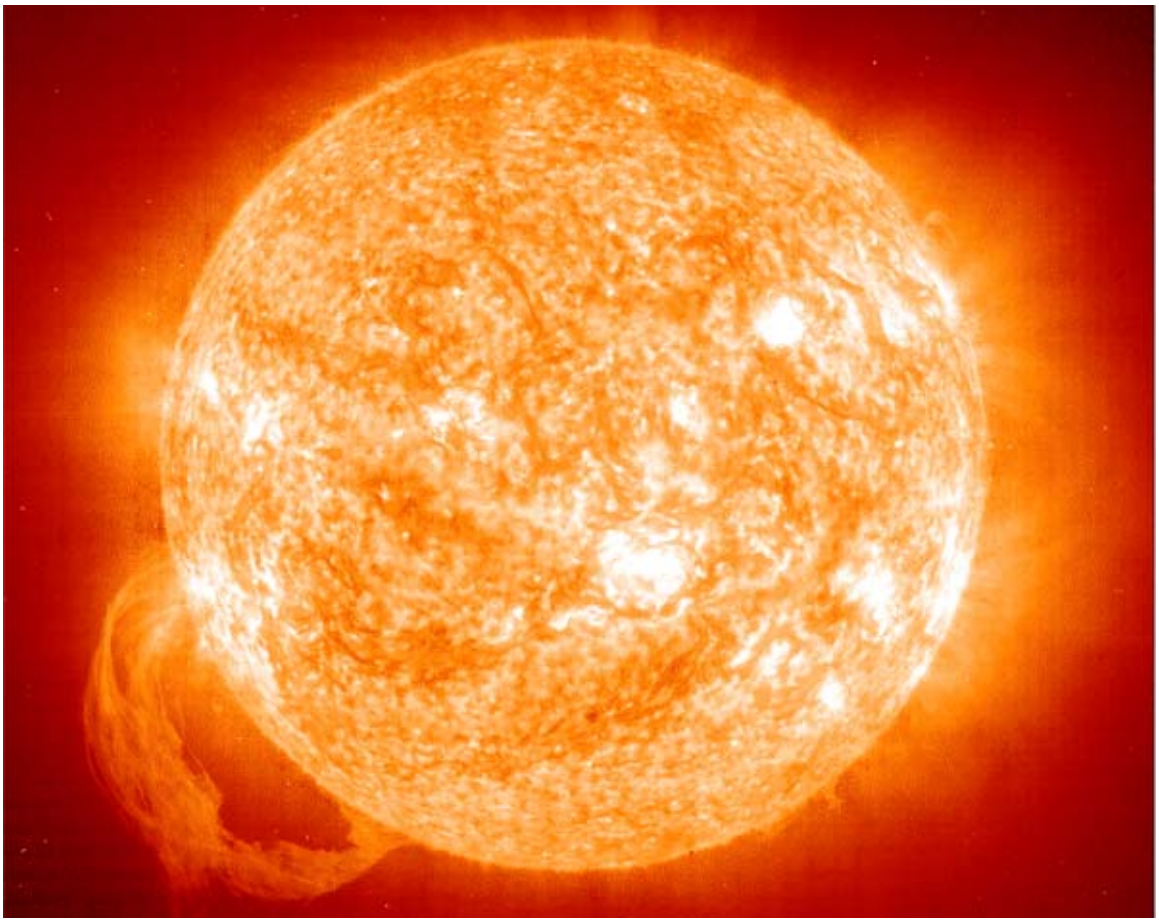
THEME: Sun-Earth Connections



On June 9, 2002 a large dynamic eruption of material was observed leaving the Sun by the Solar and Heliospheric Observatory (SOHO) spacecraft. This particular image shows an early phase of the event where a cool, dense cloud of gas, principally composed of Hydrogen and Helium, was seen departing the Sun. Because this event was not directed toward Earth, no geophysical effects were associated with the activity. Eruptive prominences usually take 2-4 days to travel the distance between the Sun and the Earth. Monitoring the Sun can provide early warning for major activity, likely avoiding some of the disruption otherwise experienced. More information can be found at http://sec.gsfc.nasa.gov .

SUN-EARTH CONNECTIONS

MAJOR EVENTS IN FY 2004

- STEREO completes integration and test in preparation for launch in 2005. STEREO will use two identically equipped spacecraft to provide revolutionary 3-D imaging of Coronal Mass Ejections.
- Solar Dynamics Observatory enters implementation of development in January 2004. It is a cornerstone mission in the Living With a Star program. It will study the Sun's magnet field and the dynamic processes that influence space weather.

THEME: Sun-Earth Connection (SEC)

OVERVIEW

Life and society on Earth can prosper within a relatively stable and safe biosphere because the Sun provides a steady energy source to the Earth, and the Earth's upper atmosphere and magnetic field shield the planet from external influences. The Earth's upper atmosphere and magnetic field form a coupled system with the Sun and geospace (the space inside the protective cavity of the Earth's magnetic field). This is evident in auroral displays at the Earth's poles, and in the belts of high-energy particles encircling the Earth and extending out to distances where communication and weather spacecraft operate. The Sun-Earth Connection (SEC) Programs seek to understand how the Sun, geospace, and the Earth's upper atmosphere are connected in a single system.

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.	1.3 Understand the origins and societal impacts of variability in the Sun-Earth Connection.
Explore the Universe and Search for Life	5. Explore the solar system and the universe beyond, understand the origin and evolution of life, and search for evidence of life elsewhere.	5.13 Understand the changing flow of energy and matter throughout the Sun, heliosphere, and planetary environments.
		5.14 Understand the fundamental physical processes of space plasma systems.
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 Theme.
	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

The system comprised of the Sun, the Earth's upper atmosphere, magnetic field and geospace, is dynamic. The changes to this system, commonly known as space weather, have important implications for life and society. Space weather effects may induce some climate shifts, modify the ozone layer, change the propagation of radio and radar signals in and through the ionosphere, and produce significant effects on any object or person outside the atmosphere. Increasing our understanding of solar variability, its space weather effects, and its implications for technology and life on Earth will lower the risk of failure or degraded performance of new technologies and maintain the U.S. industry's competitiveness in the global marketplace.

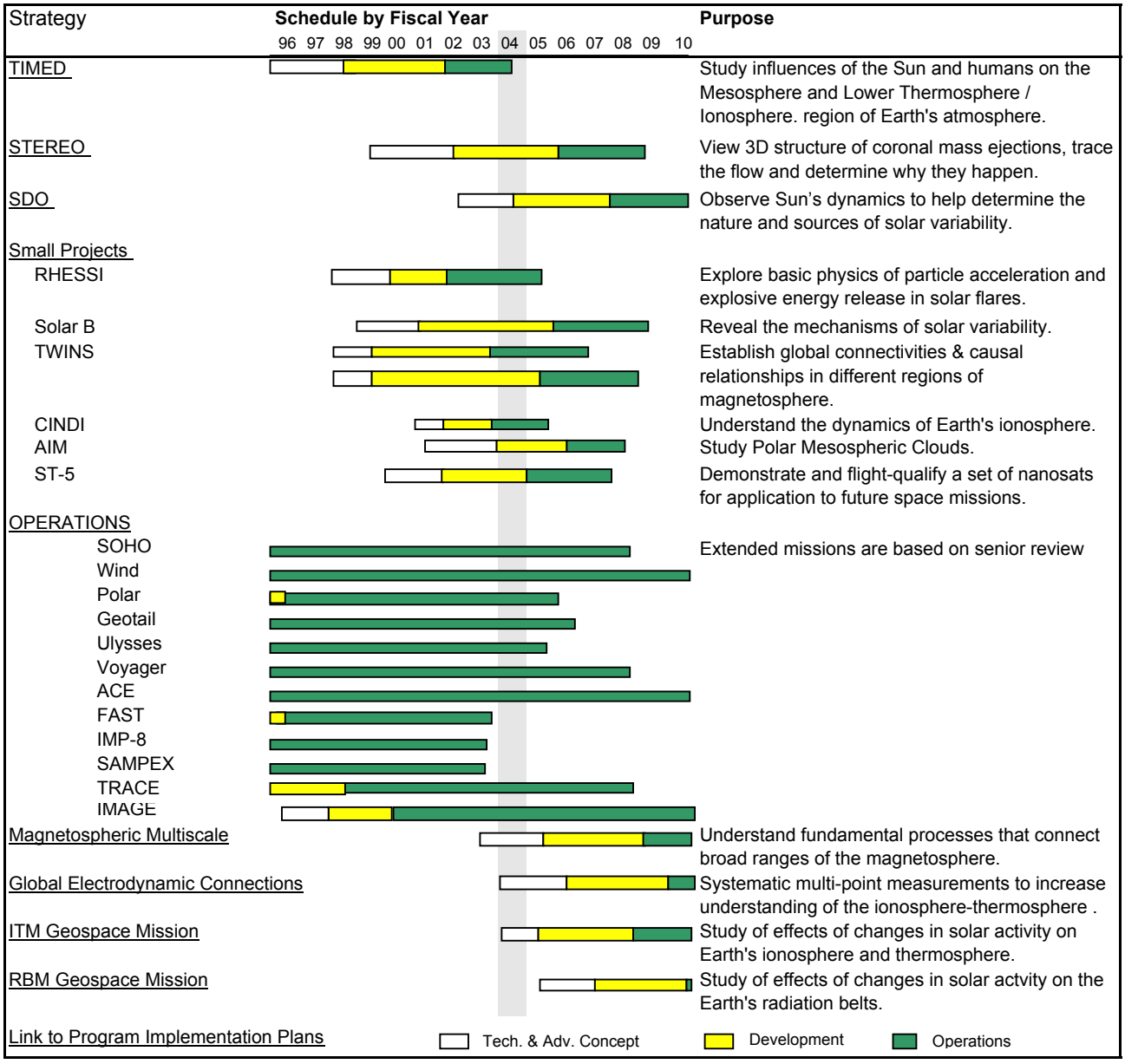
Education and Public Benefits
The Sun-Earth Education Forum and regional Broker/Facilitator institutions work together to develop and support partnerships between SEC scientists and education professionals in formal and informal settings as well as to encourage coordination of activities. The SEC Division also has significant science resources to share with the public. In the modern age, space exploration continues to thrill the public with new discoveries that help build a better understanding of the Sun, near-Earth space, the solar system, and the Universe. They are informed through news releases highlighting solar events, high-production-value films bringing the excitement of SEC science and research to life, documentaries, innovative planetarium shows, exhibits at museums and science centers, and rich website environments. A significant fraction of the U.S. population retains an abiding fascination with space exploration and discovery that can be used to improve science literacy throughout the Nation.

THEME: Sun-Earth Connection (SEC)

IMPLEMENTATION

The Sun-Earth Connection 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 Headquarters. Enterprise official is Dr. Edward Weiler, Associate Administrator for Space Science. Theme director and point of contact is Dr. Richard Fisher, Director of the Sun-Earth Connection Division at Headquarters. This theme is in full compliance with NPG 7120.5B.



Tailoring
No exceptions to NPG 7120.5B have been taken.

THEME: Sun-Earth Connection (SEC)

STATUS

During 2002, the SEC theme accomplished the following: launched TIMED; began Implementation for STEREO and 2 of 3 ST-6 experiments; started Phase A for SDO; completed CDR for ST-5; shipped Solar B's Focal Plane Package & X-ray telescope mechanical test models to ISAS in Japan; completed environmental testing of the TWINS A instrument; held the Pre-Environmental Review for the CINDI Ion Velocity Meter; successfully launched 27 sounding rockets and 3 meteorological rockets; and completed 25 years of Voyager operations.

Link to SEC homepage for more detailed status information: http://sec.gsfc.nasa.gov/

PERFORMANCE MEASURES

Annual Performance Goals	
	OUTCOME: A well managed program in accordance with Agency implementing strategies.
4SEC1	Each Development project will complete its current phase within 10% of total life-cycle cost shown on the table below.
4SEC2	Each Research project will allocate 75% of its funding competitively during FY04.
4SEC3	SEC will complete all of its missions within 10% of their baseline schedules.
1.3.1	OUTCOME: Define the origins and societal impacts of variability in the Sun-Earth Connection.
4SEC4	Successfully demonstrate progress in developing the capability to predict solar activity and the evolution of solar disturbances as they propagate in the heliosphere and affect the Earth. Progress towards achieving outcomes will be validated by external review.
4SEC5	Successfully demonstrate progress in specifying and enabling prediction of changes to the Earth's radiation environment, ionosphere, and upper atmosphere. Progress towards achieving outcomes will be validated by external review.
4SEC6	Successfully demonstrate progress in understanding the role of solar variability in driving space climate and global change in the Earth's atmosphere. Progress towards achieving outcomes will be validated by external review.
5.13.1	OUTCOME: Understand the changing flow of energy and matter throughout the Sun, heliosphere, and planetary environments.
4SEC7	Successfully demonstrate progress in understanding the structure and dynamics of the Sun and solar wind and the origins of magnetic variability. Progress towards achieving outcomes will be validated by external review.
4SEC8	Successfully demonstrate progress in determining the evolution of the heliosphere and its interaction with the galaxy. Progress towards achieving outcomes will be validated by external review.
4SEC9	Successfully demonstrate progress in understanding the response of magnetospheres and atmospheres to external and internal drivers. Progress towards achieving outcomes will be validated by external review.
5.14.1	OUTCOME: Support exploration of the fundamental physical processes of space plasma systems.
4SEC10	Successfully demonstrate progress in discovering how magnetic fields are created and evolve and how charged particles are accelerated. Progress towards achieving outcomes will be validated by external review.
4SEC11	Successfully demonstrate progress in understanding coupling across multiple scale lengths and its generality in plasma systems. 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).
4SEC12	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.
4SEC13	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.
4SEC14	Provide high quality educational materials and teacher training based on Theme content and focused on national curriculum standards.
4SEC15	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.
4SEC16	Provide higher education opportunities offered through OSS research awards and other NASA research and education programs.

THEME: Sun-Earth Connection (SEC)

PERFORMANCE MEASURES - CONTINUED

Annual Performance Goals - Continued	
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.
4SEC17	Through partnerships with major science museums or planetariums, put on display or on tour major exhibitions or planetarium shows based on Theme content.
4SEC18	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.
4SEC19	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.

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
Nat'l Academy of Sciences	Space Stdy Board	7/02	N/A	Effectiveness and quality of the program
Advisory Council	NAC	9/02	3 times/year	Review sci. strategy, program implementation strategy
	SScAC	8/02	3 times/year	Review sci. strategy, program implementation strategy
	SEC Subcommittee	7/02	3 times/year	Review sci. strategy, program implementation strategy

Other independent reviews are conducted at the Program and Project level.

BUDGET

Budget Authority ($millions)	FY02	FY03	Chng	FY04	Comments
Sun Earth Connection	**412.9**	**544.2**	**+225.5**	**769.6**	
Development	104.4	120.8	+99.2	220.0	
TIMED	4.3				
STEREO	58.9	74.3	+25.0	99.3	
Solar Dynamics Observatory (SDO)	8.6	26.6	+39.6	66.2	SDO includes MO&DA - will be moved in next budget process to Operations and Research.
Small Projects	32.6	19.9	+34.6	54.5	
Operations	37.0	43.5	+13.8	57.3	
Research	140.6	124.3	+54.0	178.3	
Technology and Advanced Concepts	130.9	255.6	+58.5	314.0	

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: Sun-Earth Connection (SEC)

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THEME: Sun-Earth Connection (SEC)

DEVELOPMENT: Solar Terrestrial Relations Observatory (STEREO)

PURPOSE

Objectives		Performance Measures
1.3, 5.13, 5.14, 6.1, 6.2, 6.3, 6.4, 7.1, and 7.2	Reference 2003 Strategic Plan	4SEC1, 3, 4, 7, 8, 10-19

The STEREO project will lead to an understanding of the cause and mechanisms of Coronal Mass Ejection (CME) initiation; characterize the progagation of the CMEs through the heliosphere; discover the mechanisms and sites of the energetic particle acceleration in the Sun's corona and the interplanetary medium; and develop a 3-D time-dependent model of the magnetic topology, temperature, density, and velocity structure of the ambient solar wind.

OVERVIEW

NASA's STEREO mission will use two identically equipped spacecraft to provide revolutionary 3-D imaging of CMEs. The two spacecraft will be in heliocentric orbits at 1 AU (Astronomical Unit, the mean distance from the Earth to the Sun) with one leading Earth and the other lagging Earth. The STEREO mission will be a multilateral international collaboration involving participants from France, Germany, the United States, and United Kingdom. Investigations for STEREO will include: Sun-Earth Connection Coronal and Heliospheric Investigation (SECCHI) using the remote sensing package which will study the 3-D evolution of CME's from birth at the Sun's surface through the corona and interplanetary medium to their eventual impact at Earth; STEREO/WAVES (SWAVES), an interplanetary radio burst tracker that will trace the generation and evolution of traveling radio disturbances from the Sun to the orbit of Earth; In situ Measurements of Particles and CME Transients (IMPACT) investigation, which will sample the 3-D distribution and provide plasma characteristics of solar energetic particles and the local vector magnetic field, and the PLAsma and SupraThermal Ion and Composition (PLASTIC) experiment,, which will provide plasma characteristics of protons, alpha particles, and heavy ions.

Link to STEREO Homepage for more information.

PROGRAM MANAGEMENT

STEREO is the third mission within the Solar Terrestrial Probe Program with program and project responsibility delegated to the Goddard Space Flight Center. The Enterprise Program Management Council (PMC) has STEREO governing responsibility. Enterprise official is Dr. Ed Weiler, Associate Administrator for Space Science at HQ. The Theme Director and the Point of Contact is Dr. Richard Fisher, Director of the Sun-Earth Connection Division at HQ. The program is in full compliance with NPG7120.5B.

TECHNICAL COMMITMENT

The baseline for this commitment is detailed in the 3/2002 STP Program Commitment Agreement (PCA).

Technical Specifications	FY04 President's Budget	Change from Baseline
CME Initiation Time:	accuracy of order 10[120] minutes	--
Location of CME Initiation:	± 5 [30] degrees of solar latitude and longitude	--
Operational capability:	Prime mission life is 2 years for both spacecraft; assuming a CME rate consistent with minimum of solar magnetic activity cycle, observe at least 60 CMEs with remote sensing instruments and at least 24 interplanetary events in-situ.	--
Science Instruments:	4 major science instrument suites	--

Values not enclosed in brackets indicate the accuracy required when both STEREO spacecraft are required to be operational. Values in square brackets indicate the accuracy of the measurements required to be achieved to meet Minimum Mission Success Criteria.

Schedule	FY04 President's Budget	Change from Baseline
Start of Formulation	May-01	--
Start of Implementation	Mar-02	--
Mission Critical Design Review	Dec-02	--
Complete S/C I & T	Jul-04	--
Launch	Nov-05	--

THEME: Sun-Earth Connection (SEC)

DEVELOPMENT: Solar Terrestrial Relations Observatory (STEREO)

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

The four instrument suites were competitively procured via AO in Dec. 1999. NASA selected these investigations:
(1) SECCHI (Naval Research Laboratory),
(2) STEREO/WAVES (SWAVES) (Centre National de la Recherche Scientifique Observatory of Paris),
(3) In situ Measurements of Particles and CME Transients (IMPACT) (University of California, Berkeley), and
(4) PLAsma and SupraThermal Ion and Composition (PLASTIC), (University of New Hampshire).
The spacecraft, ground support, mission operations, and mission integration function are a sole source procurement to JHU/APL. STEREO will launch on a Delta 2925-10L from Kennedy Space Center. **Changes since FY03 Pres. Budget: None.**

Current Acquisitions	Actual *	Selection Method	Actual *	Performer	Actual *
Cooperative Agreements	0%	Full & Open Competition	45%	Industry	7%
Cost Reimbursable	96%	Sole Source	55%	Government	21%
Fixed Price	0%		100%	NASA Intramural	3%
Grants	2%			University	68%
Other	2%	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. ELV Procurement	Fall 2003	fixed price

AGREEMENTS

Internal: The program is not dependent on other NASA activities outside of the control of the Associate Administrator for Space Science.
External: LOAs are in place with CNES (France), Hungary, Switzerland, PPARC (Particle Physics CNES), the German Aerospace Center and ESA. An MOU with ESA will also be developed. **Changes since FY03 Pres. Budget: None.**

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
Independent Implementation Revi	IRT	NA	Oct-02	Annual review to look at implementation procuredures
Confirmation Review	IRT	Mar-02	NA	Approval to proceed into Development

BUDGET / LIFE CYCLE COST

Total budget authority represents the Life Cycle Cost (LCC). These figures include ELV.

Budget Authority ($ in millions)	Prior	FY02	FY03	FY04	FY05	FY06	FY07	FY08	BTC	Total	Comments
FY 2004 President's Budget	37.4	58.9	74.3	99.3	68.3	42.6	24.7	15.0	2.5	423.0	
Pre-Development	37.4	21.0								58.4	
Development		37.9	74.3	99.3	68.3	22.2				302.1	
Operations						10.8	10.2	2.1		23.1	
Data Analysis						9.6	14.5	12.9	2.5	39.5	
Changes since FY 03 Pres. Budget		+6.0		+9.3	+7.1	+6.1	+1.6	+15.0	-14.8	+30.3	***Reason for Change:***
Development		+6.0		+9.3	+7.1	+1.5				+24.0	full cost adjustment
Operations						+3.4	+0.8	+2.1	-4.7	+1.6	full cost adjustment
Data Analysis						+1.2	+0.8	+12.9	-10.1	+4.8	full cost adjustment
FY 2003 President's Budget	37.4	52.9	74.3	90.0	61.2	36.5	23.1		17.3	392.7	
Pre-Development	37.4	21.0								58.4	
Development		31.9	74.3	90.0	61.2	20.7				278.1	
Operations						7.4	9.4		4.7	21.5	
Data Analysis						8.4	13.7		12.6	34.7	
Initial Baseline	37.2	52.9	74.3	90.0	61.2	36.5	23.1	17.3	2.8	395.3	
Pre-Development	37.2	21.0								58.2	Begin C/D -- March 02
Development		31.9	74.3	90.0	61.2	20.7				278.1	Launch 11/05
Operations						7.4	9.4	4.7		21.5	
Data Analysis						8.4	13.7	12.6	2.8	37.5	

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: Sun-Earth Connection (SEC)

DEVELOPMENT: Sun-Earth Connection Small Development Projects

PURPOSE

Objectives		Performance Measures
1.3, 5.13, 5.14, 6.1, 6.2, 6.3, 6.4, 7.1, and 7.2	Reference 2003 Strategic Plan	4SEC1, 3, 4, 5, 6, 7, 9-19

The Sun-Earth Connection Small Projects include the Explorer Program and the Solar-B mission (which is the second mission in the Solar Terrestrial Probe Program). The Small Explorer (SMEX) program provides frequent flight opportunities for highly focused, relatively inexpensive missions. Missions are selected through the Announcement of Opportunity (AO) process. SMEX investigations are characterized by a total cost to NASA for definition, development, launch service, and mission operations and data analysis not to exceed $85M (fiscal 2002 dollars). Also included included in this group are Missions of Opportunity (MO). MO are Space Science investigations that are flown as part of a non-NASA space mission.

OVERVIEW

The missions that are included in the Sun-Earth Connection Small Projects are:

- SOLAR-B is an international collaboration building on the highly successful Japan/U.S./UK Yohkoh (Solar-A) experience. Solar-B is a single sun-synchronous low-Earth orbit spacecraft. It will measure the Sun's magnetic field and ultraviolet/x-ray radiation and use the data to increase the understanding of the sources of solar variability. The U.S. responsibility is to manage the U.S. hardware development of three science instruments: Focal Plan Package, X-Ray telescope and the Extreme Ultraviolet Imaging Spectrometer.

- CINDI (MO) (Coupled Ion Neutral Dynamics Investigation) will study ion-neutral interactions in Earth's ionosphere to discover their role in the electrodynamic connection between the Sun and the Earth's upper atmosphere. These interactions can interfere with communications and navigation systems.

- TWINS A/B (MO) (Two Wide-angle Imaging Neutral-atom Spectrometers) will provide stereoscopic images of the Earth's magnetosphere for the first time. The TWINS project consists of two identical instruments on two spacecraft in Molniya (highly eliptical) orbits around the Earth.

- AIM (Aeronomy of Ice in the Mesosphere) (SMEX) will establish the relationship between polar mesospheric clouds and their environment. This will form the basis for the study of long-term changes in the mesosphere.

http://stp.gsfc.nasa.gov/missions/solar-b/solar-b.htm
http://nis-www.lanl.gov/nis-projects/twins/
http://129.110.7.63/heelis/cindi.html
http://www.hamptonu.edu/science/physics/CAS/AIM/aim.html

PROGRAM MANAGEMENT

CINDI, TWINS, and AIM are projects within the Explorer Program with management responsibility delegated to the Goddard Space Flight Center. CINDI and TWINS are in development. AIM will enter into development in Jan. 2004. The Enterprise Program Management Council (PMC) has governing responsibility. Enterprise official is Dr. Ed Weiler, Associate Administrator for Space Science at HQ. The Theme Director and the Point of Contact is Dr. Richard Fisher, Dir. of the Sun-Earth Connection Division at HQ. The program is in full compliance with NPG7120.

TECHNICAL COMMITMENT

The baseline for CINDI, TWINS and AIM are detailed in the Explorer Program Commitment Agreement (PCA).
The baseline for SOLAR-B was made in 12/00 and is detailed in the Program Level I Reqs. for the Solar-B Project.

Technical Specifications	FY04 President's Budget	Change from Baseline
SOLAR-B		
Focal Plane Package polarimetric accuracy	within 0.001	--
X-ray Telescope Angular Resolution	2.0 arcsec	--
EUV Imaging Spectrometer spatial resolution	2.0 arcsec	--
CINDI		
Measure Total Ion Concentration; Drift Velocity	200 passes/month	--
and Neutral Wind Velocity		--
TWINS		
Two dimentional views of Earth's	~10 images per day	--
energetic neutral atoms		--
AIM	TBD/Confirmation Review 12/03	New

THEME: Sun-Earth Connection (SEC)

DEVELOPMENT: Sun-Earth Connection Small Development Projects

TECHNICAL COMMITMENT - CONTINUED

Schedule	FY04 President's Budget	Change from Baseline
SOLAR-B Launch	Sep-05	--
CINDI Launch	Oct-03	--
TWINS Launch	4th Qt/2003 & 1st Qt/2005	--

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

The **Solar-B** instrument developers were selected in response to a NASA AO issued in May 1998. Selections made in December 1998 were Lockheed Martin Missiles and Space for the FPP, Smithsonian Astrophysical Observatory for the XRT, and the Naval Research Laboratory for the EIS. **CINDI's** science investigation and both instruments are being developed at the Unversity of Texas at Dallas. Launch on a Pegasus XL by the U.S. Air Force. **TWINS** Principle Investigation is located at the Southwest Research Institute. **AIM** Principle Investigation institution is Hampton University with four major instruments. Spacecraft is being built by Ball Aerospace & Technologies Corp; AIM is being lannch from Vandenber Air Force Base on a Pegasus. **Changes since FY03 Pres. Budget: AIM selected.**

Current Acquisitions	Actual *	Selection Method	Actual *	Performer	Actual *
Cooperative Agreements	100%	Full & Open Competition	100%	Industry	52%
Cost Reimbursable	0%	Sole Source	0%	Government	12%
Fixed Price	0%		100%	NASA Intramural	0%
Grants	0%			University	22%
Other	0%	Sci Peer Review	100%	Non Profit	14%
* 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 acquisitions are in place	n/a	n/a

AGREEMENTS

Internal: The programs is not dependent on other NASA activities outside of the control of the Associate Administrator of Space Science.

External: CINDI -- MOA with USAF. Solar-B LOA between NASA and ISAS, Febrrary 3, 2001; LOA between NASA and PPARC, March 24, 2000; MOU with ISAS in process. **Changes since FY03 Pres. Budget: None**.

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
SOLAR-B Indep Implement. Review	IPAO	Oct-02		Annual implementation review
CINDI Confirmation Review	GSFC	Nov-01	N/A	Approval to proceed into Dev. from the AA for Space Sci.
TWINS Confirmation Review	GSFC	Apr-99	N/A	Approval to proceed into Dev. from the AA for Space Sci.
AIM Confirmation Review	GSFC	N/A	Sep-03	Approval to proceed into Dev. from the AA for Space Sci.

BUDGET / LIFE CYCLE COST

Budget authority represents the Development Cost, including launch services for NASA missions. 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	53.4	32.6	19.9	54.5	28.3	10.8				199.3	
SOLAR-B	39.5	25.4	16.2	12.5	10.4					104.0	
CINDI	1.9	4.9	3.1	0.9						10.7	
TWINS	12.0	2.1	0.6	1.1	0.4					16.3	
AIM		0.2		40.0	17.5	10.8				68.4	
Changes since FY 03 Pres. Budget		+1.4		+43.7	+20.6	+10.8				+76.4	***Reason for Change:***
SOLAR-B				+2.7	+2.7					+5.4	full cost accounting
CINDI		+1.2		+0.4						+1.5	
TWINS				+0.6	+0.4					+1.0	NIAT Added/launch delay
AIM		+0.2		+40.0	+17.5	+10.8				+68.4	new mission
FY 2003 President's Budget	53.4	31.2	19.9	10.8	7.7					123.0	
SOLAR-B	39.5	25.4	16.2	9.8	7.7					98.6	
CINDI	1.9	3.7	3.1	0.5						9.2	
TWINS	12.0	2.1	0.6	0.5						15.2	
Initial Baseline	39.5	25.5	16.8	9.8	7.7					99.3	
SOLAR-B	39.5	25.5	16.8	9.8	7.7					99.3	CD 12/20/00 Launch Sept 05

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: Sun-Earth Connection (SEC)

DEVELOPMENT: Solar Dynamics Observatory (SDO)

PURPOSE

Objectives		Performance Measures
1.3, 5.13, 5.14, 6.1, 6.2, 6.3, 6.4, 7.1, and 7.2	Reference 2003 Strategic Plan	4SEC1, 3, 4, 5, 6, 7, 10-19

SDO will increase our understanding of how the Sun's magnetic field is generated and structured and how this stored magnetic energy is converted and released into the heliosphere and geospace in the form of solar wind, energetic particles, and variations in solar irradiance.

OVERVIEW

The Solar Dynamics Observatory (SDO) is a cornerstone mission within the Living With a Star (LWS) program. SDO will increase the scientific understanding of how the Sun's magnetic field is generated and structured and how this stored magnetic energy is converted and released into the heliosphere and geospace in the forms of solar wind, energetic particles, and variations in solar irradiance. From geosynchronous Earth orbit, SDO's instrument suites will characterize the Sun's interior (including components of its magnetic activity), its surface, its corona, and the extreme ultraviolet irradiance beyond the corona. These data will be analyzed to improve the capability to predict solar variations (or space weather) and their effects on life on Earth and technological systems. The project includes funding for the spacecraft, launch vehicle, data analysis (6 years), project operations (5 years), education, and outreach. Prime mission operations should end five years and thirty days after launch. Each of the last four years of funding for data analysis is half the value of each of the first two years of funding. Phase A began in 8/2002 when awards for 3 SDO science investigations were announced. Funding guidelines are subject to change as the requirements and design mature and will be capped when SDO is confirmed to start Phase C.

Link to SDO Homepage for more information.

PROGRAM MANAGEMENT

Goddard Space Flight Center (GSFC) is responsible for mission management, design, integration, test, and operation. The GSFC Program Management Council (PMC) has SDO governing responsibility until March 2003. The Agency PMC subsequently assumes oversight until SDO is confirmed for implementation, at which time the Enterprise assumes governing responsibility. Enterprise official is Dr. Ed Weiler, Associate Administrator for Space Science at HQ. The Theme Director and the Point of Contact is Dr. Richard Fisher, Director of the Sun-Earth Connection Division at HQ. This program is in full compliance with NPG7120.5B.

TECHNICAL COMMITMENT

No technical commitments will be made until the mission is confirmed to start Implementation in early FY 2004. SDO guidelines are in the mission Formulation Authorization Document (FAD) and may change as the content of the mission requirements and design matures. The LWS Program Commitment Agreement (PCA) and Program Plan will also be signed when SDO is confirmed, because SDO is the first mission in the LWS Program.

Technical Specifications	FY04 President's Budget	Change from Baseline
Orbit	Geosynchronous	--
Prime mission life	5 years	--
Helioseismic and Magnetic Imager (HMI)	Study origin of solar variability through analysis of the Sun's interior and various components of its magnetic activity.	--
Extreme Ultraviolet Variability Experimen	Measure extreme ultraviolet irradiance and study it in	--
(EVE)	relationship with the Sun's magnetic features.	--
Solar Heliospheric Activity Research and Prediction Program (SHARPP)	Study the Sun's atmosphere and develop space weather predictions by using an Atmospheric Imaging Assember (AIA) and a white light coronograph (WCI).	--

Schedule	FY04 President's Budget	Change from Baseline
Start of Formulation	Aug-02	--
Initial Confirmation Review	Jun-03	--
Start of Implementation	Jan-04	--
Launch	Aug-07	--
End of Prime Mission	Sep-12	--

THEME: Sun-Earth Connection (SEC)

DEVELOPMENT: Solar Dynamics Observatory (SDO)

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

The selected investigations are: Helioseismic and Magnetic Imager (HMI) at Stanford University (with assistance from a Lockheed Martin team); Extreme Ultraviolet Variability Experiment (EVE) at the University of Colorado, Boulder, Laboratory for Atmospheric and Space Physics; and Solar Heliospheric Activity Research and Prediction Program (SHARPP) at the Naval Research Laboratory. SDO spacecraft and ground system will be built in-house at Goddard Space Flight Center. The launch vehicle will be purchased through Kennedy Space Center. International agreements with Italy, France, Belgium, and the United Kingdom will provide significant components of instruments.

Changes since FY03 Pres. Budget: None.

Current Acquisitions	Actual *	Selection Method	Actual *	Performer	Actual *
Cooperative Agreements	12%	Full & Open Competition	100%	Industry	0%
Cost Reimbursable	0%	Sole Source	0%	Government	12%
Fixed Price	27%		100%	NASA Intramural	88%
Grants	0%			University	0%
Other	61%	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. Instrument Contracts	Fall 03	100% F&O Competition, 100% Cost type contracts.
2. Ground system Contracts	Fall 03	100% Sci Peer Review, 20% University, 11% Non Profit.
3. Support Service contract extensions	Fall 03	

AGREEMENTS

Internal: Dependence on other NASA activities outside of the control of the Associate Administrator of Space Science will be established when the Living With a Star (LWS) PCA is baselined at SDO's Confirmation Review.

External: Letters of Agreement with International Co-Investigators were initiated when instrument investigations were awarded (8/2002).

Changes since FY03 Pres. Budget: None.

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
Before Initial Confirm. Review (IRC)	(IRT) Indep. Review Team	N/A	Sep-03	Confirm to start Phase B; obtain a life cycle cost estimate as directed by Congress (tentative date).
Non-Advocate Rev.(NAR)	IRT		Mar-03	Seek approval to start Implementation (tentative date).
Critical Design Review	IRT		TBD	

BUDGET / LIFE CYCLE COST

Total budget authority represents the Life Cycle Cost (LCC). These figures include…

Budget Authority ($ in millions)	Prior	FY02	FY03	FY04	FY05	FY06	FY07	FY08	BTC	Total	Comments
FY 2004 President's Budget (LCC)	1.7	8.6	26.6	66.2	90.0	98.9	88.5	20.0		400.5	Confirm. Review sched. 12/03
Development	1.7	8.6	26.6	66.2	90.0	98.9	88.5	20.0		400.5	MO & DA are included in Dev.
Operations											Baseline
Data Analysis											
Changes since FY 03 Pres. Budget	+1.7	+8.6	+26.6	+66.2	+90.0	+98.9	+88.5	+20.0		+400.5	***Reason for Change:***
Development	+1.7	+8.6	+26.6	+66.2	+90.0	+98.9	+88.5	+20.0		+400.5	new mission
Operations											
Data Analysis											

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: Sun-Earth Connection (SEC)

OPERATIONS

PURPOSE

Objectives		Performance Measures
1.3, 5.13, 5.14	Reference 2003 Strategic Plan	4SEC4-11

The Sun-Earth Connection Operation's objective is to safely and efficiently operate these scientific satellites. This program element sponsors the maintenance of existing mission operations infrastructure and the development of new control center capabilities at GSFC.

OVERVIEW

Within the SEC Theme there are currently 14 operational Space Science missions. These include the venerable Voyager spacecraft and SOHO and TRACE. Also included is the TIMED mission which is the first of the STP missions. Many missions involve foreign partners, including ESA and ISAS. In FY06, this program element will include the operations for STEREO and AIM. The program element also supports the multi-mission operations activities at GSFC. These multimission activities support both current and future missions for the SEC, ASO, and SEU themes.

Link to Office of Space Science Missions homepage for more information
http://spacescience.nasa.gov/missions/index.htm

PROGRAM MANAGEMENT

Enterprise official is Ed Weiler, Associate Administrator for Space Science at HQ. The Theme Director and the Point of Contact is Richard Fisher, Director of the Sun-Earth Connection Division at HQ. TIMED operations are managed by the J. Hopkins University Applied Physics Laboratory. Ulysses and Voyager are managed by the Jet Propulsion Laboratory. All other activities are managed by the Goddard Space Flight Center. The program is in full compliance with NPG7120.5B.

TECHNICAL COMMITMENT

The baseline for all SEC Theme missions is defined in their respective PCAs or equivalent documentation.

Technical Specifications	FY04 President's Budget	Change from Baseline
All missions will meet Level I specifications as identified in the Program Plan.		Unchanged

Mission Schedule	Launch Date	Status	Change from Baseline
SOHO	Dec. 2, 1995	Mission Extended	--
Wind	Nov. 1, 1994	Mission Extended	--
Polar	Feb. 24, 1996	Mission Extended	--
Geotail	July 24, 1992	Mission Extended	--
TIMED	Dec. 7, 2001	Prime Mission thru 12/03	--
Ulysses	Oct. 6, 1990	Mission Extended	--
Voyager	Aug. 20, 1977	Mission Extended	--
ACE	Aug. 25, 1997	Mission Extended	--
FAST	Aug. 21, 1996	Mission Extended	--
IMP-8	Oct. 26, 1973	Terminated Oct 2001	--
SAMPEX	July 3, 1992	Mission Extended	--
TRACE	Apr. 1, 1998	Mission Extended	--
RHESSI	Feb. 5, 2002	Prime Mission thru 2/05	--
IMAGE	Mar. 25, 2000	Mission Extended	--

THEME: Sun-Earth Connection (SEC)

OPERATIONS

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

This element contains approximately twenty project tasks ranging from the operation of spacecraft at university sites and NASA Centers, engineering support, and engineering research to improve the technology state to be employed in future mission control centers. Six of the SEC satellite control centers and certain enginnering support services are located at GSFC and are staffed via Consolidated Space Operations Contract (CSOC) under Lockheed Martin. This contract covers 5 years of operations, and will terminate in FY04. **Changes since FY03 Pres. Budget: None.**

Current Acquisitions	Actual *	Selection Method	Actual *	Performer	Actual *
Cooperative Agreements	0%	Full & Open Competition	89%	Industry	59%
Cost Reimbursable	75%	Sole Source	11%	Government	
Fixed Price	1%		100%	NASA Intramural	19%
Grants	0%			University	22%
Other	24%	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. CSOC recompetition	Late 2003	100% Full & Open Competition

AGREEMENTS

Internal: The program is not dependent on activities outside of the control of the Associate Administrator for Space Science.

External: Three of the program elements depend on international agreements with ESA (SOHO and Ulysses) and ISAS (Geotail).

Changes since FY03 Pres. Budget: None.

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
Senior Review	External panel	9-Jul-01	17-Jun-03	To consider mission extensions and funding levels for operating SEC spacecraft that have completed their prime mission, based on science productivity and cost.

BUDGET

Budget Authority ($ in millions)		FY02	FY03	FY04	Comments
FY 2004 President's Budget	0.0	37.0	43.5	57.3	
SOHO		3.6	0.9	2.8	
TIMED		3.5	3.1	1.6	
Voyager		1.8	0.8	2.0	
STEREO					
Multi-Miss. Ops		20.3	37.4	44.2	
All Other SEC Operations		7.8	1.3	6.7	
Changes since FY 03 Pres. Budget		+0.0		+14.3	realignment with DA; Full Cost
SOHO		-0.9		+2.4	
TIMED				+1.6	
Voyager		+0.4			
STEREO					
Multi-Miss. Ops		+1.5		+3.9	
All Other SEC Operations		-1.0		+6.4	

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: Sun-Earth Connection (SEC)

RESEARCH

PURPOSE

Objectives		Performance Measures
1.3, 5.13, 5.14, 6.1, 6.2, 6.3, 6.4, 7.1, and 7.2	Reference 2003 Strategic Plan	4SEC2, 4SEC4-19

SEC 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 by spacecraft so that we can answer specific questions posed and fit them into the overall picture of the Sun, its environment, and solar effects on Earth.

OVERVIEW

The SEC research element funds a variety of programs including, SEC Research and Analysis (R&A); the analysis of data (DA) from SEC operating missions; the suborbital program for sounding rockets and their payloads; and the science data tools and archives needed to perform 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 provide the new theories and instrumentation that guide future investigations. The alignment of Research programs with SEC 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 scientific 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."

NASA Research Opportunities http://research.hq.nasa.gov/code_s/code_s.cfm
http://spacescience.nasa.gov/missions/opmsns.htm
Link to Rockets http://www.wff.nasa.gov/pages/soundingrockets.html

PROGRAM MANAGEMENT

The Sun-Earth Connection Research program responsibility is retained at Headquarters. The NASA Program Management Council (PMC) has SEC governing responsibility. Enterprise official is dr. Ed Weiler, Associate Administrator for Space Science at HQ. The Theme Director and the Point of Contact is Dr. Richard Fisher, Director of the Sun-Earth Connection Division at HQ. The program is in full compliance with NPG7120.5B.

TECHNICAL COMMITMENT

The baseline for all SEC Theme missions is defined in their respective PCAs or equivalent documentation. Content of R&A is defined in each individual Research Announcement.

Technical Specifications	FY04 President's Budget	Change from Baseline
The NASA Strategic Plan has incorporated results of the OSS Strategic Planning process, which specifies a series of goals, strategic objectives and research focus areas. The OSS Strategic Plan draws from the Solar and Space Physics Decadal Survey (NRC) as well as the road mapping activities by the Sun-Earth Connection Advisory Subcommittee (SECAS). All selections processes and reviews of the elements of the SEC 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	--
Sounding Rockets		
Research Opportunities In Space Science (ROSS)	Campaigns run all year	--

THEME: Sun-Earth Connection (SEC)

RESEARCH

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

The Research and Analysis (R&A), Data Analysis (DA), and Sounding Rockets programs make awards following peer-reviewed competitions under NASA Research Announcements (NRAs), Announcements of Opportunity (AOs), and Cooperative Agreement Notices (CANs). The Sounding Rocket program has a prime contractor selected via competitive procurement through a Request for Proposals (RFPs). In FY 02, direct procurement represented 100% of budget authority. **Changes since FY 03 Pres. Budget: None.**

Current Acquisitions	Actual *	Selection Method	Actual *	Performer	Actual *
Cooperative Agreements	1%	Full & Open Competition	95%	Industry	33%
Cost Reimbursable	41%	Sole Source	5%	Government	7%
Fixed Price	4%		100%	NASA Intramural	7%
Grants	40%			University	42%
Other	14%	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: Four of the program elements depend on international agreements with ESA (SOHO, Cluster, and Ulysses) and ISAS (Geotail).

Changes since FY03 Pres. Budget: None.

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
SEC MO&DA Senior Review	Sr. Review committee	July 2001	June 2003	To recommend approval and funding level for extending science investigations of the operating SEC missions.
R&A peer review	Peer review committee	Summer 2002	Summer 2003	To review SEC proposals to the annual R&A announcement.

BUDGET

Budget Authority ($ in millions)	FY02	FY03	FY04	Comments
FY 2004 President's Budget	140.6	124.3	178.3	
SEC Research and Analysis	29.0	30.6	35.2	
Science Data & Computing Tech.	19.3	11.5	15.0	
SOHO Data Analysis	11.0	10.4	14.1	
SEC Data Analysis	53.7	41.5	69.7	
Sounding Rockets	27.6	30.3	44.3	
Changes since FY 03 Pres. Budget			+46.3	Programmatic Changes and Full Cost.
SEC Research and Analysis			+2.2	
Science Data & Computing Tech.			+3.8	
SOHO Data Analysis			+2.6	
SEC Data Analysis			+24.0	
Sounding Rockets			+13.7	

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: Sun-Earth Connection (SEC)

TECHNOLOGY AND ADVANCED CONCEPTS

PURPOSE

Objectives		Performance Measures
1.3, 5.13, 5.14	Reference 2003 Strategic Plan	4SEC5, 6, 9-11

The SEC 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. In SEC, future missions will seek to understand how changes in solar activity change the Earth's ionosphere, thermosphere, and radiation belts, and how mass and particle ejections from the Sun propagate to the Earth and other planets. Technologies critical to the success of these missions include spacecraft and instrument technologies for microsats and nanosats, solar sails and improved conventional propulsion, and improved power and communications technologies.

OVERVIEW

Technology and Advanced Concepts are dedicated to mission studies, and the pre-concept and formulation phases of flight projects. Space science programs and projects use an aggressive technology development approach that requires all major technology hurdles to be cleared prior to a science mission's development phase. During pre-concept and formulation phases of missions, scientists work collaboratively with technologists and mission designers to develop the most effective alignment of technology development programs with future missions. This collaboration enables intelligent technology investment decisions through detailed analysis of the trade-offs between design considerations and cost. In order to ensure that the decisions resulting from mission studies are realistic and can be implemented, the studies employ new techniques for integrated design. SEC includes the following pre-development components: the Solar Terrestrial Probe (STP) Program's Magnetospheric Multiscale (MMS) and Global Electrodynamics Connection (GEC) missions, the Living With a Star (LWS) Program's Solar Dynamics Observatory (SDO) and Geospace Ionosphere/Thermosphere Mapper (I/TM) missions; and Future Explorer missions that are not yet selected. Also included is the New Millennium Program (NMP), which provides a path to flight-validate key emerging technologies to enable more capable and more frequent science missions.

PROGRAM MANAGEMENT

The Office of Space Science is responsible for all SEC programs. The Enterprise Program Management Council is the Governing Program Management Council (GPMC) for the Solar Terrestrial Probes (STP) and Living With a Star Programs (LWS) (until SDO is confirmed for Implementation). After SDO is confirmed to start Implementation, the GPMC for the LWS Program is the Enterprise Program Management Council. GSFC is the GPMC for the Explorers Program, and JPL is the GPMC for the New Millennium Program (NMP). Enterprise official is Dr. Edward Weiler, Associate Administrator for Space Science at HQ. The Theme Director and the Point of Contact is Dr. Richard Fisher, Director of the Sun-Earth Connection Division at HQ. The 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
New Millennium Program Space Technology-5 (ST-5)	Tests advanced technologies in space flight. Demonstrate and flight qualify a set of nanosats for application to future space missions.	
Solar Terrestrial Probes Magnetospheric Multiscale	Understand fundamental processes that connect broad ranges of the magnetosphere.	No established baseline until confirmation.

THEME: Sun-Earth Connection (SEC)

TECHNOLOGY AND ADVANCED CONCEPTS

TECHNICAL COMMITMENT - CONTINUED

Technical Specifications - Continued	FY04 President's Budget	Change from Baseline
Solar Terrestrial Probes Global Electrodynamic Connections	Study the roles the ionosphere-thermosphere plays in the coupling between the magnetosphere and the upper atmosphere.	No baseline until confirmation.
Living With a Star Ionosphere-Thermosphere Mapper (Geospace Mission)	Study effects of changes in solar activity on the Earth's ionosphere & thermosphere.	No baseline until confirmation.
Living With a Star Radiation Belt Mapper (Geospace Mission)	Study effects of changes in solar activity on the Earth's radiation belts.	No baseline until confirmation.

Schedule	FY04 President's Budget	Change from Baseline
STP - MMS Launch	Jan-09	No baseline until confirmation.
STP - GEC Launch	Sep-09	No baseline until confirmation.
LWS - SDO Launch	Aug-07	No baseline until confirmation.
LWS - ITM Launch	Aug-08	No baseline until confirmation.
LWS - RBM Launch	Aug-10	No baseline until confirmation.
NMP ST-5	Oct-04	5-month slip; Launch Readiness Date at Confirmation was May-04.

ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS

Major acquisitions are: Phase A studies for STP MMS; instrument investigations and spacecraft provider for STP GEC; instrument investigations and spacecraft provider for LWS Geospace Mission - ITM; and LWS SDO spacecraft and instrument hardware.

Changes since FY03 Pres. Budget: None

Current Acquisitions	Actual *	Selection Method	Actual *	Performer	Actual *
Cooperative Agreements	1%	Full & Open Competition	90%	Industry	8%
Cost Reimbursable	39%	Sole Source	10%	Government	20%
Fixed Price	3%		100%	NASA Intramural	18%
Grants	19%			University	52%
Other	38%	Sci Peer Review	100%	Non Profit	2%
* as % of FY02 direct procurement	100%	* as % of FY02 direct procurement		* as % of FY02 direct procurement	100%

Future Acquisitions - Major	Selection	Goals
1.Phase A studies MMS	Summer 03	85% Full & Open Competition, 15% GSFC mgmt
2.Instrument investigations & Phase A studies - GEC	Mar 03	85% Full & Open Competition, 15% GSFC mgmt
3.Instrument investigations & spacecraft-ITM-GM	Winter 03	40% Full & Open Comp (Instruments); 60% APL Sole Source

THEME: Sun-Earth Connection (SEC)

TECHNOLOGY AND ADVANCED CONCEPTS

AGREEMENTS

Internal: The program is not dependent on other NASA activities outside of the control of the Associate Administrator of Space Science.

External: None at this time; may be baselined prior to mission confirmation.

Changes since FY03 Pres. Budget: None.

INDEPENDENT REVIEWS

Types of Review	Performer	Last Review	Next Review	Purpose
STP & STEREO Independent Review	IRT	Oct-02	Feb-03	STP & STEREO CDR
STP Program & STP MMS mission	STP IRT	Feb-02	Feb-03	MMS ICR to transition from Phase A to Phase B
LWS Program & LWS SDO NAR	LWS IRT		Dec-03	Confirm SDO for transition to Development

BUDGET

Budget Authority ($ in millions)	FY02	FY03	FY04	Comments
FY 2004 President's Budget (T&AC)	130.9	255.6	314.0	
New Millennium Program (NMP)	48.2	62.8	86.8	Includes ST-5
Future Explorers	13.5	96.4	118.0	
Solar Terrestrial Probes (STP)	3.7	12.9	43.5	Includes MMS and GEC
Living With a Star (LWS)	38.4	78.3	49.9	Includes ITM and RBM (see Development section for SDO)
Other Tech and Adv. Concepts	27.2	5.2	15.8	CoF funding
Changes since FY 03 Pres. Budget	-33.3	-26.6	-63.5	***Reason for Change:***
New Millennium Program (NMP)	-12.0		+8.0	
Future Explorers	-9.5		-45.1	realign to new missions
Solar Terrestrial Probes (STP)			+17.9	
Living With a Star (LWS)	-14.8	-26.6	-45.1	transfer SDO to Dev., transition
Other Tech and Adv. Concepts	+3.0		+0.8	to 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.