MULTI-YEAR PERFORMANCE TREND
Space Science Enterprise (SSE)

Solve mysteries of the universe.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #	9S1: Successfully launch seven spacecraft, within 10% of budget, on average.			
Assessment	Blue			
Annual Performance Goal and APG #	9S2: Measure the Hubble constant within an accuracy of about 10 percent, as compared to previous measurements that differ among themselves by a factor of two. (R&A)			
Assessment	Green			
Annual Performance Goal and APG #	9S3:Record 25 images and spectra at a resolution of better than an arcsecond, five to ten times sharper than images gathered earlier by the Einstein Observatory (CXO)	OS1: The Chandra X-ray Observatory (formerly AXAF) instrument will meet nominal performance expectations, and science data will be taken with 70% efficiency, with at least 90% of science data recovered on the ground.		
Assessment	Green	Green		

Space Science Enterprise (SSE)

Mission

The primary goal of the Space Science Enterprise is to chart the evolution of the universe from origins to destiny, and improve understanding of galaxies, stars, planets, and life (Figure 2). Within this goal, Enterprise objectives are to: understand the structure of the universe, from its earliest beginnings to its ultimate fate; explore the ultimate limits of gravity and energy in the universe; learn how galaxies, stars and planets form, interact, and evolve; look for signs of life in other planetary systems; understand the formation and evolution of the Solar System and Earth within it; probe the origin and evolution of life on Earth and determine if life exists elsewhere in our Solar System; understand our changing Sun and its effects throughout the Solar System; and chart our destiny in the Solar System. Other Enterprise goals include developing innovative technologies to support Space Science programs and making them available for other applications that benefit the Nation. Enterprise missions and research also yield scientific information of value for future exploration programs. Knowledge and discoveries will be shared with the public to enhance science, mathematics, and technology education and increase the scientific and technological literacy of all Americans.

Implementation Strategy

The Space Science Enterprise Performance Plan is tied directly to the Enterprise Strategic Plan. The Strategic Plan is based on science goals and objectives, with research and flight programs structured to implement these goals. The Enterprise continues to use scientific merit as the primary criterion for program planning and resource commitment. In implementing this program, the Enterprise will preserve safety as NASA's number one priority, with balanced risks between missions to ensure overall achievement of program goals.* Properly implemented, the "faster, better, cheaper" approach does not jeopardize this priority. Projects will not be approved for implementation until a clear technology path to successful implementation is demonstrated. These new technologies will be applied aggressively, within the constraints of prudent stewardship of public investment.

The Enterprise will continue to ensure the active participation of the research community outside NASA in planning, flight programs, research investigations, and peer review; this participation is viewed as being critical to the program's success. Collaborative efforts with other Federal agencies, such as the National Science Foundation, Department of Defense and Department of Energy, as well as with international partners, play a key role in the implementation strategy of the Enterprise. Finally, a fundamental consideration in planning and conducting all of our programs is the recognition that the national investment in space science is a public trust. The Enterprise places a very high priority on sharing the results and excitement of our programs through the formal education system and public engagement.

[*Note: Safety as it applies to human space flight does not apply to Space Science missions and would be prohibitively expensive if it did. Moreover, Space Science missions should not all have the same risk profile. For example, a balance of lower-risk (e.g., Chandra) and higher-risk (e.g., Explorer) missions should be used to maximize science return per dollar.]

Enterprise Resource Requirements

The President has requested the following budget for FY99 to FY02 to support the accomplishment of Space Science goals:

	FY 1999	FY 2000	FY 2001	FY 2002
NOA $M	2119	2,194	2,321	2,786
CS FTEs	1,846	2,362	2,173	2,187

FY02 Performance Metrics

Strategic Plan Goal:
Science: **Chart the evolution of the Universe, from origins to destiny, and understand its galaxies, stars, planets, and life.**

Objective: Understand the structure of the Universe, from its earliest beginnings to its ultimate fate.

Public Benefit: One of the great quests of the last half-millennium since the time of Copernicus has been to understand where humanity fits within the Cosmos: What is the age of the Universe? How did it begin and how will it end? What are its primary constituents and how do they interact? NASA's pursuits in the research focus areas are intended to answer these questions.

APG 2S1: Earn external review rating of "green," on average, on making progress in the following research focus areas:

- Identify dark matter and learn how it shapes galaxies and systems of galaxies.
- Determine the size, shape, age, and energy content of the universe.

Indicators

- Demonstrate significant progress toward the goal, as determined by external expert review.
- Obtain expected scientific data from 80% of operating missions supporting this goal (as identified and documented by Associate Administrator at beginning of fiscal year).

Objective: Explore the ultimate limits of gravity and energy in the Universe.

Public Benefit: The basic constituents of Nature interact via fundamental forces that are likely to be studied best by using the Universe as a giant laboratory of extreme environments. Understanding these forces will give us insight into the most important processes in Nature and may reveal "new physics" and new phenomena that cannot be created in any Earthbound laboratory.

APG 2S2: Earn external review rating of "green," on average, on making progress in the following research focus areas:

- Discover the sources of gamma ray bursts and high-energy cosmic rays.
- Test the general theory of relativity near black holes and in the early universe, and search for new physical laws, using the universe as a laboratory.
- Reveal the nature of cosmic jets and relativistic flows.

Indicators

- Demonstrate significant progress toward the goal, as determined by external expert review.
- Obtain expected scientific data from 80% of operating missions supporting this goal (as identified and documented by Associate Administrator at beginning of fiscal year).

Objective: Learn how galaxies, stars, and planets form, interact, and evolve.

Public Benefit: Life on Earth is the product of a complex sequence of events, which are at present only approximately understood. This sequence begins with the birth of the galaxies and continues through the creation of heavy elements inside stars and the birth of stars and other planetary systems. To understand how life arose on Earth, and perhaps elsewhere, a complete understanding of the entire "thread of life" in the Cosmos is necessary.

APG 2S3: Earn external review rating of "green" on average, on making progress in the following research focus areas:

- Observe the formation of galaxies and determine the role of gravity in this process.
- Establish how the evolution of a galaxy and the life cycle of stars influence the chemical composition of material available for making stars, planets, and living organisms.
- Observe the formation of planetary systems and characterize their properties.
- Use the exotic space environments within our Solar System as natural science laboratories and cross the outer boundary of the Solar System to explore the nearby environment of our galaxy.

Indicators

- Demonstrate significant progress toward the goal, as determined by external expert review.
- Obtain expected scientific data from 80% of operating missions supporting this goal (as identified and documented by Associate Administrator at beginning of fiscal year).

Objective: Look for signs of life in other planetary systems.

Public Benefit: "Are we alone?" is one of the most profound questions that humanity can ask, and its answer will affect almost every aspect of how humans view themselves and their place in the Universe.

APG 2S4: Earn external review rating of "green" on average, on making progress in the following research focus areas:

- Discover planetary systems of other stars and their physical characteristics.
- Search for worlds that could or do harbor life.

Indicators

- Demonstrate significant progress toward the goal, as determined by external expert review.
- Obtain expected scientific data from 80% of operating missions supporting this goal (as identified and documented by Associate Administrator at beginning of fiscal year).

Objective: Understand the formation and evolution of the Solar System and the Earth within it.

Public Benefit: Earth and all of the other bodies in the Solar System formed at about the same time from a disk of gas and dust that surrounded the Sun. While these bodies share some similarities, there are striking differences among them. A fundamental goal of the NASA Space Science Enterprise is to understand the physical conditions and processes that led to those differences.

What do these differences imply about the response of Earth's environment to natural and manmade influences? What do they imply about the likelihood of Earth-like planets, potential habitats for life, circling other stars?

APG 2S5: Earn external review rating of "green," on average, on making progress in the following research focus areas:

- Inventory and characterize the remnants of the original material from which the Solar System formed.
- Learn why the planets in our Solar System are so different from each other.
- Learn how the Solar System evolves.

  Indicators
  - Demonstrate significant progress toward the goal, as determined by external expert review.
  - Obtain expected scientific data from 80% of operating missions supporting this goal (as identified and documented by Associate Administrator at beginning of fiscal year).

Objective: Probe the evolution of life on Earth, and determine if life exists elsewhere in our Solar System.

Public Benefit: The organizing principles of life and its origin(s) are very poorly known, but at the same time are essential to understanding the biosphere, the Earth's layer of life. Understanding the origin and early evolution of life on Earth will permit a deeper understanding of the robustness (or fragility) of terrestrial life, life's interactions with the non-living world, and the dangers that life faces in an occasionally-hostile environment.

APG 2S6: Earn external review rating of "green," on average, on making progress in the following research focus areas:

- Investigate the origin and early evolution of life on Earth, and explore the limits of life in terrestrial environments that might provide analogues for conditions on other worlds.
- Determine the general principles governing the organization of matter into living systems and the conditions required for the emergence and maintenance of life
- Chart the distribution of life-sustaining environments within our Solar System, and search for evidence of past and present life.
- Identify plausible signatures of life on other worlds.

  Indicators
  - Demonstrate significant progress toward the goal, as determined by external expert review.
  - Obtain expected scientific data from 80% of operating missions supporting this goal (as identified and documented by Associate Administrator at beginning of fiscal year).

Objective: Understand our changing Sun and its effects throughout the Solar System.

Public Benefit: Solar variability affects life and society by causing "space weather," which can affect space assets vital to the national economy (communications, weather, and military satellites), short wave radio communications, the electric power grid, and astronauts. Solar variability also is a natural driver of global climate change, which appears to have affected Earth's climate in the past.

APG 2S7: Earn external review rating of "green," on average, on making progress in the following research focus areas:

- Understand the origins of long- and short-term solar variability.

- Understand the effects of solar variability on the solar atmosphere and heliosphere.
- Understand the space environment of Earth and other planets.

  Indicators
  - Demonstrate significant progress toward the goal, as determined by external expert review.
  - Obtain expected scientific data from 80% of operating missions supporting this goal (as identified and documented by Associate Administrator at beginning of fiscal year).

Objective: Chart our destiny in the Solar System.

Public Benefit: The course of life on Earth has been profoundly altered by impacts of asteroids and/or comets. It is widely accepted that a major impact 65 million years ago led to the extinction of dinosaurs and cleared the way for the rise of mammals. An even greater impact more than 200 million years ago led to the extinction of about 90 percent of the species alive at the time. Impacts did not end in prehistoric times. In 1908, a fragment of a comet or asteroid leveled hundreds of square miles of forest in the remote Siberian region of Tunguska; had the object fallen about four hours later, it would have annihilated the city of St. Petersburg. It is estimated that there are between 700 and 1000 objects whose orbits cross Earth's (these are known as Near Earth Objects, or NEOs), that are large enough to cause global catastrophe if they were to strike Earth. NASA Space Science supports the search for such NEOs, with a goal of identifying at least 90 percent of them by the year 2008 (nearly 500 have been discovered to date). By identifying those objects that actually have a potential to collide with Earth, we expect to have decades of advance warning in which to take countermeasures, if necessary.

APG 2S8: Earn external review rating of "green," on average, on making progress in the following research focus areas:

- Understand forces and processes, such as impacts, that affect habitability of Earth.
- Develop the capability to predict space weather.
- Find extraterrestrial resources and assess the suitability of Solar System locales for future human exploration.

  Indicators
  - Demonstrate significant progress toward the goal, as determined by external expert review.
  - Obtain expected scientific data from 80% of operating missions supporting this goal (as identified and documented by Associate Administrator at beginning of fiscal year).

Objective: Support of Strategic Plan Science Objectives; Development/ Near-Term Future Investments (Supports all objectives under the Science Goal)

Public Benefit: NASA has been chartered by the American people to undertake challenging scientific explorations of our Solar System and the Universe beyond by building and launching missions that will achieve ambitious scientific goals. Missions in development have moved beyond study and preliminary design, and into detailed design and fabrication. Once launched and operational, the images and data they provide will advance our understanding of our Solar System and the Universe in which we live.

APG 2S9: Earn external review rating of "green" on making progress in the following area:

- Design, develop, and launch projects to support future research in pursuit of Strategic Plan science objectives.

Indicator

Meet no fewer than 75% of the development performance objectives for "major programs/projects," supported by completion of performance objectives in majority of "other projects."

Major Programs/Projects:

- Hubble Space Telescope (HST) Development: Begin system test of the Cosmic Origins Spectrograph (COS).
- Hubble Space Telescope (HST) Development: Advanced Camera for Surveys (ACS) and Solar Array 3 (SA3) will be ready for flight and installation on Servicing Mission 3B.
- Space Infrared Telescope Facility (SIRTF) Development: Complete integration and test (I&T) of spacecraft and payload.
- Stratospheric Observatory for Infrared Astronomy (SOFIA) Development: Complete installation of the forward pressure bulkhead.
- Gravity Probe-B (GP-B) Development: Initiate flight vehicle integration and test (I&T).
- Mars Exploration Rover '03 Development: Initiate assembly, test and launch operations (ATLO) process.
- Mars Reconnaissance Orbiter '05 Development: Select payload and initiate development.
- Solar Terrestrial Relations Observatory (STEREO) Development: Have contracts in place for start of spacecraft and instrument detailed design and fabrication.

Other Projects:

- Swift Gamma Ray Burst Explorer (Swift) Development: Complete build-up of spacecraft subsystems.
- Full-sky Astrometric Mapping Explorer (FAME) Development: Conduct Confirmation Review.
- Galaxy Evolution Explorer (GALEX) Development: Complete environmental testing.
- Comet Nucleus Tour (CONTOUR) Development: Complete environmental testing.
- Mercury Surface, Space Environment, Geochemistry and Ranging (MESSENGER) Mission Development: Conduct Critical Design Review (CDR).
- Solar-B Development: Conduct the Pre-Environmental Review for the U.S.-provided Extreme Ultraviolet Imaging Spectrometer (EIS).
- Planck Development: Complete the High-Frequency Instrument (HFI) flight detectors.

Strategic Plan Goal:

Technology/Long-Term Future Investments: **Develop new technologies to enable innovative and less expensive research and flight missions.**

Objectives: Acquire new technical approaches and capabilities. Validate new technologies in space. Apply and transfer technology.

Public Benefit: NASA must be a prudent steward of the taxpayers' money by investing in essential technologies that are clearly relevant to future missions. This important principle includes consideration of the possibilities for commercialization, as well as options for using key technologies for multiple missions.

APG 2S10: Earn external review rating of "green" on making progress in the following technology development area:

- Focus technology development on a well-defined set of performance requirements covering the needs of near-term to mid-term strategic plan missions.

  Indicator

  Meet no fewer than 66% of the performance objectives for technology development.
  - Next Generation Space Telescope (NGST): Downselect to single Phase II prime contractor.
  - Space Interferometry Mission (SIM): Use the Microarcsecond Metrology (MAM-1) Testbed to demonstrate metrology at the 200-picometer level with white light fringe measurements. (Accomplishing this level of performance is required in order for SIM to identify multi-planet solar systems out to 10 parsecs.)
  - Terrestrial Planet Finder (TPF): Provide studies and integrated models of mission architecture concepts.
  - Gamma-ray Large Area Space Telescope (GLAST): Conduct Large Area Telescope Preliminary Design Review (PDR).
  - Herschel Space Observatory: Complete the SPIRE qualification model detectors.
  - StarLight: Conduct Preliminary Design Review (PDR).
  - Outer Planets Program: Complete evaluation and restructuring of Outer Planets Program.
  - In-Space Propulsion: Compete and select Phase I award(s) for electric propulsion technology development.
  - Living With a Star: Announce instrument investigations for Solar Dynamics Observatory (SDO) mission.

Public Benefit: Careful stewardship of public money requires that challenging new technologies be evaluated via cost-effective demonstration and precursor missions so that NASA's most ambitious research facilities can be reliably developed using proven technologies.

APG 2S11: Earn external review rating of "green" on making progress in the following technology validation area:

- Formulate and implement cost-effective space demonstrations of selected technologies on suitable carriers.

  Indicator

  Meet no fewer than 66% of the performance objectives for flight validation.
  - Flight Validation/New Millennium Program: Conduct Space Technology 6 (ST-6) Confirmation Review.
  - Flight Validation/New Millennium Program: Conduct New Millennium Carrier-1 (NMC-1) Confirmation Review.
  - Flight Validation/New Millennium Program: Conduct Space Technology 5 (ST-5) Critical Design Review (CDR).

Strategic Plan Goal:
Education and Public Outreach: **Share the excitement and knowledge generated by scientific discovery and improve science education.**

Objectives: Share the excitement of space science discoveries with the public. Enhance the quality of science, mathematics, and technology education, particularly at the pre-college level. Help create our 21st Century scientific and technical workforce.

Public Benefit: Space Science Enterprise education and public outreach goals center on sharing the results of our missions and research programs with wide audiences and using space science discoveries as vehicles to improve teaching and learning at all levels. This is a deliberate expansion of the traditional role of the Enterprise in supporting graduate and postgraduate professional education, a central element of meeting our responsibility to help create the scientific workforce of the future. Our commitment to education includes a special emphasis on pre-college education and on increasing the general public's understanding and appreciation of science, mathematics, and technology.

APG 2S12: Earn external review rating of "green," on average, on making progress in the following focus areas:

- Incorporate a substantial, funded education and outreach program into every space science flight mission and research program.
- Increase the fraction of the space science community that contributes to a broad public understanding of science and is directly involved in education at the pre-college level.
- Establish strong and lasting partnerships between the space science and education communities.
- Develop a national network to identify high-leverage education and outreach opportunities and to support long-term partnerships.
- Provide ready access to the products of space science education and outreach programs.
- Promote the participation of underserved and underutilized groups in the space science program by providing new opportunities for minorities and minority universities to compete for and participate in space science missions, research, and education programs.
- Develop tools for evaluating the quality and impact of space science education and outreach programs.

Indicator

Meet no fewer than six (75%) of the eight performance objectives for education and public outreach (E/PO).

- Ensure that every mission initiated in FY 2002 has a funded E/PO program, with a comprehensive E/PO plan prepared by its Critical Design Review (CDR).
- Ensure that by the end of FY 2002, ten percent of all research grants have an associated E/PO program underway.
- Plan and/or implement Enterprise-funded E/PO activities taking place in at least forty states.
- Ensure that at least ten Enterprise-funded research, mission development or operations, or education projects are underway in Historically Black Colleges and Universities, Hispanic Serving Institutions, and Tribal Colleges, with at least three being underway in an institution of each type.
- Provide exhibits, materials, workshops, and personnel at a minimum of five national and three regional education and outreach conferences.
- Ensure that at least eight major Enterprise-sponsored exhibits or planetarium shows will be on display or on tour at major science museums or planetariums across the country.
- Prepare the second comprehensive Space Science Education/Outreach Report describing participants, audiences, and products for Enterprise E/PO programs.
- Initiate a major external review of the accomplishments of the Space Science E/PO efforts over the past five years, and complete a pilot study directed towards the eventual development of a comprehensive approach to assessing the E/PO program's long-term effectiveness and educational impact. Use the preliminary results of both studies to guide adjustments in program direction and content.

VERIFICATION AND VALIDATION

Internal Assessment and Verification

The Space Science program consists of numerous diverse components, and each component's performance must be assessed in an appropriate way. For some program elements, such as mission and technology development, achievement of major milestones can be assessed through routine project management reviews. For missions in an operational phase, success can be gauged in terms of operating efficiency or major data sets returned. In each of these cases, performance assessment data is retrieved from normal project management reporting during the course of the fiscal year, and is verified and validated by the cognizant Program Executive or Program Scientist.

External Assessment and Verification

For the basic research programs, evaluation must consider important contextual factors such as: the relative value of the research objectives; progress toward those objectives; productivity by prevailing research community standards; and impact on related research funded or performed by other agencies. Measures such as number of grants or scientists supported, publication counts, or research citations are not able to capture these important aspects of the evaluation requirement. The best way to assess research programs has been demonstrated to be an external peer review approach. The Enterprise will employ this mechanism to qualitatively assess the progress of its programs in basic research and data analysis against Enterprise strategic plan science goals and objectives. The reviews will determine whether outcomes of these programs are fully effective, are not as strong as desired but have returned results of significant value, or are not scientifically or technologically competitive. The review process will also identify those programs that have produced important unexpected results or have contributed to an unanticipated degree to other research.

External Validation

At the conclusion of the assessment and verification process, the performance results will be reviewed and validated by the NASA Advisory Council.

Solve mysteries of the universe.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #	9S4: Record data on approximately 12 compact stellar objects with a sensitivity 50 times greater than the Einstein Observatory.(CXO)			
Assessment	Green			
Annual Performance Goal and APG #	9S5: Observe physical phenomena 25,000 times closer to the event horizon of black holes than permitted with optical wavelength measurements. (RXTE)	OS2:The baseline RXTE mission ended in 1997; the target for FY00 is to operate at least three of the five instruments at an efficiency of 45%, with 95% data recovery; All Sky Monitor data will be posted on the web within 7 days, and Proportional Counter Array and High-Energy X-ray Timing Experiment data will be released within 60 days.		
Assessment	Green	Green		
Annual Performance Goal and APG #		OS3: Complete final integration and test of the Gravity Probe-B science payload with the spacecraft in August 2000.		
Assessment		Yellow		

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	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		OS4: Successfully install and activate three key Hubble upgrades during the third servicing mission: flight computer, advanced camera, and solar arrays. Maintain an average on-target pointing efficiency of 35% during FY00 operations before they are interrupted for the third servicing mission, presently scheduled for May 2000.		
Assessment		Yellow		
Annual Performance Goal and APG #		OS43: Complete the SOFIA 747 Section 46 mockup test activity during June 2000, with no functional test discrepancies that would invalidate CDR-level designs and cause significant design rework, with attendant cost and schedule impact.		
Assessment		Green		

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	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S5: Deliver the SIRTF Infrared Array Camera (IRAC), Multiband Imaging Photometer (MIPS), and Infrared Spectrograph (IRS) instruments during April 2000. The instruments shall perform at their specified levels at delivery.		
Assessment		Yellow		
Annual Performance Goal and APG #		0S6: Prepare the INTEGRAL Science Data Center (ISDC) for data archiving and prepare instrument analysis software for the spectrometer on INTEGRAL (SPI) instrument within 10% of estimated cost.		
Assessment		Green		
Annual Performance Goal and APG #		0S7:Assemble and successfully test the breadboard cooler for ESA's Planck mission in April 2000.		
Assessment		Yellow		

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	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S8: Deliver the GALEX science instrument from JPL to the Space Astrophysics Laboratory at Caltech during April 2000 for science calibration. The instrument will be fully integrated, functionally tested, and environmentally qualified at the time of the scheduled delivery.		
Assessment		Yellow		
Annual Performance Goal and APG #		0S9: Begin system-level environmental testing of the MAP spacecraft during July 2000.		
Assessment		Green		
Annual Performance Goal and APG #		0S11:The baseline mission of the CGRO ended in 1996; the target for FY00 is to continue to operate those instruments not dependent on expended consumables (Oriented Scintillation Spectrometer Experiment, OSSE; Burst and Transient Source Experiment, BATSE; and Imaging Compton Telescope, COMPTEL) at an average efficiency of at least 60%.		
Assessment		Green		

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	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S12: The 3-year FUSE mission will complete at least one-third of the observations needed for its minimum science program, with six of the eight instrument performance parameters being met.		
Assessment		Green		
Annual Performance Goal and APG #		0S15: The prime mission of SAMPEX ended in 1995; the FY00 target is to obtain at least 60% data coverage from at least three of SAMPEX's four instruments.		
Assessment		Green		
Annual Performance Goal and APG #		0S14: If launched, activate the XRS and XIS instruments on the Japanese Astro-E spacecraft after launch and collect at least 90% of the XRS and XIS data.		
Assessment		Red		

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	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S53: Complete the NGST Developmental Cryogenic Active Telescope Testbed (DCATT) phase 1, measure ambient operation with off-the-shelf components, and make final preparations for phase 2, the measurement of cold telescope operation with selected "flight-like" component upgrades.		
Assessment		Red		
Annual Performance Goal and APG #		0S62: Demonstrate performance of the Superconductor-Insulator-Superconductor (SIS) mixer to at least 8hv/k at 1,120 GHz and 10hv/k at 1,200 GHz. The U.S. contribution to the ESA FIRST is the heterodyne instrument, which contains the SIS receiver.		
Assessment		Yellow		
Annual Performance Goal and APG #		0S63: The prototype primary instrument for GLAST will demonstrate achievement of the established instrument performance level of angular resolution of 3.5 degrees across the entire 20-MeV to 100-GeV energy range.		
Assessment		Green		

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	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S65: Based on an overall goal of successfully launching 25 sounding rocket missions, at least 23 payloads shall successfully achieve their required altitude and orientation, and at least 21 investigators shall achieve their minimum mission success goals.		
Assessment		Red		
Annual Performance Goal and APG #		0S66: Based on an overall goal of conducting 26 worldwide science and technology demonstration balloon missions, at least 23 campaigns shall successfully achieve altitude and distance, and investigators' instrumentation shall function as planned for at least 19 missions.		
Assessment		Red		
Annual Performance Goal and APG #			1S1: Successfully develop and launch no fewer than three of four planned missions within 10% of budget and schedule. Missions are: GALEX, MAP, GP-B, and CATSAT. (Indicators have also been established for other missions in development.)	
Assessment			TBD	

Solve mysteries of the universe.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #			1S2: Obtain expected scientific data from at least 80% of operating missions. Missions are: HST, CXO, XTE, ACE, FUSE, SWAS, and, if successfully launched, GALEX, and GP-B.	
Assessment			TBD	
Annual Performance Goal and APG #			1S3: Perform innovative scientific research and technology development by meeting technology development objectives for major projects, by achieving mission success in astronomy rocket and balloon flights, and by making satisfactory research progress in related Research and Analysis (R&A) and Data Analysis (DA) programs. Meet no fewer than 66% of the performance objectives for the following technology and research programs NGST, Herschel (FIRST), GLAST, Sounding Rockets, Balloons, and R&A. Achieve a "fully effective" (green) overall science achievement rating from the Space Science external advisory committee. (#1S3)	
Assessment			TBD	

Understand the structure of the Universe, from its earliest beginnings to its ultimate fate.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #				2S1: Earn external review rating of "green," on average, on making progress in the following research focus areas: • Identify dark matter and learn how it shapes galaxies and systems of galaxies. • Determine the size, shape, age, and energy content of the universe.
Assessment				TBD

Explore the ultimate limits of gravity and energy in the Universe.

Annual Performance Goal and APG #				2S2: Earn external review rating of "green," on average, on making progress in the following research focus areas: • Discover the sources of gamma ray bursts and high-energy cosmic rays. • Test the general theory of relativity near black holes and in the early universe, and search for new physical laws using the universe as a laboratory. • Reveal the nature of cosmic jets and relativistic flows.
Assessment				TBD

Learn how galaxies, stars, and planets form, interact, and evolve.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #				2S3: Earn external review rating of "green," on average, on making progress in the following research focus areas: • Observe the formation of galaxies and determine the role of gravity in this process. • Establish how the evolution of a galaxy and the life cycle of stars influence the chemical composition of material available for making stars, planets, and living organisms. • Observe the formation of planetary systems and characterize their properties. • Use the exotic space environments within our Solar System as natural science laboratories and cross the outer boundary of the Solar System to explore the nearby environment of our galaxy.
Assessment				TBD

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #	9S6: Orbit Eros closer than 50 kilometers, 20-30 times closer than previous asteroid flybys. (NEAR)	0S16: NEAR will successfully orbit 433 Eros and meet primary scientific objectives while not exceeding projected mission cost by more than 10%.		
Assessment	Yellow	Green		
Annual Performance Goal and APG #	9S7: Measure the shape of Eros to an accuracy of 1 kilometer or better, about 10 times better than previous measurements, and measure the asteroid's mass to an accuracy of 20 percent. (NEAR)			
Assessment	Green			
Annual Performance Goal and APG #	9S8: Complete the first direct compositional measurements of an asteroid. (NEAR)			
Assessment	Yellow			
Annual Performance Goal and APG #	9S9: Map the 75 to 80 percent of the Moon's surface not accessible during the Apollo missions conducted from 1969 to 1972. (Lunar Prospector)			
Assessment	Green			

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #	9S10:Provide definitive measurements of the weak lunar magnetic field. (Lunar Prospector)			
Assessment	Green			
Annual Performance Goal and APG #	9S11: Provide these data with spatial resolution five times better than were collected from the Yohkoh Soft X-ray Telescope. (TRACE)	0S17: Collect pixel-limited images in all Transition Region and Coronal Explorer (TRACE) wavelength bands, operating 24-hour schedules for sustained periods over eight months.		
Assessment	Green	Green		
Annual Performance Goal and APG #		0S29: Deliver the Mars '01 Orbiter and Lander science instruments that meet capability requirements by June 1, 2000; prelaunch Gamma Ray Spectrometer (GRS) tests shall determine abundances in known calibration sources to 10% accuracy.		
Assessment		Yellow		

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S30: Assuming the Mars Surveyor program architecture is confirmed, meet the milestones for the Mars 03 instrument selection and initiate implementation of the Lander mission. Deliver engineering models of the radio-frequency subsystem and antennae for the radar sounder instrument to ESA (if ESA approves the Mars Express mission), and select the contractors for the major system elements of the Mars Surveyor 05 mission.		
Assessment		Yellow		
Annual Performance Goal and APG #		0S20: The Rosetta project will deliver the electrical qualification models for the four U.S.-provided instruments to ESA in May 2000 for integration with the Rosetta Orbiter.		
Assessment		Green		
Annual Performance Goal and APG #		0S18: The TIMED mission will be delivered on time for a planned May 2000 launch, within 10% of the planned development budget.		
Assessment		Yellow		

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S19:If successfully launched, the TIMED mission will acquire global data in the mesosphere and lower thermosphere/ionosphere region globally (all the latitudes) for at least 90 days at the required spatial resolution, coverage, and accuracy and for all local solar times.		
Assessment		Yellow		
Annual Performance Goal and APG #		0S21: Complete the development of the Cluster-II instrument analysis software for the one U.S. and five U.S.-partnered instruments before launch and, if launch occurs in FY00, activate and verify the wideband data and U.S. sub-components after launch.		
Assessment		Green		
Annual Performance Goal and APG #		0S22: HESSI will be delivered in time for a planned July 2000 launch, within 10% of the planned development budget.		
Assessment		Yellow		

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S23:Assuming launch and normal checkout, HESSI operations will return data to achieve at least the primary science objectives, with at least 80% coverage of the time allowed by orbit.		
Assessment		Yellow		
Annual Performance Goal and APG #		0S25: Deliver to the Los Alamos National Laboratory in March 2000 all components for system integration and testing of the first flight system for the TWINS mission.		
Assessment		Green		
Annual Performance Goal and APG #		0S26: IMAGE will be delivered on time for a planned February 2000 launch and within 10% of the planned development budget.		
Assessment		Green		
Annual Performance Goal and APG #		0S27: If launched, IMAGE will acquire critical measurements at minute time scales, returning 85% real-time coverage of Earth's magnetospheric changes.		
Assessment		Green		

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S28: Select two Small Explorer (SMEX) missions and release a University Explorer (UNEX) Announcement of Opportunity (AO).		
Assessment		Red		
Annual Performance Goal and APG #		0S24: Acquire calibrated observational data from the Japanese Yohkoh high-energy solar physics mission (including the U.S.-provided SXT) for at least 75% of the time permitted by tracking coverage.		
Assessment		Green		
Annual Performance Goal and APG #		0S31: Complete Genesis spacecraft assembly and start functional testing in November 1999.		
Assessment		Green		
Annual Performance Goal and APG #		0S32: Release an AO for the next Discovery mission.		
Assessment		Green		

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S42: Successfully complete the breadboard of the imager instrument for CONTOUR and award the contract for the propulsion system after a PDR that confirms the design and maintains 15% margins for mass and power.		
Assessment		Green		
Annual Performance Goal and APG #		0S45: The baseline Galileo mission ended in 1997; the target for FY00 is to recover at least 90% of playback data from at least one Galileo flyby of Io. *(also shown below, under "Search for Life Beyond Earth")*		
Assessment		Blue		

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S40: The Mars Climate Orbiter (MCO) will aerobrake from its initial insertion orbit into a near-polar, Sun-synchronous, approximately 400-km circular orbit and will initiate mapping operations no later than May 2000, acquiring 70% of the available science data and relaying to Earth 70% of the data transmitted at adequate signal levels by the Mars Polar Lander (MPL).		
Assessment		Red		
Annual Performance Goal and APG #		0S41: MPL will successfully land on Mars in December 1999 and operate its science instruments for the 80-day prime mission with at least 75% of planned science data returned.		
Assessment		Red		

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S46: The Mars Global Surveyor (MGS) will acquire 70% of science data available, conduct at least two five-day atmospheric mapping campaigns, and relay to Earth at least 70% of data transmitted at adequate signal levels by the Deep Space-2 Mars microprobes. *(also shown below, under "Mars, the Moon, and small bodies")*		
Assessment		Green		
Annual Performance Goal and APG #		0S33: Collect 85% of data acquired from the International Solar-Terrestrial Physics Program (ISTP) spacecraft and successfully execute the WIND trajectory plan.		
Assessment		Green		

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		Cassini: Continue operations during the quiescent cruise phase without major anomalies, conduct planning for the Jupiter gravity-assist flyby, and explore early science data collection opportunities. The following in-flight activities will be completed: Instrument Checkout #2; uplink Articulation and Attitude Control Subsystem (AACS) software update with Reaction Wheel Authority capability; Command and Data Subsystem Version 8; and Saturn tour designs for selection by the Program Science Group. #OS34		
Assessment		Green		
Annual Performance Goal and APG #		0S35: Capture at least 90% of available Ulysses science data. These will be the only data observed from outside-of-the-ecliptic plane.		
Assessment		Green		

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		Average 12 hours of Voyager Interstellar Mission data capture per day per spacecraft to characterize the heliosphere and the heliospheric processes at work in the outer solar system as well as the transition from the solar system to interstellar space. #OS36		
Assessment		Yellow		
Annual Performance Goal and APG #		0S37: Stardust: Continue spacecraft cruise operations without major anomalies and perform interstellar dust collection for at least 36 days.		
Assessment		Green		
Annual Performance Goal and APG #		0S38: FAST will return simultaneous data from high-latitude, low-altitude magnetosphere locations in the Sun-Earth connected system through solar maximum at the required resolution and accuracy with at least 85% efficiency.		
Assessment		Green		

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S39: Collect and process data from the Interplanetary Monitoring Platform (IMP-8, launched in 1973), making data from at least six instruments available within 15 months and the magnetic field and plasma data available within 2 months.		
Assessment		Green		
Annual Performance Goal and APG #		0S48: ACE will measure the composition and energy spectra of heavy nuclei in at least eight solar energetic particle events; maintain real-time solar wind data transmissions at least 90% of the time; measure the isotopic composition of a majority of the "primary" galactic cosmic ray elements from carbon to zinc; and provide browse parameters within three days for 90% of the year.		
Assessment		Green		

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S47: Complete the system CDR for the New Millennium Deep Space-4 (Champollion) project before the end of FY00, including successful completion of the avionics subsystem CDR and the mechanical subsystem CDR.		
Assessment		Red		
Annual Performance Goal and APG #		0S58: The Advanced Radioactive Power Source (ARPS), which is a partnership with the Department of Energy to develop small, robust, highly efficient radioisotope power sources, will accomplish the following five objectives on time and within budget in 2000: fabricate and test 15 prototype AMTEC cells by January; complete the final design of the AMTEC cells by March; complete the final design for a 75-watt ARPS by April; begin the prototype AMTEC four-cell lifetime test by April; and begin qualification unit fabrication by September.		
Assessment		Red		

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S60: Complete and deliver for testing Solar-B's four Electrical Engineering Models in September 2000.		
Assessment		Yellow		
Annual Performance Goal and APG #		0S61: Complete STEREO Phase A studies by June 2000, including the release of an AO for investigations with specific instruments and selection of the formulation phase payload.		
Assessment		Yellow		
Annual Performance Goal and APG #		0S64: Successfully complete a preliminary design for either the Europa Orbiter or Pluto-Kuiper Express mission (whichever is planned for earlier launch) that is shown to be capable of achieving the Category 1A science objectives with adequate cost, mass, power, and other engineering margins.		
Assessment		Red		

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S70: The first engineering model (EM-1) of the X2000 First Delivery will be delivered in September 2000. Successful development includes the integration of all EM-1 hardware, the functional verification of delivered hardware and software, and the ability to support ongoing testing, hardware integration, and software verification for delivered software.		
Assessment		Red		
Annual Performance Goal and APG #			1S4: Successfully develop and launch no fewer than one of two missions within 10% of budget and schedule. Missions are: Mars Odyssey ('01 Orbiter) and Genesis. (Indicators have also been established for other projects in development.)	
Assessment			TBD	

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #			1S5: Obtain expected scientific data from at least 80% of operating missions. Missions are: Cassini, Voyager, Ulysses, SAMPEX, FAST, TRACE, Stardust, Mars Global Surveyor, and ISTP spacecraft; also, if successfully launched, TIMED, HESSI, IMAGE, Genesis, and Mars Odyssey ('01 Orbiter).	
Assessment			TBD	

Explore the solar system.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #			1S6: Perform innovative scientific research and technology development by meeting technology development objectives for major projects, by achieving mission success in space physics rocket and balloon flights, and by making satisfactory research progress in related R&A and DA programs. Meet no fewer than 66% of the performance objectives for the following technology and research programs Solar-B, STEREO, Solar Probe, Future Solar Terrestrial Probes, Future Deep Space Technology, CISM, X2000, Sounding Rockets, and Balloons. Achieve a "fully effective" (green) overall science achievement rating from the Space Science external advisory committee.	
APG Assessment				

Understand the formation and evolution of the Solar System and the Earth within it.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #				2S5: Earn external review rating of "green," on average, on making progress in the following research focus areas: • Inventory and characterize the remnants of the original material from which the Solar System formed. • Learn why the planets in our Solar System are so different from each other. • Learn how the Solar System evolves.
Assessment				TBD

Probe the evolution of life on Earth, and determine if life exists elsewhere in our Solar System.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #				2S6: Earn external review rating of "green," on average, on making progress in the following research focus areas: • Investigate the origin and early evolution of life on Earth, and explore the limits of life in terrestrial environments that might provide analogues for conditions on other worlds. • Determine the general principles governing the organization of matter into living systems and the conditions required for the emergence and maintenance of life • Chart the distribution of life-sustaining environments within our Solar System, and search for evidence of past and present life. • Identify plausible signatures of life on other worlds.
Assessment				TBD

Understand our changing Sun and its effects throughout the Solar System.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #				2S7: Earn external review rating of "green," on average, on making progress in the following research focus areas: • Understand the origins of long- and short-term solar variability. • Understand the effects of solar variability on the solar atmosphere and heliosphere. • Understand the space environment of Earth and other planets.
Assessment				TBD

Chart our destiny in the Solar System.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #				2S8: Earn external review rating of "green," on average, on making progress in the following research focus areas: • Understand forces and processes, such as impacts, that affect habitability of Earth. • Develop the capability to predict space weather. • Find extraterrestrial resources and assess the suitability of Solar System locales for future human exploration.
Assessment				

Discover planets around other stars.

Annual Performance Goal and APG #	9S12:Assemble and lab-test the interferometer beam combiner. This state-of-the-art system will approximately double observational efficiency by using a new approach to fringe detection. (Keck)	0S55: Development of the interferometer program for connecting the twin Keck 10-meter telescopes with an array of four two-meter class outrigger telescopes will be tested by detecting and tracking fringes with two test siderostats at two- and ten-micron wave		
Assessment	Green	Yellow		

Discover planets around other stars.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S52: The Space Interferometry Mission (SIM) System Testbed (STB) will demonstrate, in May 2000, that an rms optical path difference can be controlled at 1.5 nanometers, operating in an emulated on-orbit mode.		
Assessment		Green		
Annual Performance Goal and APG #		0S54: Complete and deliver a technology development plan for the Terrestrial Planet Finder (TPF) mission by June 2000. This infrared interferometer mission is projected for a 2010 launch and requires the definition of technologies that will not be developed or demonstrated by precursor missions.		
Assessment		Red		

Discover planets around other stars.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #			1S7: Perform innovative scientific research and technology development by meeting interferometry technology development objectives and by making satisfactory research progress in related R&A programs. Meet no fewer than 66% of the performance objectives for SIM, TPF, ST-3, Keck, and R&A. Achieve a "fully effective" (green) overall science achievement rating from the Space Science external advisory committee.	
Assessment			TBD	

Look for signs of life in other planetary systems.

Annual Performance Goal and APG #				2S4: Earn external review rating of "green," on average, on making progress in the following research focus areas: • Discover planetary systems of other stars and their physical characteristics. • Search for worlds that could or do harbor life.
Assessment				

Search for life beyond Earth.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #	9S13: Successfully complete and receive scientific data from at least 8 of 10 planned data-taking encounters with Europa. (Galileo)			
Assessment	Green			
Annual Performance Goal and APG #	9S14: Bring the total mapping coverage to about 1 percent of the surface at about 30-meter resolution, and multispectral coverage distributed over 50 percent of the surface at lower resolution. (Galileo)			
Assessment	Green			
Annual Performance Goal and APG #	9S17: Initiate Institute operations by linking up to 8 institutions and engaging approximately 50 investigators. (Astrobiology Institute)			
Assessment	Green			
Annual Performance Goal and APG #		0S56:The Europa Orbiter project will successfully complete a PDR in March 2000 and will begin the integration and test of the Avionics Engineering Model in July 2000.		
Assessment		Red		

Search for life beyond Earth.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #			1S8:Perform innovative scientific research and technology development by meeting technology development objectives and by making satisfactory research progress in the related R&A program, including the Astrobiology program. Meet no fewer than two of the three performance objectives for Europa Orbiter, Astrobiology, and R&A. Achieve a "fully effective" (green) overall science achievement rating from the Space Science external advisory committee.	
Assessment			TBD	
Annual Performance Goal and APG #			1S14: Advance the search for life beyond Earth by successfully launching a Mars mission, by obtaining data from operational spacecraft, and by performing innovative technology development. Meet no fewer than two of the three performance objectives for Mars Odyssey ('01 Orbiter), Mars Global Surveyor, and Terrestrial Planet Finder.	
Assessment			TBD	

Investigate the composition, evolution, and resources on Mars, the Moon, and small bodies.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #	9S15: Achieve the final science orbit. (MGS)			
Assessment	Green			
Annual Performance Goal and APG #	9S19: Measure the topography with 10-meter precision, about 100 times more accurate than previous measurements. (MGS)			
Assessment	Blue			
Annual Performance Goal and APG #	9S20: Provide high-resolution 1.5-meter imaging data, 10 times more detailed than the best imaging from the 1976 Viking mission. (MGS)			
Assessment	Green			
Annual Performance Goal and APG #	9S21: Provide the first thermal infrared spectrometry of the planet. (MGS)			
Assessment	Green			

Investigate the composition, evolution, and resources on Mars, the Moon, and small bodies.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #			1S10: Investigate the composition, evolution, and resources of Mars, the Moon, and small bodies by successfully launching a Mars mission, by obtaining data from operational spacecraft, and by making satisfactory progress in related R&A and DA programs. Meet no fewer than 75% of the performance objectives for Mars Odyssey ('01 Orbiter), CONTOUR, Mars Global Surveyor, and R&A. Achieve a "fully effective" (green) overall science achievement rating from the Space Science external advisory committee.	
Assessment			TBD	

Improve the reliability of space weather forecasting.

Annual Performance Goal and APG #	9S22: Achieve complete coverage (maximum and minimum) of the solar cycle, an increase from 35 percent. (Space Physics fleet of spacecraft)	*(Refer to Space Physics spacecraft targets under "Explore the Solar System.")*		
Assessment	Green			

Improve the reliability of space weather forecasting.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #			1S11: Develop the knowledge to improve the reliability of space weather forecasting by obtaining scientific data from three of five missions and by making satisfactory progress in related areas in R&A and DA programs. Meet no fewer than 75% of the performance objectives for R&A, ACE, SAMPEX, TRACE, ISTP, and, if successfully launched, HESSI. Achieve a "fully effective" (green) overall science achievement rating from the Space Science external advisory committee.	
Assessment			TBD	

Improve the reliability of space weather forecasting.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #			1S13: Further understanding of basic natural processes and the effects of solar variability on humans and technology. Meet no fewer than two of the three performance objectives for: Strategic Plan Development, Solar Dynamics Observatory, and Research and Data Analysis. Achieve a "fully effective' (green) overall science achievement rating from the Space Science external advisory committee.	
Assessment			TBD	
Annual Performance Goal and APG #	9S24: Demonstrate an improvement in measurement precision for optical path lengths in laser light to the 100-picometer (million-millionths of a meter) range. (Micro-Arcsecond Metrology Testbed)			
Assessment	Yellow			

Improve the reliability of space weather forecasting.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #	9S25: Demonstrate an advanced robotic manipulator with an order of magnitude performance improvement compared to the manipulator used on Viking in 1976. (Robotic Manipulator, Mars Polar Lander)			
Assessment	Green			
Annual Performance Goal and APG #		OS49: Information Systems R&T will demonstrate the search, discovery, and fusion of multiple data products at a major science meeting. Accomplish and document the infusion of five information systems R&T efforts into flight projects or the broad research community. Space science data services shall be acknowledged as enabling for two interdisciplinary collaborations.		
Assessment		Green		

Improve the reliability of space weather forecasting.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S50: The Remote Exploration and Experimentation element of the HPCC program will demonstrate software-implemented fault tolerance for science teams' applications on a first-generation embedded computing testbed, with the applications' sustained performance degraded by no more than 25% at fault rates characteristic of deep space and low-Earth orbit.		
Assessment		Yellow		
Annual Performance Goal and APG #		In April 2000, the Center for Integrated Space Microelectronics will deliver to the X2000 First Delivery project the first engineering model of an integrated avionics system that includes the functionality of command and data handling, attitude control, power management and distribution, and science payload interface. The system will be used on the Europa Orbiter and other missions. #OS57		
Assessment		Red		

Develop new technologies needed to carry out innovative and less costly mission and research concepts.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #			1S12: Plan, develop, and validate new technologies needed to enable future research and flight missions by achieving performance objectives in the space science core technology programs and by making progress as planned in the Flight Validation program. Meet no fewer than 66% of the performance objectives for Information Systems, High Performance Computing, Explorer Program Technology, and Flight Validation.	
Assessment			TBD	

Acquire new technical approaches and capabilities. Validate new spacecraft capabilities in space. Apply and transfer technology.

Annual Performance Goal and APG #				2S10: Earn external review rating of "green" on making progress in the following technology development area: • Focus technology development on a well-defined set of performance requirements covering the needs of near-term to mid-term strategic plan missions.
Assessment				TBD

Acquire new technical approaches and capabilities. Validate new spacecraft capabilities in space. Apply and transfer technology.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #				2S11: Earn external review rating of "green" on making progress in the following technology validation area: • Formulate and implement cost-effective space demonstrations of selected technologies on suitable carriers.
Assessment				TBD

Incorporate education and enhanced public understanding of science as integral components of space science missions and research.

Annual Performance Goal and APG #	9S26: Account for 4 percent of the 150 "most important science stories" in the annual review by *Science News*.			
Assessment	Green			
Annual Performance Goal and APG #	9S27: Account for no less than 25 percent of total contributions to the college textbook *Astronomy: From the Earth to the Universe*.			
Assessment	Green			
Annual Performance Goal and APG #	9S28: Each new Space Science Enterprise mission initiated in FY 1999 will have a funded education and outreach program.			
Assessment	Green			

Incorporate education and enhanced public understanding of science as integral components of space science missions and research.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #	9S29: The Space Science Enterprise will complete an organized network of contacts by the end of FY 1999 to work with educators and space scientists to formulate and implement space science education and outreach programs. This network will be available to every state in the United States.	0S67: Successful achievement of at least seven of the following eight objectives will be made. (1) Each new Space Science mission will have a funded education and outreach program. (2) By the end of FY00, 10% of all Space Science research grants will have an associated education and outreach program under way. (3) Twenty-six states will have Enterprise-funded education or outreach programs planned or underway. (4) At least five research, mission development/ operations, or education programs will have been planned/undertaken in Historically Black Colleges and Universities, Hispanic Serving Institutions, or Tribal Colleges, with at least one project underway in each group. (5) At least three national and two regional educational or outreach conferences will be supported with a significant Space Science presence. (6) At least three exhibits or planetarium shows will be		

		on display. (7) An online directory providing enhanced access to major Space Science-related products and programs will be operational by end of the fiscal year. (8) A comprehensive approach to assessing the effectiveness and impact of the Space Science education and outreach efforts will be under development, with a pilot test of the evaluation initiated.		
Assessment	Green	Green		

Make education and enhanced public understanding of science an integral part of our missions and research.

	FY 1999	**FY 2000**	**FY 2001**	**FY 2002**
Annual Performance Goal and APG #			1S9: Continue and expand the integration of education and enhanced public understanding of science with Enterprise research and flight mission programs. Meet no fewer than 75% of the eight performance objectives for education and public outreach.	
Assessment			TBD	

Share the excitement of space science discoveries with the public. Enhance the quality of science, mathematics, and technology education, particularly at the pre-college level. Help create our 21st Century scientific and technical workforce.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #				2S12: Earn external review rating of "green," on average, on making progress in the following focus areas: • Incorporate a substantial, funded education and outreach program into every space science flight mission and research program. • Increase the fraction of the space science community that contributes to a broad public understanding of science and is directly involved in education at the pre-college level. • Establish strong and lasting partnerships between the space science and education communities. • Develop a national network to identify high-leverage education and outreach opportunities and to support long-term partnerships. • Provide ready access to the products of space science education and outreach programs. • Promote the participation of underserved and

				underutilized groups in the space science program by providing new opportunities for minorities and minority universities to compete for and participate in space science missions, research, and education programs. • Develop tools for evaluating the quality and impact of space science education and outreach programs.
Assessment				TBD

Multi-theme / support all objectives.

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #		0S68: Conduct research and analysis.		
Assessment		Green		
Annual Performance Goal and APG #		0S69: Conduct data analysis.		
Assessment		Green		

Support of Strategic Plan Science Objectives; Development/ Near-Term Future Investments (supports all objectives under the Science goal)

	FY 1999	FY 2000	FY 2001	FY 2002
Annual Performance Goal and APG #				2S9: Earn external review rating of "green" on making progress in the following area: • Design, develop, and launch projects to support future research in pursuit of Strategic Plan science objectives.
Assessment				TBD

Space Science Enterprise FY 2002	Budget Category	SIRTF	HST Development	GP-B	SOFIA	STEREO	Payloads	Explorers	Discovery	Mars Surveyor	Operating Missions	SR&T
Annual Performance Goal & APG #												
2S1: Earn external review rating of "green," on average, on making progress in the following research focus areas: (1) Identify dark matter and learn how it shapes galaxies and systems of galaxies. (2) Determine the size, shape, age, and energy content of the universe.											X	X
2S2: Earn external review rating of "green," on average, on making progress in the following research focus areas: (1) Discover the sources of gamma ray bursts and high energy cosmic rays. (2) Test the general theory of relativity near black holes and in the early universe, and search for new physical laws using the universe as a laboratory. (3) Reveal the nature of cosmic jets and relativistic flows.											X	X
2S3: Earn external review rating of "green," on average, on making progress in the following research focus areas: (1) Observe the formation of galaxies and determine the role of gravity in this process. (2) Establish how the evolution of a galaxy and the life cycle of stars influence the chemical composition of material available for making stars, planets, and living organisms. (3) Observe the formation of planetary systems and characterize their properties. (4) Use the exotic space environments within our Solar System as natural science laboratories and cross the outer boundary of the Solar System to explore the nearby environment of our galaxy.											X	X

Space Science Enterprise FY 2002	Budget Category	SIRTF	HST Development	GP-B	SOFIA	STEREO	Payloads	Explorers	Discovery	Mars Surveyor	Operating Missions	SR&T
2S4: Earn external review rating of "green," on average, on making progress in the following research focus areas: (1) Discover planetary systems of other stars and their physical characteristics. (2) Search for worlds that could or do harbor life.											X	X
2S5: Earn external review rating of "green," on average, on making progress in the following research focus areas: (1) Inventory and characterize the remnants of the original material from which the Solar System formed. (2) Learn why the planets in our Solar System are so different from each other. (3) Learn how the Solar System evolves.											X	X
2S6: Earn external review rating of "green," on average, on making progress in the following research focus areas: (1) Investigate the origin and early evolution of life on Earth, and explore the limits of life in terrestrial environments that might provide analogues for conditions on other worlds. (2) Determine the general principles governing the organization of matter into living systems and the conditions required for the emergence and maintenance of life. (3) Chart the distribution of life-sustaining environments within our Solar System, and search for evidence of past and present life. (4) Identify plausible signatures of life on other worlds.											X	X

Space Science Enterprise FY 2002	Budget Category	SIRTF	HST Development	GP-B	SOFIA	STEREO	Payloads	Explorers	Discovery	Mars Surveyor	Operating Missions	SR&T
2S7: Earn external review rating of "green," on average, on making progress in the following research focus areas: (1) Understand the origins of long- and short-term solar variability. (2) Understand the effects of solar variability on the solar atmosphere and heliosphere. (3) Understand the space environment of Earth and other planets.											X	X
2S8: Earn external review rating of "green," on average, on making progress in the following research focus areas: (1) Understand forces and processes, such as impacts, that affect habitability of Earth. (2) Develop the capability to predict space weather. (3) Find extraterrestrial resources and assess the suitability of Solar System locales for future human exploration.											X	X
2S9: Earn external review rating of "green" on making progress in the following area: Design, develop, and launch projects to support future research in pursuit of Strategic Plan science objectives.		X	X	X	X	X	X	X	X	X		
2S10: Earn external review rating of "green" on making progress in the following technology development area: Focus technology development on a well-defined set of performance requirements covering the needs of near-term to mid-term strategic plan missions.												X

Space Science Enterprise FY 2002	Budget Category	SIRTF	HST Development	GP-B	SOFIA	STEREO	Payloads	Explorers	Discovery	Mars Surveyor	Operating Missions	SR&T
2S11: Earn external review rating of “green” on making progress in the following technology validation area: Formulate and implement cost-effective space demonstrations of selected technologies on suitable carriers.												X
2S12: 'Earn external review rating of “green,” on average, on making progress in the following focus areas: (1) Incorporate a substantial, funded education and outreach program into every space science flight mission and research program. (2) Increase the fraction of the space science community that contributes to a broad public understanding of science and is directly involved in education at the pre-college level. (3) Establish strong and lasting partnerships between the space science and education communities. (4) Develop a national network to identify high-leverage education and outreach opportunities and to support long-term partnerships. (5) Provide ready access to the products of space science education and outreach programs. (6) Promote the participation of underserved and underutilized groups in the space science program by providing new opportunities for minorities and minority universities to compete for and participate in space science missions, research, and education programs. (7) Develop tools for evaluating the quality and impact of space science education and outreach programs.		X	X	X	X	X	X	X	X	X	X	X