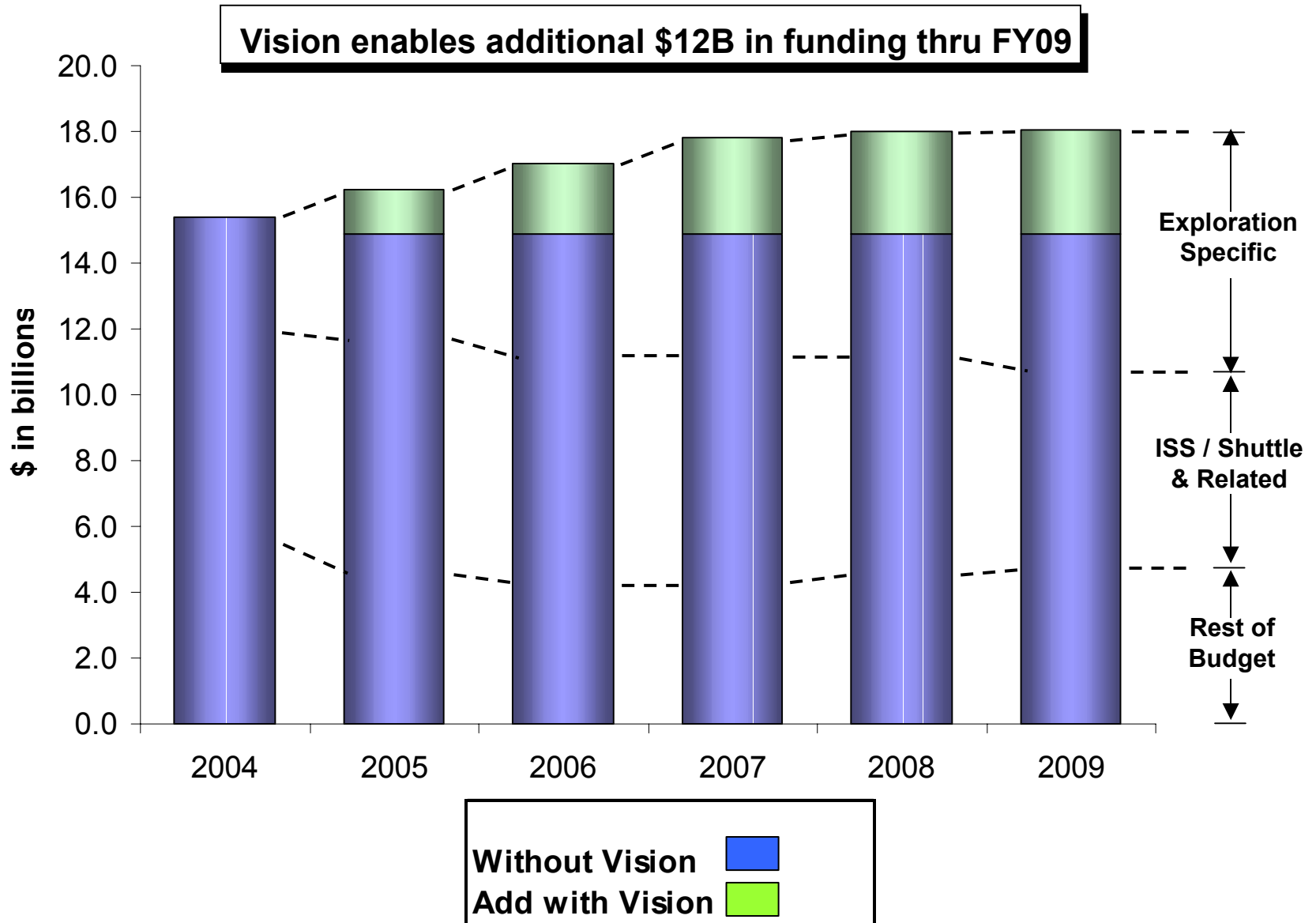


Facing Major Cuts Without the New Vision





Budget with Approved Exploration Vision

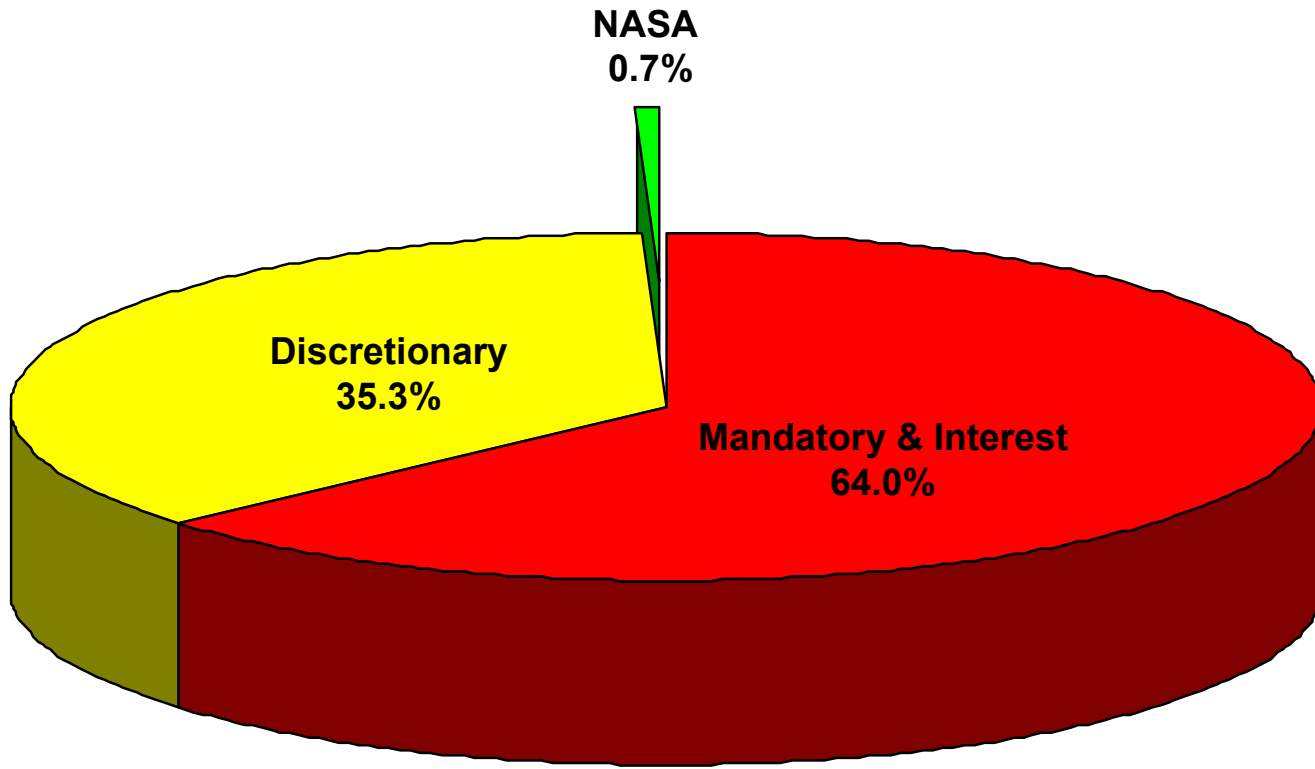




Affordable Budget Plan

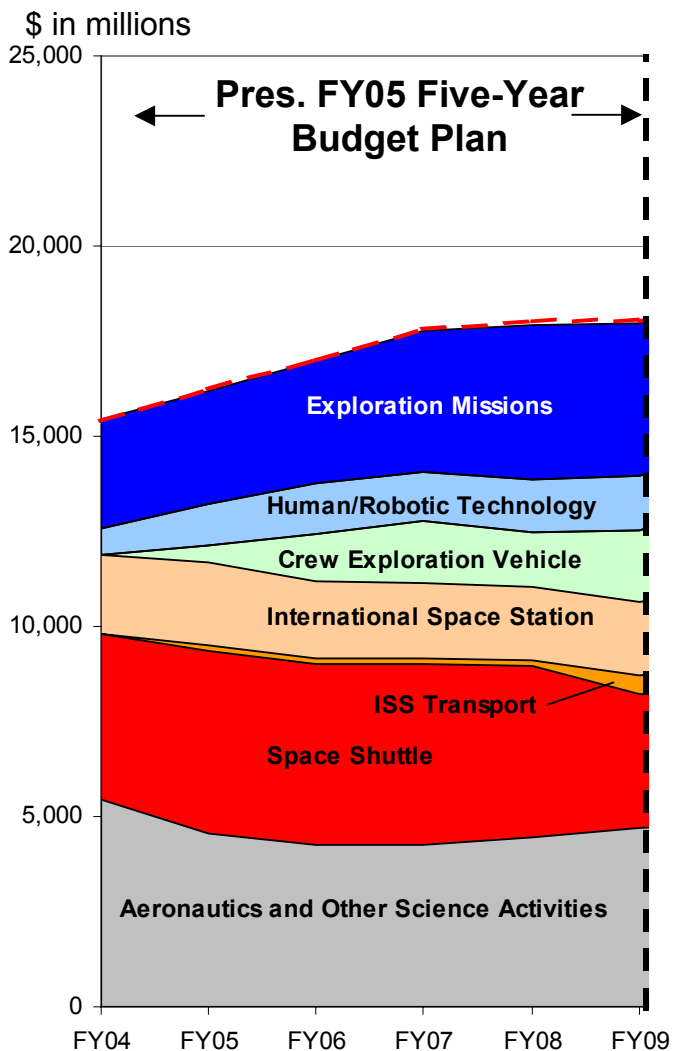
NASA's Budget fits within the President's overall plan to cut the deficit in half in five years and limit overall discretionary growth to 4%

Total Federal Budget





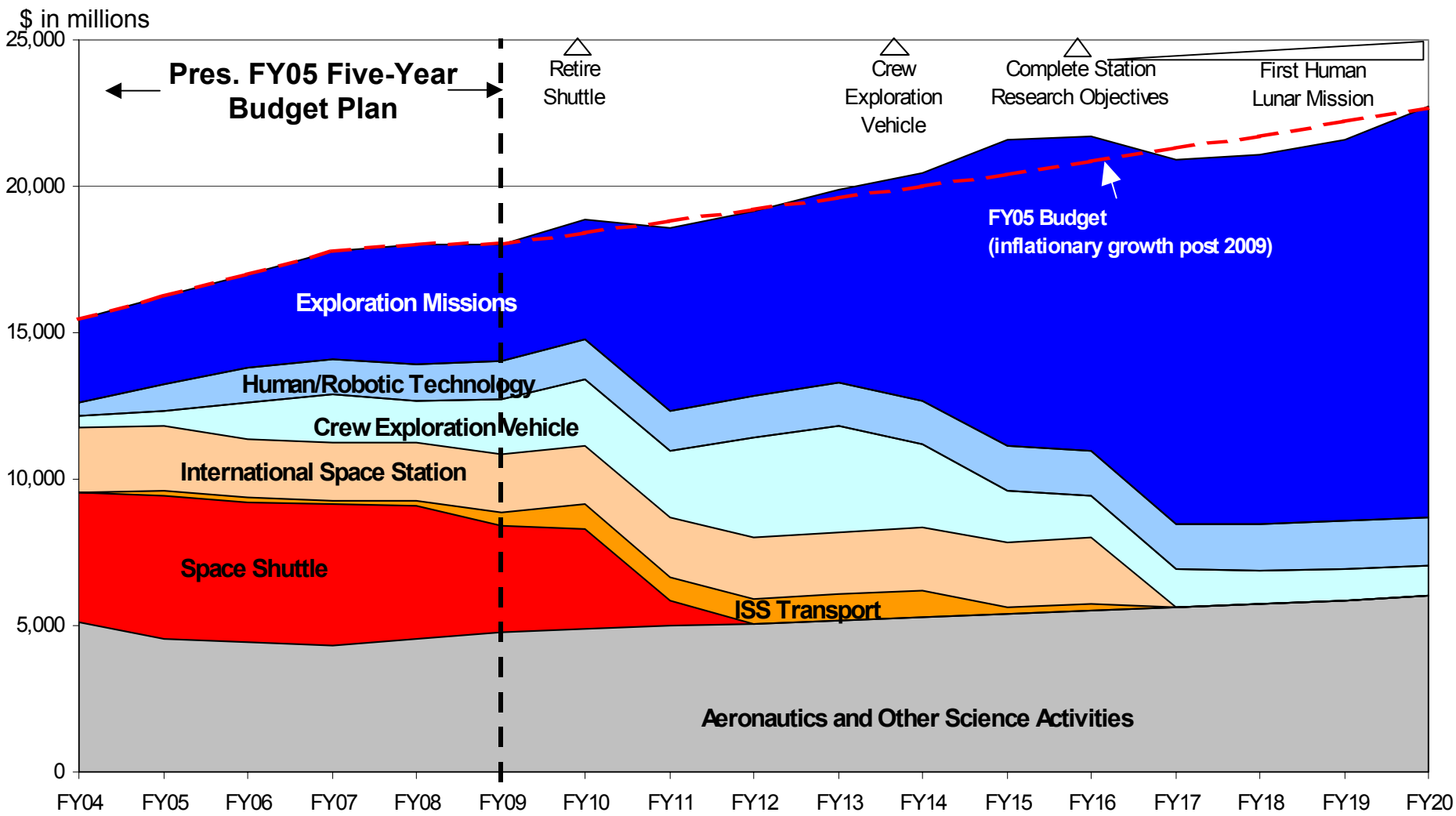
Strategy Based on Long-Term Affordability



- **Five-year budget provides needed investment to implement vision**
- **However, budget strategy was derived based on a longer term assessment of affordability to avoid balloon-payments and placing onus on future Administration decisions**
- **Also, sole focus on a five-year budget would miss needed strategy for Shuttle retirement and opportunity to fund missions beyond low-earth orbit**
- **Hence, vision based on roughly inflationary growth beyond the FY09 horizon and deemed achievable with such amounts**



Strategy Based on Long-Term Affordability



NOTE: Exploration missions – Robotic and eventual human missions to Moon, Mars, and beyond
 Human/Robotic Technology – Technologies to enable development of exploration space systems
 Crew Exploration Vehicle – Transportation vehicle for human explorers
 ISS Transport – US and foreign launch systems to support Space Station needs especially after Shuttle retirement



Budget Summary

\$ In Millions	FY 2004 *	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Exploration, Science & Aeronautics	7,544	7,760	7,869	8,320	8,900	9,091
Space Science	3,943	4,138	4,404	4,906	5,520	5,561
Earth Science	1,526	1,485	1,390	1,368	1,343	1,474
Biological & Physical Research	965	1,049	950	938	941	944
Aeronautics	946	919	957	938	926	942
Education	164	169	169	171	170	170
Exploration Capabilities	7,420	8,456	9,104	9,465	9,070	8,911
Exploration Systems	1,563	1,782	2,579	2,941	2,809	3,313
Space Flight	5,857	6,674	6,525	6,524	6,261	5,598
Inspector General	27	28	29	30	31	32
Earmarks	388					
TOTAL NASA	15,378	16,244	17,002	17,815	18,001	18,034
year to year growth		5.6%	4.7%	4.8%	1.0%	0.2%



* - FY 2004 budget displays enacted less earmarks



Space Science



The President's budget request for FY05 includes:

- \$1.2 billion for Solar System Exploration, including funding to support missions to Saturn, Mercury, Pluto, comets, and asteroids
- \$691 million for Mars Exploration, 16 percent over FY04, and doubling by FY09 to support the exploration vision
- \$70 million for Lunar Exploration, increasing to \$420 million by FY09 to support annual missions with first by 2008
- \$1.1 billion for Origins, 19 percent over FY04, to support the Hubble Telescope, Webb Telescope development, Spitzer Telescope operation, and three additional future space observatories
- \$378 million for Structure and Evolution of the Universe missions, including Chandra x-ray observatory and development of three future missions.
- \$746 million for Sun-Earth Connection missions including development of Solar Dynamics Observatory (SDO), Solar-Terrestrial Relations Observatory (STEREO), and others.

\$ In Millions	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Space Science	3,943	4,138	4,404	4,906	5,520	5,561
Solar System Exploration	1,302	1,187	1,202	1,300	1,392	1,438
Mars Exploration	595	691	724	944	1,188	1,268
Lunar Exploration	0	70	135	280	375	420
Astronomical Search for Origins	894	1,067	1,196	1,212	1,182	927
Structure & Evolution of the Univ.	404	378	365	382	425	457
Sun-Earth Connections	749	746	781	788	958	1,051



Earth Science



The President's budget request for FY05 includes:

- \$54 million for the Climate Change Research Initiative, making NASA the largest contributor to the interagency Climate Change Science Program (CCSP)
- \$141 million for development of the NPOESS Preparatory Project (NPP), 36% above FY04
- \$42 million to maintain critical work on Landsat continuity
- \$560 million for research, 7% above FY04, allowing research on data from 80 sensors on 18 operating satellites
- \$240 million for missions in formulation, a 37% increase from FY 2004, including such missions as Orbiting Carbon Observatory, Aquarius, and Hydros

\$ In Millions	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Earth Science	1,526	1,485	1,390	1,368	1,343	1,474
Earth System Science	1,451	1,409	1,313	1,290	1,266	1,397
Earth Science Applications	74	77	77	77	77	77

Note: FY04 does not include earmarks



Biological and Physical Research



The President's budget request for FY05 includes:

- \$343 million for bioastronautics research, 61% above FY04, to understand and mitigate risks to humans from explorations mission
- \$149 million for Fundamental Space Biology to focus on research on life's responses to space environment's at all levels.
- Funding to support increased BPRE research on ISS following Return-to-Flight. Four major facilities are completed and will be launched on the first two missions to ISS.
- Plans to conduct a thorough review of all research activities to achieve full alignment with and support of the new exploration vision

\$ In Millions	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Biological & Physical Research	965	1,049	950	938	941	944
Biological Sciences Research	356	492	499	496	500	502
Physical Sciences Research	350	300	220	210	210	210
Research Partnerships & Flt Supt	259	257	232	232	231	232

Note: FY04 does not include earmarks



Aeronautics



The President's budget request for FY05 includes:

- \$7 million to study technologies and concepts that may enable planetary aircraft in support of the new vision.
- \$188 million for aviation safety and security projects, 4% above FY04, aimed at reducing accident and fatality rates and reducing the vulnerability of the aviation system to terrorist and criminal threats
- \$72 million to reduce the noise made by aircraft, improving the quality of life around airports, 11% above FY04
- \$209 million to reduce the emissions and enhance the efficiency of aircraft, improving our environment.
- \$154 million to provide technologies that can dramatically increase the capacity and mobility of our nation's air transportation system, in close coordination with FAA.
- \$133 million for flight and systems demonstration of enabling aeronautics technologies

\$ In Millions	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Aeronautics	946	919	957	938	926	942

Note: FY04 does not include earmarks



Education

The President's budget request for FY05 includes:

- \$10 million for the newly authorized Science and Technology Scholarship program, to ensure NASA's pipeline of new scientists and engineers includes the best of the best
- \$91 million for minority university research and education, a 2% increase above FY 2004, to expand NASA's scientific and technical base
- \$14 million for the NASA Explorer Schools program, which enters its third phase, selecting 50 new schools for a total of 150 participating schools
- Another estimated \$70 million in education-related funding, managed by the other NASA Enterprises, in coordination with the Education Enterprise



\$ In Millions	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Education	164	169	169	171	170	170

Note: FY04 does not include earmarks



Exploration Systems

The President's budget request for FY05 includes:

- \$428 million for Project Constellation (\$6.6 billion over five years) to develop a new crew exploration vehicle.
- \$438 million for Project Prometheus to develop advanced nuclear technologies for power and propulsion.
- \$115 million in new funding for Technology Maturation to identify and develop the technologies and building blocks necessary in pursuit of the exploration vision, growing to \$500 million by FY 2009.
- \$20 million in new funding for Centennial Challenge, an innovative new approach to achieving new technological capabilities.

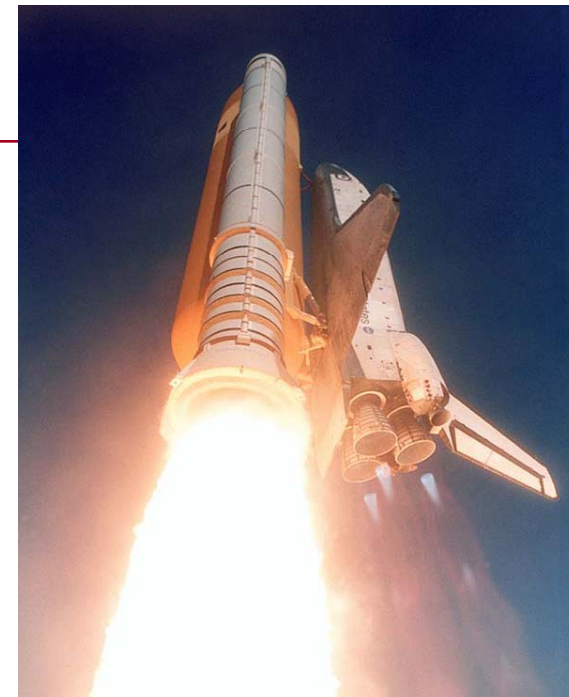


\$ In Millions	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Exploration Systems	1,563	1,782	2,579	2,941	2,809	3,313
Human and Robotic Technology	655	1,094	1,318	1,317	1,386	1,450
Transportation Systems	909	689	1,261	1,624	1,423	1,863

Note: FY04 does not include earmarks



Space Flight



The President's budget request for FY05 includes:

- \$1.9 billion for the International Space Station to continue assembly and operations, 24% above FY04, due primarily from \$140 million in new funding for crew & cargo services, \$100 million forward funding of reserves, and a \$200 million appropriation cut in FY04
- \$4.3 billion, 9% above FY04, for Space Shuttle to return to flight and continue assembly of the ISS, with a plus-up of \$0.7 billion thru FY07 including more than \$0.2 billion in FY05 dedicated for return to flight activities.
- \$10 million in new funding is provided to support demonstration of emerging launch systems

\$ In Millions	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Space Flight	5,857	6,674	6,525	6,524	6,261	5,598
Space Station	1,497	1,863	1,764	1,780	1,779	2,115
Space Shuttle	3,928	4,319	4,326	4,314	4,027	3,030
Space Flight Support	432	492	435	430	456	453

Note: FY04 does not include earmarks



President's Management Agenda

	Human Capital	Competitive Sourcing	Financial Performance	E - Government	Budget and Performance Integration
Status					
Progress					

Arrows indicate change in status rating since evaluation as of September 30, 2003.

- **Human Capital**. First human capital plan, established an accountability system, and demonstrated distinctions in employee performance using a comprehensive awards system.
- **Competitive Sourcing**. Competitive sourcing plan established and an information technology architecture in place to guide investments and strengthen IT security and project justifications.
- **Financial Performance**. Resolving inconsistencies in financial reporting and issues relating to valuation of contractor held property and conversion from old to new financial management system.
- **E-Government**. All of NASA's major IT systems are now operating within 10 percent of planned budget and schedule.
- **Budget and Performance Integration**. Use performance information and full-cost considerations to develop budget requests and inform management decisions.

Improved ratings in 4 areas. Only gov't agency to achieve GREEN in Human Capital & BPI



Summary of FY 2005 Budget

- **Compelling** – Budget fully supports the President’s vision for space exploration and supports other mission priorities such as aeronautics and earth science
- **Affordable** – Budget fits within the goals of reducing the deficit by half over five years and constraining discretionary growth
- **Achievable** – Vision can be accomplished within the long-term funding plans
- **Focused** – Budget begins to align programs with the vision goals