THEME: Solar System Exploration

Reddish spots and shallow pits on the icy surface of Jupiter's moon Europa may indicate pockets of warmer ice rising from below. This upwelling could provide an elevator ride to the surface for material (including any life forms present) in an ocean beneath the ice. The spots and pits visible in this region of Europa's northern hemisphere are each about 10 kilometers (6 miles) across. Exploring Europa is compelling target in our strategy to explore the solar system and search for life. The Jupiter Icy Moons Orbiter should provide an excellent opportunity for discovery with its visit to Europa. More information can be found at http://solarsystem.nasa.gov .

SOLAR SYSTEM EXPLORATION

MAJOR EVENTS IN FY 2004

- Deep Impact will launch in January 2004. Deep Impact will fire a projectile at comet Temple-1 to investigate the composition of the comet's interior.
- MESSENGER will launch in March 2004. MESSENGER will conduct a detailed investigation of Mercury, the least explored terrestrial planet.
- Stardust will encounter comet Wild-2 in January 2004 and collect dust samples that will be returned to Earth in 2006.
- Cassini arrives at Saturn in July 2004 following a seven-year journey.
- Genesis returns to Earth in September 2004 with its samples of the solar wind following its two-year "sunbath".

THEME: Solar System Exploration (SSE)

OVERVIEW

The Solar System Exploration (SSE) Theme is a three-pronged quest to explore the formation and evolution of our solar system and the Earth within it, seek the origins of life and its existence beyond Earth, and chart our destiny within the solar system. The SSE program will examine potentially habitable environments, search for life, and attempt to understand how solar system processes affect the future of Earth and humanity.

Missions	Goals supported by this theme	Objectives supporting those goals
Understand and Protect our Home Planet	1. Understand the Earth system and apply Earth system science to improve prediction of climate, weather and natural hazards.	1.4 Catalog and understand potential hazards to Earth from space.
Explore the Universe and Search for Life	5. Explore the solar system and beyond, understand origin/evolution of life, and search for evidence of life elsewhere.	5.1 Learn how the solar system originated and evolved to its current diverse state.
		5.2 Determine the characteristics of the solar system that led to the origin of life.
		5.3 Understand how life begins and evolves.
Inspire the Next Generation of Explorers	6. Inspire and motivate students to pursue careers in science, engineering and mathematics.	6.1, 6.2, 6.3, 6.4 (Supporting Role) See Education Programs for objectives.
	7. Engage the public in shaping and sharing the experience of exploration and discovery.	7.1 Improve the capacity of science centers, museums, and other institutions, through the development of partnerships, to translate and deliver engaging NASA content. (Supporting Role)
		7.2 Improve science literacy by engaging the public in NASA missions and discoveries, and their benefits, through such avenues as public programs, community outreach, mass media, and the Internet. (Supporting Role)

RELEVANCE

Our solar system is a place of incredible diversity, extreme environments, and continuous change. Today it is also a natural laboratory, on a grand scale, within which we seek answers to the mysteries of the universe and our place within it. In the forty years since the launch of the first interplanetary probe, our knowledge of the solar system and our ability to explore it have increased at an astonishing pace. Our robotic explorers have traveled throughout the solar system, revealing levels of complexity and diversity that were unimaginable prior to the advent of space exploration. They have also revealed to us the building blocks and chemical origins of life itself. The exploration of our solar system is founded upon the pursuit of three simple yet profound questions: Where do we come from? What is our destiny? Are we alone?

Education and Public Benefits

The SSE program strives to use our missions, research programs, and the human resources of the Space Science community to enhance the quality of American science, mathematics, and technology education, particularly at the pre-college level. SSE is dedicated to sharing the excitement of discoveries and knowledge generated by Space Science missions and research with the public, as well as contributing to the creation of the talented scientific and technical workforce needed for the 21st century.

Public benefits from SSE include a growing understanding of the solar system and Earth's significance within it. SSE's Discovery program was among the first at NASA to require a plan for education and public outreach, as NASA recognized the importance of communicating the excitement of space exploration to the public.

THEME: Solar System Exploration (SSE)

IMPLEMENTATION

The Solar System Exploration theme is composed of many elements that work together to achieve the program's goals and objectives. Repeated management and scientific peer reviews ensure that each mission provides data in a cost-effective manner. In many cases, the data obtained from different missions are complementary, and are combined in cross-disciplinary studies by members of the scientific community. Theme responsibility resides in the Office of Space Science at NASA HQ.

Enterprise official is Ed Weiler, Associate Administrator for Space Science. Theme director and point of contact is Colleen Hartman, Director of the Solar System Exploration Division at Headquarters. This theme is in full compliance with NPG 7120.5B.

Strategy	Schedule by Fiscal Year 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10	Purpose
Cassini/Huygens		Scientific investigation of the planet Saturn; probe deployment to Saturn's moon, Titan.
Stardust		Study of, and return of material from, Comet Wild 2.
Genesis		Study the origin of the solar system by collecting and returning samples of charged particles in the solar wind.
Rosetta		Study the nucleus of Comet Wirtanen.
Deep Impact		Excavate the interior of Comet P/Tempel 1.
MESSENGER		Scientific investigation of the planet Mercury.
Dawn		Scientific investigation of Ceres and Vesta -- two small planets in the main asteroid belt.
Link to Program Implementation Plans	Tech. & Adv. Concept / Development / Operations	

Tailoring
No exceptions to NPG 7120.5B have been taken.

STATUS

SSE accomplished the following this past year:
- Integration and Test of U.S.-supplied experiments on ESA's Rosetta has been completed. Rosetta has been shipped to the launch site.

THEME: Solar System Exploration (SSE)

PERFORMANCE MEASURES

Annual Performance Goals	
	OUTCOME: A well managed program in accordance with Agency implementing strategies.
4SSE1	Each Development project will complete its current phase within 10% of total life-cycle cost shown on the table below.
4SSE2	Each Research project will allocate 75% of its funding competitively during FY04.
4SSE3	SSE will complete all of its missions within 10% of their baseline schedules.
1.4.1	OUTCOME: Explore the space environment to discover hazards to Earth.
4SSE4	Successfully demonstrate progress in determining the inventory and dynamics of bodies that may pose an impact hazard to Earth. Progress towards achieving outcomes will be validated by external review.
4SSE5	Successfully demonstrate progress in determining the physical characteristics of comets and asteroids relevant to any threat they may pose to Earth. Progress towards achieving outcomes will be validated by external review.
5.1.1	OUTCOME: Determine how the solar system originated and evolved to its current diverse state.
4SSE6	Successfully demonstrate progress in understanding the initial stages of planet and satellite formation. Progress towards achieving outcomes will be validated by external review.
4SSE7	Successfully demonstrate progress in studying the processes that determine the characteristics of bodies in our solar system and how these processes operate and interact. Progress towards achieving outcomes will be validated by external review.
4SSE8	Successfully demonstrate progress in understanding why the terrestrial planets are so different from one another. Progress towards achieving outcomes will be validated by external review.
4SSE9	Successfully demonstrate progress in learning what our solar system can tell us about extra-solar planetary systems. Progress towards achieving outcomes will be validated by external review.
5.2.1	OUTCOME: Determine the characteristics of the solar system that led to the origin of life.
4SSE10	Successfully demonstrate progress in determining the nature, history, and distribution of volatile and organic compounds in the solar system. Progress towards achieving outcomes will be validated by external review.
4SSE11	Successfully demonstrate progress in identifying the habitable zones in the solar system. Progress towards achieving outcomes will be validated by external review.
5.3.1	OUTCOME: Understand how life begins and evolves.
4SSE12	Successfully demonstrate progress in identifying the sources of simple chemicals that contribute to prebiotic evolution and the emergence of life. Progress towards achieving outcomes will be validated by external review.
4SSE13	Successfully demonstrate progress in studying Earth's geologic and biologic records to determine the historical relationship between Earth and its biosphere. Progress towards achieving outcomes will be validated by external review.
6.1.1	OUTCOME: Kindergarten through graduate students will be more proficient in science, technology, engineering, and mathematics (STEM).
4SSE14	Provide opportunities for students to work directly with NASA space science missions, facilities, and data.
6.2.1	OUTCOME: More students from diverse communities motivated to pursue careers in STEM.
4SSE15	Provide new opportunities for participation in the space science program by an increasingly diverse population, including opportunities for minorities and minority universities to compete for and participate in space science missions, research, and education programs.
6.3.1	OUTCOME: Improve quality of STEM instruction.
4SSE16	Provide high quality educational materials and teacher training based on Theme content and focused on national curriculum standards.
4SSE17	Provide exhibits, materials, workshops, and personnel at national and/or regional education and outreach conferences.
6.4.1	OUTCOME: More students prepared to enter the STEM workforce.
4SSE18	Provide higher education opportunities offered through OSS research awards and other NASA research and education programs.
7.1.1	OUTCOME: Improve the capacity of science centers, museums, and other institutions, through the development of partnerships, to translate and deliver engaging NASA content.
4SSE19	Through partnerships with major science museums or planetariums, put on display or on tour major exhibitions or planetarium shows based on Theme content.
4SSE20	Provide materials and technical expertise to support the development of exhibits and programs at science museums and planetariums.
7.2.1	OUTCOME: Engage the public in NASA missions and discoveries through such avenues as public programs, community outreach, mass media, and the Internet.
4SSE21	Seek out and capitalize on special events and particularly promising opportunities in the Theme science program to bring space science to and involve the public in the process of scientific discovery.

THEME: Solar System Exploration (SSE)

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
Nat'l Academy	Space Studies Board	7/02	N/A	Effectiveness and quality of the program
Advisory Council	NAC	9/02	3 times/year	Review science strategy, prog. implementation strategy
	SScAC	8/02	3 times/year	Review science strategy, prog. implementation strategy
	SSE Sub-Committee	9/02	3 times/year	Review science strategy, prog. implementation strategy

BUDGET

Budget Authority ($millions)	FY02	FY03	Chng	FY04	Comments
Solar System Exploration	**638.9**	**975.7**	**382.8**	**1358.5**	
Development	210.6	164.3	+12.3	176.6	
CONTOUR	19.7				
Messenger	97.4	68.0	-30.0	38.0	Project preparing for March 2004 launch.
Deep Impact	90.9	59.1	-46.1	13.0	Project preparing for January 2004 launch.
Dawn	1.0	36.3	+89.3	125.6	Project preparing to enter Development phase.
Small Projects	1.6	0.9	-0.9		
Operations	119.9	310.6	-0.7	309.9	
Research	226.9	254.7	+67.0	321.7	
Technology and Advanced Concepts	81.5	246.1	+304.3	550.4	Includes New Initiatives under Project Prometheus and Optical Communications (see SAE 2-19).

Note: For all formats, the FY 02 column reflects the FY 2002 Congressional Operating Plan dated 9/30/02. The FY 03 column reflects the FY 2003 Presidents Budget Submit (PBS) as Amended. The Change column includes both programmatic and full cost adjustments. FY 2004 column is in full cost.

	Indicates budget numbers in full cost.
	Indicates changes since the FY 2003 President's Budget Submit.
	FY 2002, FY 2003, Prior and BTC are not in full cost.

THEME: Solar System Exploration (SSE)

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THEME: Solar System Exploration (SSE)

DEVELOPMENT: MESSENGER

PURPOSE

Objectives		Performance Measures
1.4, 5.1, 5.2, 5.3, 6.1, 6.2, 6.3, 6.4, 7.1, 7.2	Reference 2003 Strategic Plan	4SSE1-3, 7-21

The MErcury Surface, Space ENvironment, GEochemistry and Ranging (MESSENGER) project will determine: (1) the chemical composition of Mercury's suface; (2) Mercury's geological history; (3) the nature of Mercury's magnetic field; (4) the size and state of Mercury's core; (5) the volatile inventory of Mercury's poles; and (6) the nature of Mercury's exosphere and magnetosphere.

OVERVIEW

MESSENGER will orbit Mercury following two flybys of that planet. The orbital phase will use the flyby data as an initial guide to perform a focused scientific investigation of Mercury. MESSENGER's propulsion system is integrated into the spacecraft structure to make economical use of mass. The miniaturized instruments are located on a science deck facing Mercury, while the spacecraft is shielded from the blistering sunlight by a lightweight thermal shade. Most of the instruments are fixed-mounted, so coverage of Mercury is obtained by spacecraft motion over the planet. The imaging system uses a miniature scan mirror so it can quickly collect image mosaics.

MESSENGER Homepage: http://messenger.jhuapl.edu/index.html

PROGRAM MANAGEMENT

MESSENGER is a project in the Discovery Program with project responsibility delegated to the Principal Investigator at the Carnegie Institution of Washington. The Johns Hopkins University's Applied Physics Laboratory (APL) Space Department Management Committee (SDMAC) is the governing Program Management Council (PMC). Enterprise Official is Ed Weiler, Associate Administrator for Space Science at Headquarters. Theme Director and point of contact is Colleen Hartman, Director of the Solar System Exploration Division at Headquarters. This program is in full compliance with NPG7120.5B.

TECHNICAL COMMITMENT

The baseline for this technical commitment was made in 6/2001 and is detailed in Appendix 7 of the Discovery Program Plan.

Technical Specifications	**FY04 President's Budget**	**Change from Baseline**
Launch Vehicle:	Delta 7925H-9.5	--
Operational capability:	MESSENGER's 12 months in orbit cover 2 Mercurean solar days. (The Mercurean solar day, from sunrise to sunrise, is equal to 176 Earth days.)	--
Science Instruments:	7 science instruments: Mercury Dual Imaging System (MDIS), Gamma-Ray and Neutron Spectrometer (GRNS), X-Ray Spectrometer (XRS), Magnetometer (MAG), Mercury Laser Altimeter (MLA), Mercury Atmospheric and Surface Composition Spectrometer (MASCS), Energetic Particle and Plasma Spectrometer (EPPS)	--

THEME: Solar System Exploration (SSE)

DEVELOPMENT: MESSENGER

Schedule	FY04 President's Budget	Change from Baseline
Start of Formulation	Dec-99	--
Start of Implementation	Jul-01	--
Critical Design Review	Mar-02	--
Launch	Mar-04	--
Venus Flybys	June 2004 and March 2006	--
Mercury Flybys	July 2007 and April 2008	--
Enter Mercury Orbit	Apr-09	--
End of Orbital data collection	Apr-10	--
End of DA/Archive	Apr-11	--

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

Carnegie Insitute of Washington, under contract to NASA, provides the PI, Science Team Co-Investigators (Co-Is), and Education and Public Outreach (EPO) Team members. Johns Hopkins University/Applied Physics Laboratory, under contract to NASA, provides Science Team Co-Is, project management, mission design, systems engineering, and the spacecraft. Compositie Optics, Inc. provides the structure and Gencorp Aerojet provides the propulsion system. The payload is provided by JHU/APL, NASA/GSFC, the University of Colorado Laboratory for Atmospheric and Space Physics (LASP), and the University of Michigan Space Physics Research Laboratory (SPRL). The Mission Operations Center and Science Operations Center will be developed by JHU/APL.

Current Acquisitions	Actual *	Selection Method	Actual *	Performer	Actual *
Cooperative Agreemt.	0%	Full & Open Competition	100%	Industry	25%
Cost Reimbursable	80%	Sole Source	0%	Government	0%
Fixed Price	11%		100%	NASA Intramural	9%
Grants	0%			University	66%
Other	9%	Sci Peer Review	100%	Non Profit	%
* as % of FY02 direct procurement	100%	* as % of FY02 direct procurement		* as % of FY02 direct procurement	100%

Future Acquisitions - Major	Selection	Goals
1. None - all major contracts are in place	N/A	N/A

AGREEMENTS

Internal: The program is not dependent on other NASA activities outside of the control of the Associate Administrator for Space Science. *External:* None. **Changes since FY03 Pres. Budget: None.**

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
Confirmation Assess. (PDR)	HQ	May 01	N/A	Confirm readiness to enter implementation phase
Independent Assessment	Discovery PO	Mar 02	Sep 03	Critical Design Review; Pre-Environmental Review

BUDGET/LIFE CYCLE COST

Total budget authority represents the Life Cycle Cost (LCC).

Budget Authority ($ in millions)	Prior	FY02	FY03	FY04	FY05	FY06	FY07	FY08	BTC	Total	Comments
FY 2004 President's Budget	63.1	97.4	68.0	42.5	7.4	7.8	9.0	11.1	31.4	337.7	
Development	63.1	97.4	68.0	38.0						266.5	
Operations				3.0	4.3	4.4	4.4	5.5	14.2	35.9	
Data Analysis				1.5	3.1	3.4	4.6	5.6	17.2	35.3	
Changes since FY 03 PBS	0.0	+3.1	+0.0	+3.4	+0.3	+0.3	+0.3	+11.1	+0.0	+18.5	***Reason for Change:***
Development		+3.1		+3.3						+6.4	02 growth/full cost
Operations				+0.1	+0.2	+0.2	+0.2	+5.5		+6.3	Full cost
Data Analysis					+0.1	+0.1	+0.1	+5.6		+5.8	Full cost
FY 2003 President's Budget	63.1	94.3	68.0	39.1	7.1	7.5	8.7	0.0	42.2	330.0	
Development	63.1	94.3	68.0	34.7						260.1	
Operations		0.0		2.9	4.1	4.2	4.2		19.5	34.9	
Data Analysis		0.0		1.5	3.0	3.3	4.5		22.7	35.0	
Initial Baseline (LCC)	63.1	94.3	68.0	39.1	7.1	7.5	8.7	0.0	42.2	330.0	FY 2003 Pres. Budget
Development	63.1	94.3	68.0	34.7	0.0	0.0	0.0	0.0	0.0	260.1	
Operations	0.0	0.0	0.0	2.9	4.1	4.2	4.2	0.0	19.5	34.9	
Data Analysis	0.0	0.0	0.0	1.5	3.0	3.3	4.5	0.0	22.7	35.0	

Indicates budget numbers in full cost.

Indicates changes since the FY 2003 President's Budget Submit. FY 2002, FY 2003, Prior and BTC are not in full cost.

THEME: Solar System Exploration (SSE)

DEVELOPMENT: Deep Impact

PURPOSE

Objectives		Performance Measures
1.4, 5.1, 5.2, 5.3, 6.1, 6.2, 6.3, 6.4, 7.1, 7.2	Reference 2003 Strategic Plan	4SSE1-7, 9-21

Deep Impact will reveal the composition of the interior of a comet, increasing our understanding of the formation of the solar system. Data from the mission may also provide some insight into avoiding Near-Earth Object collisions with the Earth.

OVERVIEW

The Deep Impact mission will send a large copper projectile crashing into the surface of a comet at more than 20,000 miles per hour, creating a huge crater and revealing never before seen materials and the internal compostion and structure of a comet. The impact will excavate a crater of approximately 100 meters in diameter and 25 meters in depth. Deep Impact will observe how the crater forms, measure the crater's depth and diameter, measure the composition of the interior of the crater and its ejecta and determine the changes in natural outgassing produced by the impact. Dramatic images from both the flyby spacecraft and the impactor will be sent back to distant Earth in near-real time. Amateur astronomers, some already tracking the comet, will offer the public a first-hand look at this incredible July 2005 encounter.

DEEP IMPACT Homepage: http://deepimpact.umd.edu/

PROGRAM MANAGEMENT

Deep Impact is a project in the Discovery Program with project responsibility delegated to the Principal Investigator (PI) at University of Maryland. The JPL Program Management Council (PMC) has Deep Impact governing responsibility. Enterprise Official is Ed Weiler, Associate Administrator for Space Science at Headquarters. Theme Director and point of contact is Colleen Hartman, Director of the Solar System Exploration Division at Headquarters. This program is in full compliance with NPG7120.5B.

TECHNICAL COMMITMENT

The baseline for this technical commitment was made in 5/01 and is detailed in Appendix 8 of the Discovery Program Plan.

Technical Specifications	FY04 President's Budget	Change from Baseline
Mission requirement	Fly to comet Tempel 1	--
Payload	High Resolution Imager (HRI), Medium Resolution Imager (MRI) and Impactor Target Sensor (ITS)	--
Launch Vehicle	Delta II	--
Launch Mass	1,020 kg	--
Prime antenna diameter	1 meter (parabolic)	--
Communications bandwidths	x-band for flyby spacecraft (uplink command and downlink telemetry) and s-band for impactor communication to/from the flyby spacecraft	--
Max Data Rate	175 kbps	--
Max solar array power	620 W at encounter	--

Schedule	FY04 President's Budget	Change from Baseline
Start of Formulation	Nov-99	--
Start of Implementation	Jun-01	--
Critical Design Review	Jan-02	--
Launch	Jan-04	--
Earth/Moon Flyby	Jan-05	--
Encounter	Jul-05	--
End of Mission	Aug-05	--
End of DA/Archive	Apr-06	--

THEME: Solar System Exploration (SSE)

DEVELOPMENT: Deep Impact

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

University of Maryland provides the PI and the science team for the overall science inputs to the mission design. JPL provides the project management, mission design, systems engineering and mission operations. Ball Aerospace and Technology Corporation provides the flyby and impactor spacecraft and the HRI, MRI and ITS instruments. **Changes since FY03 Pres. Budget: None.**

Current Acquisitions	Actual *	Selection Method	Actual *	Performer	Actual *
Cooperative Agreements	0%	Full & Open Competition	100%	Industry	64%
Cost Reimbursable	10%	Sole Source	0%	Government	0%
Fixed Price	90%		100%	NASA Intramural	21%
Grants	0%			University	15%
Other	0%	Sci Peer Review	100%	Non Profit	0%
* as % of FY02 direct procurement	100%	* as % of FY02 direct procurement		* as % of FY02 direct procurement	100%

Future Acquisitions - Major	Selection	Goals
1. None - all major contracts are in place	N/A	N/A

AGREEMENTS

Internal: The project is not dependent on other NASA activities outside of the control of the Associate Administrator for Space Science. External: There are no other non-NASA organizations (other than Deep Impact team members) on which the project depends for mission success. **Changes since FY03 Pres. Budget: None.**

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
Initial Confirmation Asses.	HQ	May 01	N/A	Approval to continue to Phase C/D
Independent Assessment	Discovery PO	Feb 02	Feb 03	CDR Review; Baseline Confirmation/Risk Review

BUDGET/LIFE CYCLE COST

Total budget authority represents the Life Cycle Cost (LCC).

Budget Authority ($ in millions)	Prior	FY02	FY03	FY04	FY05	FY06	FY07	FY08	BTC	Total	Comments
FY 2004 Pres. Bud. (LCC)	96.9	90.9	59.1	21.7	11.3	2.0	0.0	0.0		281.9	
Development	96.9	90.9	59.1	13.0						259.9	
Operations				6.9	8.3	0.4	0.0		0.0	15.7	
Data Analysis				1.8	3.0	1.6				6.4	
Changes since FY 03 Pres. Bud.		+5.7		+0.7	+0.2	0.0				+6.6	***Reason for Change:***
Development		+5.7		+0.4						+6.1	growth in 02, full cost in 04
Operations				+0.1	+0.1	+0.1				+0.4	full cost
Data Analysis				+0.2	+0.1	-0.1				+0.2	full cost
FY 2003 Pres. Bud. (LCC)	96.9	85.2	59.1	21.0	11.1	2.0	0.0	0.0		275.3	
Development	96.9	85.2	59.1	12.6						253.8	
Operations				6.8	8.2	0.3				15.3	
Data Analysis				1.6	2.9	1.7				6.2	
Initial Baseline (LCC)	96.9	85.2	59.1	21.0	11.1	2.0	0.0	0.0	0.0	275.3	FY 2003 Pres. Budget
Development	96.9	85.2	59.1	12.6	0.0	0.0	0.0	0.0	0.0	253.8	
Operations	0.0	0.0	0.0	6.8	8.2	0.3	0.0	0.0	0.0	15.3	
Data Analysis	0.0	0.0	0.0	1.6	2.9	1.7	0.0	0.0	0.0	6.2	

Indicates budget numbers in full cost.
Indicates changes since the FY 2003 President's Budget Submit.
FY 2002, FY 2003, Prior and BTC are not in full cost.

THEME:	Solar System Exploration (SSE)
DEVELOPMENT:	Dawn

PURPOSE

Objectives		Performance Measures
1.4, 5.1, 5.2, 5.3, 6.1, 6.2, 6.3, 6.4, 7.1, 7.2	Reference 2003 Strategic Plan	4SSE1-21

The Dawn mission's primary objective is to significantly increase our understanding of the conditions and processes acting during the solar system's earliest history, by examing the geophysical and geochemical properties of the main belt asteroids 1 Ceres and 4 Vesta. This will be accomplished by sending a spacecraft to orbit these asteroids and perform science investigations using imaging, spectroscopy, magnetism, altimetry, and radio science.

OVERVIEW

Dawn has a focused set of science and measurement objectives to be obtained through radio science and five instruments. The mission launches in May 2006 during a 21-day launch window and uses Solar Electric Propulsion to reach and orbit each asteroid for approximately 11 months, performing science investigations at various altitudes and lighting conditions. The use of Solar Electric Propulsion readily mitigates launch injection errors and is used during the interplanetary cruise to match trajectories with the asteroid. The simple interplanetary trajectory requires no gravity assists, no critical sequences, and a maximum of 1 thruster operating at a time (there are 3 thrusters on the spacecraft). Stay times at Vesta and Ceres can easily be extended. The five instruments have functional overlaps allowing graceful degradation of science objectives if any instrument fails. Two of the instruments are fully redundant and three are partially redundant. The spacecraft electronics are fully redundant. The total mission duration is nine years.

DAWN Homepage: http://www-ssc.igpp.ucla.edu/dawn/

PROGRAM MANAGEMENT

Dawn is a project in the Discovery Program with project responsibility delegated to the Principal Investigator (PI) at University of California, Los Angeles (UCLA). The Jet Propulsion Laboratory (JPL) Program Management Council (PMC) has Dawn governing responsibility. Enterprise Official is Ed Weiler, Associate Administrator for Space Science at Headquarters. Theme Director and point of contact is Colleen Hartman, Director of the Solar System Exploration Division at Headquarters. This program is in full compliance with NPG7120.5B.

TECHNICAL COMMITMENT

The baseline for this technical commitment will be set at Confirmation Review.

Technical Specifications	FY04 President's Budget	Change from Baseline
Payload:	The five instruments are a Framing Camera, Mapping Spectrometer, Gamma Ray/Neutron Spectrometer, Laser Altimeter, and Magnetometer	--
Launch Vehicle:	Delta 2925H	--
Cruise:	3 NSTAR Xenon (Xe) thrusters, one at a time, Maximum fuel mass: 288 kg to Vesta and 89 kg to Ceres	--
Vesta:	Orbit at 700 and 120 km alt., 11 months	--
Ceres:	Orbit at 890 and 140 km alt., 11 months	--

Schedule	FY04 President's Budget	Change from Baseline
Start of Formulation	Sep 02	--
Preliminary Design Review	Aug 03	--
Critical Design Review	Apr 04	--
Launch	May 06	--
Vesta Encounter	Jul 10	--
Ceres Encounter	Aug 14	--
End of Mission & Data Archiving	Jul 16	--

THEME: Solar System Exploration (SSE)

DEVELOPMENT: Dawn

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

UCLA provides the Principal Investigator and the science team, Education and Public Outreach, and the magnetometer instrument. The Jet Propulsion Laboratory is responsible for project management, mission and system engineering, mission assurance, the ion propulsion subsystem, navigation and mission operations. Orbital Sciences Corporation, under subcontract to JPL, is responsible for the spacecraft and flight software. Goddard Space Flight Center is responsible for the Laser Altimeter. Los Alamos National Laboratory is responsible for the Gamma Ray/Neutron Spectrometer. The German Aeorspace Center is responsible for the Framing Camera, and the Italian Space Agency is responsible for the Mapping Spectrometer. **Changes since FY03 Pres. Budget: None.**

Current Acquisitions	Actual *	Selection Method	Actual *	Performer	Actual *
Cooperative Agmt.	0%	Full & Open Competition	100%	Industry	31%
Cost Reimbursable	100%	Sole Source	0%	Government	0%
Fixed Price	0%		100%	NASA Intramural	0%
Grants	0%			University	69%
Other	0%	Sci Peer Review	100%	Non Profit	0%
* as % of FY02 direct procurement	100%	* as % of FY02 direct procurement		* as % of FY02 direct procurement	100%

Future Acquisitions - Major	Selection	Goals
None - all major acquisitions are in place.	N/A	N/A

AGREEMENTS

Internal: The program is not dependent on other NASA activities outside of the control of the Associate Administrator for Space Science. External: Provision of the Framing Camera instrument from the German Aerospace Center (DLR) and the Mapping Spectrometer instrument from the Italian Space Agency (ASI). Letters of Agreement are in development. **Changes since FY03 Pres. Budget: None.**

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
Confirmation Asses.	HQ	N/A	Aug 03	Confirmation Review
Independent Asses.	Disc. PO	N/A	Apr 04	CDR Review; Pre-Environmental Review

BUDGET/LIFE CYCLE COST

Total budget authority represents the Life Cycle Cost (LCC).

Budget Authority ($ in millions)	Prior	FY02	FY03	FY04	FY05	FY06	FY07	FY08	BTC	Total	Comments
FY 2004 President's Budget	0.5	1.0	36.3	125.6	83.5	40.9	6.2	6.5	89.6	390.2	Baseline to be established at
Development	0.5	1.0	36.3	125.6	83.5	39.9				286.8	Confirmation Review; project not
Operations						1.0	5.1	5.2	44.9	56.3	yet in implementation.
Data Analysis				0.0			1.1	1.3	44.7	47.1	
Changes since FY 03 Pres. Budget	+0.5	+1.0	+36.3	+125.6	+83.5	+40.9	+6.2	+6.5	+89.6	+390.2	***Reason for Change:***
Development	+0.5	+1.0	+36.3	+125.6	+83.5	+39.9				+286.8	Mission selection
Operations						+1.0	+5.1	+5.2	+44.9	+56.3	
Data Analysis							+1.1	+1.3	+44.7	+47.1	
FY 2003 President's Budget (LCC)											Mission selected after 03 Bud.
Initial Baseline (LCC)											TBD (see above)

Indicates budget numbers in full cost.
Indicates changes since the FY 2003 President's Budget Submit.
FY 2002, FY 2003, Prior and BTC are not in full cost.

THEME: Solar System Exploration (SSE)

DEVELOPMENT: Solar System Exploration Small Development Projects

PURPOSE

Objectives		Performance Measures
1.4, 5.1, 5.2, 5.3, 6.1, 6.2, 6.3, 6.4, 7.1, and 7.2	Reference 2003 Strategic	4SSE1-14, 21

The SSE Small Projects program provides frequent flight opportunities for highly focused, relatively inexpensive missions. Missions are selected through the Announcement of Opportunity (AO) process. Also included in this group are Missions of Opportunity (MO) -- Space Science investigations that are flown as part of a non-NASA space mission.

OVERVIEW

The mission that is currently included in Solar System Exploration Small Projects is Rosetta, which is an international collaboration to study the origin of comets and the Solar System itself. The U.S. responsibility is to provide four instruments, science participation, Deep Space Network access and nagivational support.

Rosetta program home page: http://sci.esa.int/home/rosetta

PROGRAM MANAGEMENT

Rosetta is a single project with development responsibility delegated to the Jet Propulsion Laboratory.

TECHNICAL COMMITMENT

The baseline for Rosetta is detailed in the Program Level I Requirements.

Technical Specifications	FY04 President's Budget	Change from Baseline
Rosetta		
Microwave Instrument for Rosetta Orbiter (MIRO)	Center-band frequencies of 190 & 564 Ghz	--
ALICE UV Spectrometer	Obtain spectra in the 700-2050Å bandpass	--
Ion Electron Spectrometer (IES)	Operate in three science modes	--
ROSINA	Two spectrometers, a velocity and temperature sensor, and a common data processing unit	--

Schedule	FY04 President's Budget	Change from Baseline
Rosetta Launch	TBD	TBD

THEME:	Solar System Exploration (SSE)
DEVELOPMENT:	Solar System Exploration Small Development Projects

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

The Rosetta instrument developers were selected by ESA and endorsed by NASA in February 1996. Selections made were JPL for MIRO, Southwest Research Institute for ALICE and IES, and Lockheed Martin Palo Alto Research Laboratory for ROSINA hardware. **Changes since FY03 Pres. Budget: none.**

Current Acquisitions	Actual *	Selection Method	Actual *	Performer	Actual *
Coop. Agmt.	25%	Full & Open Competition	100%	Industry	25%
Cost Reimbursable	25%	Sole Source	0%	Government	0%
Fixed Price	0%		100%	NASA Intramural	25%
Grants	50%			University	50%
Other	0%	Sci Peer Review	100%	Non Profit	0%
* as % of FY02 direct procurement	100%	* as % of FY02 direct procurement		* as % of FY02 direct procurement	100%

Future Acquisitions - Major	Selection	Goals
None - all major acquisitions are in place	N/A	N/A

AGREEMENTS

Internal: SSE Small projects are not dependent on other NASA activities outside of the control of the Associate Administrator of Space Science.

External: MOU between NASA and ESA, 1999. **Changes since FY03 Pres. Budget: None**.

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
N/A	N/A	N/A	N/A	N/A

BUDGET/LIFE CYCLE COST

Budget authority rep. the Development Cost. Mission Operations and Data Analysis costs are budgeted elsewhere.

Budget Authority ($ in millions)	Prior	FY02	FY03	FY04	FY05	FY06	FY07	FY08	BTC	Total	Comments
FY 2004 President's Budget	39.5	1.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0	42.0	
Rosetta	39.5	1.6	0.9							42.0	Launch TBD
Changes since FY 03 Pres. Budget		+0.3								+0.3	***Reason for Change:***
Rosetta		+0.3									Growth
FY 2003 President's Budget (LCC)	39.5	1.3	0.9							0.0	NASA is making a contribution to this international mission; the NASA component has no initial baseline.
Rosetta	39.5	1.3	0.9								

Indicates budget numbers in full cost.
Indicates changes since the FY 2003 Presidents Budget Submit.
FY 2002, FY 2003, Prior and BTC are not in full cost.

THEME: Solar System Exploration (SSE)

OPERATIONS

PURPOSE

Objectives		Performance Measures
1.4, 5.1, 5.2, 5.3	Reference 2003 Strategic Plan	4SSE4-11

Maximize the scientific return from NASA's investment in spacecraft and other data collection sources by conducting efficient and reliable operations of the data-collecting hardware which produces scientific discoveries.

OVERVIEW

SSE Operations funds operational missions that support SSE goals and objectives, and the Deep Space Mission System (DSMS) that provides communications with SSE missions. This includes the construction of the Deep Space Network (DSN) 34-meter Beam Wave Guide (BWG) antenna in Spain to meet DSN loading requirements in 2003/2004.

DISCOVERY Program Homepage: http://discovery.nasa.gov/

CASSINI Homepage: http://www.jpl.nasa.gov/cassini/

DSN Homepage: http://deepspace.jpl.nasa.gov/dsn/

PROGRAM MANAGEMENT

Enterprise Official is Ed Weiler, Associate Administrator for Space Science at Headquarters. Theme Director and point of contact is Colleen Hartman, Director of the Solar System Exploration Division at Headquarters. SSE mission operations are managed by the Jet Propulsion Laboratory, with the exception of MESSENGER, which is managed by the Johns Hopkins University's Appled Physics Laboratory. This program is in full compliance with NPG7120.5B.

TECHNICAL COMMITMENT

The baseline for all SSE missions is defined in their respective PCAs.

Technical Specifications FY04 President's Budget	Change from Baseline
All missions will meet Level I specifications as identified in each mission's respective program plan.	None

Schedule	FY04 President's Budget	Change from Baseline
Stardust		
Encounter/Flyby: Comet Wild 2	1/04	--
Encounter/Flyby: Sample Return	1/06	--
End of Mission	9/06	--
Genesis		
End of Mission	9/04	--
End of Project (including DA)	9/08	--
Messenger		
Launch	3/04	--
Target Arrival	4/09	--
End of Mission	4/11	--
Deep Impact		
Launch	1/04	--
Target Arrival	7/05	--
End of Mission	8/05	--
End of Project (including DA)	4/06	--
Cassini		
Target arrival	7/04	--
Orbital Checkout Complete	7/04	--
End of Mission	7/08	--

THEME: Solar System Exploration (SSE)

OPERATIONS

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

The prime contractor for the Deep Space Mission System is Lockheed Martin under the Consolidated Space Operations Contract (CSOC). This contract was not renewed and will expire after FY03; it will be recompeted in late 2003. The Cassini mission is an international endeavor with JPL, ESA and ASI. Prime contractors for Discovery missions are selected by the Principal Investigator (PI) of each mission. In FY02, direct procurement represented 100% of budget authority. **Changes since FY03 Pres. Budget: None.**

Current Acquisitions		Selection Method	Actual *	Performer	Actual *
Coop.Agreemnt.	0%	Full & Open Competition	15%	Industry	5%
Cost Reimbursable	100%	Sole Source	85%	Government	0%
Fixed Price	0%		100%	NASA Intramural	0%
Grants	0%			University	95%
Other	0%	Sci Peer Review	100%	Non Profit	0%
* as % of FY02 direct procurement	100%	* as % of FY02 direct procurement		* as % of FY02 direct procurement	100%

Future Acquisitions - Major	% of Project	Selection	Goals
1. CSOC recompetition	85%	Late 2003	100% Full & Open Competition

AGREEMENTS

Internal: NASA has a MOA in place among the Office of Space Science, Office of Space Flight, Office of Earth Science, and the Office of Aerospace and Technology regarding Space Communication responsibilities.
External: NASA has international agreements with the European Space Agency (ESA); the German, French, and Italian Space Agencies (DLR, CNES and ASI); and the countries of Spain and Australia. **Changes since FY03 Pres. Budget: None.**

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
Independent Implementation	IRT	May-02	Mar-03	Cassini - progress and risk assessment
Independent Implementation	IRT	N/A	TBD	DSMS - progress and risk assessment
Independent Annual Review	IRT	Sep-02	Sep-03	Validate performance of Discovery program against PCAs

BUDGET

Budget Authority ($M)	FY02	FY03	FY04	Comments
FY 2004 President's Budget	119.9	310.6	309.9	
Stardust	3.5	4.6	5.3	
Genesis	6.0	7.2	8.2	
Contour		2.4		
Galileo	1.5			
DS-1	0.3			
Messenger			3.0	
Deep Impact			6.9	
Dawn				
Cassini	30.7	31.5	30.3	
DSN expansion	22.0	15.3	0.7	
DSMS	55.9	249.6	255.5	
Changes since FY 03 Pres. Budget	+6.8	+0.0	-3.5	***Reason for Change:***
Stardust			+0.3	
Genesis	-0.2		+2.0	growth
Contour			-2.0	spacecraft lost
Messenger			+0.1	full cost
Deep Impact			+0.1	full cost
Dawn				new mission selection
Cassini	+1.0		+1.0	full cost
DSN expansion	+7.0			
DSMS	-1.0		-5.0	includes transfer to Optical Comm

Indicates budget numbers in full cost.
Indicates changes since the FY 2003 President's Budget Submit.
FY 2002 and FY 2003 are not in full cost.

THEME: Solar System Exploration (SSE)

RESEARCH

PURPOSE

Objectives		Performance Measures
1.4, 5.1, 5.2, 5.3, 6.1, 6.2, 6.3, 6.4, 7.1, 7.2	Reference 2003 Strategic Plan	4SSE2, 4SSE4-21

SSE research develops the theoretical tools and laboratory data needed to analyze flight data, makes possible new and better instruments to fly on future missions, and analyzes the data returned so that we can answer specific questions posed and fit this new knowledge into the overall picture of the solar system.

OVERVIEW

The SSE research element funds a variety of programs, including SSE Reseach and Analysis (R&A), the analysis of data (DA) from SSE operating missions, and the science data tools and archives needed to perform and catalog the research. DA programs are tied to specific missions, which are focused on the achievement of specific strategic objectives. The scope of R&A programs is generally wider because they must provide the new theories and instrumentation that enable the next generation of flight missions. The alignment of reseach programs with SSE strategic goals is ensured through two mechanisms. First, NASA Research Announcements soliciting R&A proposals contain explicit prioritization criteria with respect to Enterprise objectives. Second, the entire R&A program is reviewed triennially to assess the science quality and productivity of the major components and to adjust plans to best support Enterprise goals. Data Analysis (DA) programs have traditionally been performed by mission instrument teams and interdisciplinary scientists competitively selected for an individual mission for the lifetime of that mission. The DA program includes annual, open and competitive solicitations to all missions that can accommodate "guest investigations."

For more information, go to: http://spacescience.nasa.gov/missions/index.htm
http://research.hq.nasa.gov/code_s/code_s.cfm
http://ssds.nasa.gov/

PROGRAM MANAGEMENT

NASA Headquarters is responsible for the SSE Research Program. Enterprise Official is Ed Weiler, Associate Administrator for Space Science at Headquarters. Theme Director and point of contact is Colleen Hartman, Director of the Solar System Exploration Division at Headquarters. This program is in full compliance with NPG7120.5B.

TECHNICAL COMMITMENT

Content of SSE Data Analysis and Research and Analysis is defined in each individual mission PCA or NASA Research Announcement.

Technical Specifications	FY04 President's Budget	Change from Baseline
The OSS Strategic Planning process specifies a series of goals, strategic objectives and research focus areas. The OSS Strategic Plan draws from the Solar System Exploration Decadal Survey (NRC), as well as the road mapping activities by the Solar System Exploration Subcommittee (SSES). All selections processes and reviews of the elements of the SSE research program use these strategic items as guide posts for selection and/or continuation. Proposals for research must relate to these strategic items.		--

Schedule	FY04 President's Budget	Change from Baseline
R & A		
Research Opportunities In Space Science (ROSS)	Yearly in Feb.	--
Data Analysis		
Senior Reviews	Every Two Years	--

THEME: Solar System Exploration (SSE)

RESEARCH

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

The Research and Analysis (R&A) and Data Analysis (DA) programs make awards following peer reviewed competitions under NASA Research Announcements (NRAs), Announcements of Opportunity (AOs) and Cooperative Agreement Notices (CANs). In FY 02, direct procurement represented 100% of budget authority. **Changes since FY 2003 President's Budget: None.**

Current Acquisitions	Actual *	Selection Method	Actual *	Performer	Actual *
Cooperative Agreements	12%	Full & Open Competition	98%	Industry	6%
Cost Reimbursable	48%	Sole Source	2%	Government	5%
Fixed Price	1%		100%	NASA Intramural	5%
Grants	30%			University	73%
Other	9%	Sci Peer Review	100%	Non Profit	11%
* as % of FY02 direct procurement	100%	* as % of FY02 direct procurement		* as % of FY02 direct procurement	100%

Future Acquisitions - Major	Selection	Goals
1. Annual R&A research announcement	late 2003	100% Science Peer Review

AGREEMENTS

Internal: The program is not dependent on other NASA activities outside of the control of the Associate Administrator for Space Science. *External:* Cassini and Rosetta Data Analysis involve agreements with the European Space Agency. **Changes since FY03 Pres. Budget: None.**

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
MO&DA Senior Review	Sr. Review committee	July 2000	summer 2003	To recommend approval and funding level for extending the science investigations of the operating SSE missions.
R&A peer review	peer review committee	summer 2002	summer 2003	To review SSE proposals to the annual R&A announcement.

BUDGET

Budget Authority ($ in millions)	FY02	FY03	FY04	Comments
FY 2004 President's Budget	226.9	254.7	321.7	
Cassini DA	31.6	33.4	45.1	
Miscellaneous DA	22.9	29.6	32.3	
SSE R&A	172.4	191.7	244.3	
Changes since FY 03 Pres. Budget	-6.1		+38.1	***Reason for Change:***
Cassini DA			+2.1	full cost
Miscellaneous DA			+2.2	full cost; CONTOUR lost
SSE R&A	-6.1		+33.8	HQ support reduced in 02; full cost

Indicates budget numbers in full cost.
Indicates changes since the FY 2003 President's Budget Submit.
FY 2002 and FY 2003 are not in full cost.

THEME: Solar System Exploration (SSE)

TECHNOLOGY AND ADVANCED CONCEPTS

PURPOSE

Objectives		Performance Measures
1.4, 5.1, 5.2, 5.3	Reference 2003 Strategic Plan	4SSE4-13

The SSE Technology and Advanced Concepts effort develops advanced technologies needed for specific science missions. This process begins with mission studies -- the first phase of the flight program development process. In this phase, scientists work collaboratively with technologists and mission designers to develop the most effective alignment of technology development programs with future mission requirements. This collaboration enables intelligent technology investment decisions through detailed analysis of the trade-offs between design considerations and cost. Technologies critical to the success of future SSE missions include, but are not limited to, new propulsion systems that have greater power and efficiency, advanced communications systems, and advanced avionics capabilities.

OVERVIEW

The goal of the **In-Space Propulsion (ISP)** program is to develop alternative, more efficient propulsion systems.

The goal of **Project Prometheus** is to develop spacecraft power and propulsion systems that use nuclear power sources. In FY04 the *Jupiter Icy Moons Orbiter (JIMO)* will begin as a new initiative under Project Prometheus. Exploring the habitable water worlds of Jupiter, the spacecraft will search for evidence of global oceans on the Jovian moons Europa, Ganymede and Callisto. JIMO will demonstrate the advantages of using nuclear power and propulsion, setting the stage for the next phase of exploring Jupiter and the rest of the outer solar system.

Another new initiative in FY04 is the development of **Optical Communications** technology. This initiative will improve the communication data rate and lower the cost per byte of data returned by many orders of magnitude. While nuclear propulsion will enable us to get to targets more quickly and nuclear power will allow for extended orbital or surface stay times, optical communication will allow the return of much larger quantities of data.

Besides these core technology programs, Technology and Advanced Concepts also supports the selection of future **Discovery** and **New Frontiers** missions. During FY 2002, the program also supported the **New Horizons Pluto/Kuiper Belt** mission study.

SSE TECHNOLOGY Homepage:	http://solarsystem.nasa.gov/technology/tech.html
NEW FRONTIERS Homepage:	http://centauri.larc.nasa.gov/newfrontiers/
Discovery Acquisition Homepage:	http://discovery.larc.nasa.gov/discovery/
PLUTO-KUIPER BELT Homepage:	http://solarsystem.nasa.gov/missions/pluto_missns/pluto-pkb.html

PROGRAM MANAGEMENT

Enterprise Official is Ed Weiler, Associate Administrator for Space Science at Headquarters. Theme Director and point of contact is Colleen Hartman, Director of the Solar System Exploration Division at Headquarters. This program is in full compliance with NPG7120.5B.

TECHNICAL COMMITMENT

Project technical baselines are defined by the individual Formulation Authorization Document (FAD), Program Commitment Agreement (PCA) or equivalent documentation.

Technical Specifications	FY04 President's Budget	Change from baseline
In-Space Propulsion	Develop alternative, more efficient propulsion systems	--
Project Prometheus: Nuclear Power	Develop power systems that use nuclear energy (radioisotope)	--
Project Prometheus: Nuclear Propulsion	Develop propulsion systems that use nuclear energy (fission)	--
Project Prometheus: JIMO	Use nuclear electric propulsion to conduct an in-depth exploration of Jupiter's icy moons and search for evidence of life	N/A
SSE Tech (formerly X-2000)	Develop new remote sensing, autonomy, and comm technologies	--
Future Discovery	Lower-cost, highly focused planetary science investigations	--
New Frontiers	Science-driven, mid-sized planetary missions	--
Optical Communications	Develop prototype system to be demonstrated on Mars '09 mission	N/A
New Horizons (PKB) Study	Study mission to visit the planet Pluto and its satellite Charon	--

THEME: Solar System Exploration (SSE)

TECHNOLOGY AND ADVANCED CONCEPTS

TECHNICAL COMMITMENT

Project technical baselines are defined by the individual Formulation Authorization Document (FAD), Program Commitment Agreement (PCA) or equivalent documentation.

Technical Specifications	FY04 President's Budget	Change from baseline
In-Space Propulsion	Develop alternative, more efficient propulsion systems	--
Project Prometheus:		
Nuclear Power	Develop power systems that use nuclear energy (radioisotope)	--
Nuclear Propulsion	Develop propulsion systems that use nuclear energy (fission)	--
JIMO	Use nuclear electric propulsion to conduct an in-depth exploration of Jupiter's icy moons and search for evidence of	N/A
SSE Tech (formerly X-2000)	Develop new remote sensing, autonomy, and comm technologies	--
Future Discovery	Lower-cost, highly focused planetary science investigations	--
New Frontiers	Science-driven, mid-sized planetary missions	--
Optical Communications	Develop prototype system to be demonstrated on Mars '09 mission	N/A
New Horizons (PKB) Study	Study mission to visit the planet Pluto and its satellite Charon	--

Schedule	FY04 President's Budget	Change from Baseline
In-Space Propulsion	Ongoing	--
Project Prometheus: Nuclear Power	DOE select contractor for Multi-Mission Radioisotope Thermoelectric Generator (MMRTG) dev't - 2nd Qtr 03	--
Project Prometheus: Nuclear Power	Stirling Radioisotope Generator PDR - FY 04	--
Project Prometheus: Nuclear Propulsion	Completion of Phase 1 of Technology NRA work - FY 04	--
Future Discovery	AO release spring 2003	--
New Frontiers	Conduct first full and open mission competition	--
Optical Communications	TBD	N/A

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

Major acquisitions in FY 2002 included a selection for the Next Generation Ion Engine for the ISP program. In FY02, direct procurement represented 100% of budget authority.

Changes since FY03 Pres. Budget: none.

Current Acquisitions	Actual *	Selection Method	Actual *	Performer	Actual *
Cooperative Agreements	0%	Full & Open Competition	74%	Industry	12%
Cost Reimbursable	79%	Sole Source	26%	Government	15%
Fixed Price	2%		100%	NASA Intramural	
Grants	0%			University	62%
Other	19%	Sci Peer Review	100%	Non Profit	11%
* as % of FY02 direct procurement	100%	* as % of FY02 direct procurement		* as % of FY02 direct procurement	100%

Future Acquisitions - Major	Selection	Goals
1. NRA selection for Nuclear Power	1st Qtr 2003	100% Full & Open Competition
2. NRA selection for Nuclear Propulsion	SEP 2002	100% Full & Open Competition
3. NRA selection for High Power Instruments	4th Qtr 2003	100% Full & Open Competition
4. RFP for JIMO Phase A	4th Qtr 2003	100% Full & Open Competition
5. Aerocapture	Fall 2002	100% Full & Open Competition
6. Solar Sails	Fall 2002	100% Full & Open Competition
7. Advanced Chemical	Summer 2003	100% Full & Open Competition

AGREEMENTS

Internal: The program is not dependent on other NASA activities outside of the control of the Associate Administrator for Space Science. *External:* Project Prometheus is currently working on a Memorandum of Agreement with the Department of Energy. **Changes since FY03 President's Budget: None.**

THEME: Solar System Exploration (SSE)

TECHNOLOGY AND ADVANCED CONCEPTS

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
ISP: Independent Technology Assessment	SSE Subcomm. Tech. Assessment Group	JUL 2002	JUL 2003	Evaluate and prioritize ISP technologies
Optical Communication: Independent Technology	SSE Subcomm. Tech. Assessment	N/A	2nd Qtr 2003	Evaluate and prioritize Optical Communication technology

BUDGET

Budget Authority ($ in millions)	FY02	FY03	FY04	Comments
FY 2004 President's Budget	81.5	246.1	550.4	
ISP	19.6	62.5	75.0	
Project Prometheus		125.5	279.2	
JIMO			92.6	New Initiative - JIMO (part of Project Prometheus)
Nuclear Power		46.5	55.7	
Nuclear Propulsion		79.0	130.9	
Optical Communications			31.2	New Initiative - Optical Communications
X-2000	24.1	30.0	10.8	
Other SSE Tech	6.9			
Future Discovery	0.9	13.1	24.0	
New Frontiers		15.0	130.2	
New Horizons (PKB)	30.0			
Changes since FY 03 Pres. Budget	-9.4	-61.8	-88.6	***Reason for Change:***
ISP			+8.3	full cost
Project Prometheus			+64.7	
JIMO			+92.6	New Initiative - JIMO (part of Project Prometheus)
Nuclear Power		-32.5	-5.3	full cost; 04 deferral
Nuclear Propulsion		+32.5	-22.6	full cost; 04 deferral
Optical Communications			+31.2	New Initiative - Optical Communications
X-2000	-6.7		-16.7	redirected to other priorities
Other SSE Tech	+6.4			
Future Discovery	-9.1	-61.8	-151.3	selected Dawn and Kepler
New Frontiers			-24.8	lower flight rate planned

Indicates budget numbers in full cost.
Indicates changes since the FY 2003 President's Budget Submit.
FY 2002 and FY 2003 are not in full cost.