



National Aeronautics and  
Space Administration  
Goddard Space Flight Center

# Goddard News

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PLEASE GIVE TO CFC

## ISTP spacecraft nears launch

by Jim Sahli

To address the mysteries of energy transport from the solar interior to the solar wind, the Solar and Heliospheric Observatory (SOHO), carrying 12 instruments developed by international teams of scientists, will be launched in late November on an Atlas IAS rocket from Cape Canaveral Air Station, Fla. SOHO is a cooperative mission between ESA and NASA.

SOHO will have a superlative and uninterrupted view of the Sun from an orbit around a point known as the "L-1 Lagrangian point," approximately 1,500,000 km or 930,000 miles from Earth, where the gravitational forces of the Earth and Sun balance one another, said SOHO Project Scientist Dr. Art Poland, Code 682.

"Three of the 12 instruments on SOHO are U.S. Some of the American instruments have European components while some of the European instruments have U.S. compo-

nents. It is a very much a cooperative program," added Poland.

SOHO is part of a larger effort known as the International Solar-Terrestrial Physics (ISTP) science initiative.

"ISTP is an international cooperative project, with the Japanese, Europeans and Americans and has been under way for the past several years. The project develops a constellation of scientific spacecraft intended to study the interaction of the Sun and Earth in the Earth's magnetosphere.

"The launches of SOHO, Wind and Cluster during the next several months will complete the complement of all the ISTP elements. With those spacecraft in orbit, scientists can utilize the scientific instruments to understand in real time the interaction phenomena of the Sun with the Earth and the way things change on a global basis," said ISTP Project Manager Ken Sizemore, Code 407.

"The SOHO mission is designed to study the Sun from its deep interior to its outer atmosphere and actually to measure particles in space as they pass through interplanetary space going toward the Earth. As the data is received scientists at the SOHO experiment operations facility at Goddard will ensure that the telescopes are pointed exactly where they want them. Then over time, we will take the data from the experiments on orbit and try to understand the physical processes that are occurring on the Sun," said Poland.

"SOHO is the largest solar laboratory to be launched since Skylab. The only way ESA and NASA could have conducted this program was to collaborate and financially share in the funding required to build, launch and operate this spacecraft. SOHO represents the way future enterprises between NASA and ESA will operate."

"The cooperation thus far has been spectacular. There has been excellent

cooperation already amongst the individual science teams and amongst the different experiments. There is a great scientific sharing process being developed," said Poland.

Poland added that the data they get with SOHO will be placed on the internet for all those interested. "Those who have a computer and access to the internet will be able to look at the images we get from SOHO within hours of when we get that data. Because of the electronic advances we are making in our society people can share in what we are observing."

Continued on page 8

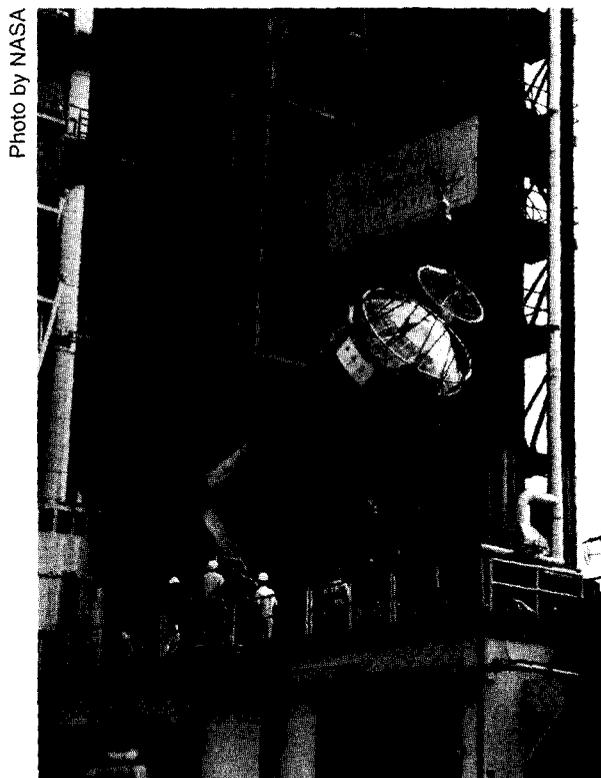


Photo by NASA

### SOHO's launch vehicle

The Centaur stage is being lifted and mated to the Atlas portion of an Atlas IAS at Launch Pad 36B on Cape Canaveral Air Station. This Atlas IAS will carry SOHO into orbit around the end of November.



Photo by Mark DeBord

## Minority Contractor of the Year Award

During a recent ceremony, Science Systems and Applications, Inc. (SSAI) of Lanham, was presented the "Goddard Minority Contractor of the Year Award" for superior work in support of Goddard projects. Accepting the award from Center Director Joseph Rothenberg on behalf of SSAI is (at left) Dr. Om Bahethi, company president. Looking on (at right) is Carl Codan, Code 940; representing the Goddard Institute for Space Studies, N.Y.

## Spartan 201 mission accomplished

NASA scientists reported that Spartan 201 successfully completed its mission during the flight of Space Shuttle Endeavour on Mission STS-69 in September.

Project Scientist Dr. Dick Fisher, Code 682, reported that the tapes retrieved from the Spartan 201 indicated that the free-flying spacecraft has done its job properly and both instruments worked as planned throughout the mission.

Concern about whether the Spartan had operated correctly was raised when the spacecraft was to be retrieved during the STS-69 mission on Sept. 10. At that time, the crew reported that Spartan was rotating slowly, and its batteries seemed to have been drained. Starting in the near future, scientists will begin an in-depth study of the data contained on the tapes from the two Spartan 201 instruments. Engineers will study "housekeeping data" from the spacecraft to determine why the Spartan behaved as it did.

Until the spacecraft could be examined following landing, it was not possible to know whether it had accomplished its mission of observing the Sun's northern polar regions.

Data from the Spartan 201 Ultraviolet Coronagraph Spectrometer instrument are being examined, and scientists say that preliminary findings show the data are excellent. "The White Light Coronagraph instrument obtained spectacularly good data over 95 percent of the planned observing sequence," Fisher said.

# International Ultraviolet Explorer operations transferred to Europe

After nearly two decades of continuous operations support, NASA has transferred primary control of the International Ultraviolet Explorer (IUE) to a partnership of the European Space Agency (ESA) and the Particle Physics and Astronomy Research Council (PPARC) of the United Kingdom.

As part of the U.S. space agency's continuing cost reduction efforts, day-to-day operational control of IUE was fully transferred to ESA on Oct. 1. IUE-related science programs will be combined, and NASA will concentrate on the completion of the IUE data archive.

Goddard has operated the IUE in collaboration with ESA and the PPARC since the spacecraft's launch on Jan. 26, 1978. This arrangement allowed astronomers and astrophysicists in both the U.S. and Europe to make around-the-clock observations using IUE, in much the same way as telescopes at ground-based observatories are operated. The new mission design enables scientists world-wide to continue to use the IUE for ongoing science programs.

The IUE is a great NASA success story and has had a tremendous impact on the astronomical community, said Dr. Andrea Dupree, the President-Elect of the American Astronomical Society.

"The IUE marked the first true space observatory to be used by professional astronomers and students all over the world.

The various IUE programs demonstrate superb cooperation among scientists from many different nations to address challenging problems. The spacecraft was operated with care and ingenuity by NASA."

A past winner of the U.S. Presidential Award for Design Excellence, IUE uses spectrographic instruments to study astronomical and cosmic phenomena visible in ultraviolet light. The observatory has observed nearly 100,000 spectra, including planets, comets, stars and galaxies. The spacecraft was designed for a three-year lifetime.

According to Dr. Andrew Michalitsianos, the IUE deputy project scientist at Goddard, IUE results have been used as the basis for more than 100 Ph.D. and master's degree theses in the U.S. alone.

"IUE has been and continues to be used as a central facility in most multiwavelength observations," said Michalitsianos. "Multiwavelength observation is an important modern approach in astrophysical research. In fact, the forthcoming X-Ray Timing Explorer mission is counting on the continued availability of IUE -- not to mention some observers using the Hubble Space Telescope," he said.

Some of IUE's discoveries and research results are:

- Comparative studies of aurorae on Jupiter, Saturn, and Uranus
- Discovery of molecular sulfur emission

from the nucleus of a comet

- Identification of many stars with magnetic fields and surface activity
- Identification of previously unknown stellar companions to cool stars
- Measurements of stellar "winds"
- Mapping of low-density gas bubbles around the Sun and nearby stars
- Supernova observations in the Large Magellanic Cloud (a nearby galaxy)
- Measurements of the composition of planetary nebulae
- Discovery of hot (180,000 degrees Fahrenheit) gas surrounding the Milky Way
- Estimates of active galaxy sizes

Even after almost 18 years of operation, the demand for IUE observation time exceeds the time available.

"More than 2,000 astronomers have used the NASA observatory at Goddard and the ESA observatory in Spain as guest observers," Michalitsianos said. "The results of these observations have been described in more than 3,000 scientific papers that appeared in major peer-reviewed astronomical journals by the end of 1994. This makes IUE the most productive and successful telescope of all time."

More information on IUE is available on the Internet at URL: [http://iuewww.gsfc.nasa.gov/iuedac/iuedac\\_homepage.html](http://iuewww.gsfc.nasa.gov/iuedac/iuedac_homepage.html)

## Procurement personnel receive award

by *Barbara Veres*

Janet Jew, Code 260; and Bernie Pagliaro, Code 242, received the Exceptional Achievement Medal Award on Sept. 26. Both employees were recognized for their efforts in awarding contracts to small and small disadvantaged contractors at Goddard.

Jew was honored for her contributions in helping the small business community participate in GSFC contracts. Her recommendations and expertise has enabled the GSFC procurement community to successfully award numerous contracts to small business. Pagliaro was recognized for his efforts in awarding \$175 million in contracts to small disadvantaged businesses. Under his leadership, half of the Management Operations Procurement

Branch's active contracts were awarded to small disadvantaged business.

Jew is a small business specialist who has been in charge of the Industry Assistance Section since May 1988. Prior to that position, she was the source evaluation board coordinator. She began her career in procurement at Goddard in 1978, as a contract negotiator. Her first assignment was with the Engineering Directorate and involved competitive and non-competitive awards for support services and hardware. Jew also served two years in the Management Intern Program.

Pagliaro is the assistant branch head of the Management Operations Procurement Branch. He has served in this position since 1993. Prior

to that position, he was the assistant branch head of the Commercial/Construction Procurement Branch. Pagliaro began his procurement career at Goddard as a co-op student in 1977. While assigned to the Program Procurement Division, he worked on procurements in support of Solar Maximum Mission, Earth Radiation Budget Satellite, Science Operations Time, Upper Atmosphere Research Satellite, Gamma Ray Observatory, Cosmic Background Explorer, Hubble Space Telescope, Delta, and Extreme Ultraviolet Explorer/Explorer Platform. He also supported several Code 900 procurements.

# Arthur J. Fuchs leads Mission Operations and Data Systems Directorate



**Arthur J. Fuchs**

Arthur J. Fuchs has been selected the new director of the Mission Operations and Data Systems Directorate, Code 500. His appointment, announced by Center Director Joseph Rothenberg, was effective Oct. 1.

Fuchs previously held the position of

Deputy Director of the Astrophysics Division, Office of Space Science, NASA Headquarters, Washington, D.C. He also was Chief of the Observatories Development Branch at NASA Headquarters, which has responsibility for the Hubble Space Telescope (HST), the Advanced X-ray Astrophysics Facility (AXAF), the Space InfraRed Telescope Facility (SIRTF) and Gravity Probe-B. Prior positions at Headquarters included Chief of the Explorer Programs Branch and program manager for AXAF, SIRTF and HST in the Astrophysics Division.

In making the announcement, Rothenberg said, "We are pleased to get Art back on the Goddard team. He brings both operations and program experience to the leadership of the Mission Operations and Data Systems Directorate."

Fuchs began his career with NASA in 1963 at Goddard. He worked on the Gemini and Apollo manned space missions and on numerous science and applications missions such as the early Explorers and

the Earth Resources Technology Satellite later known as LANDSAT. During his 20 years at Goddard, Fuchs served in a variety of positions, the last one being Head of the Systems Development and Analysis Branch. In 1983 he transferred to NASA Headquarters and was assigned to work on the HST development program. In 1984, he became program manager of AXAF.

Fuchs holds a bachelor of science degree in mathematics from Queens College of the City University of New York and a master of science degree in aerospace engineering from the Catholic University of America. In addition, he has attended the University of Michigan, Flight Dynamics Institute and the Penn State University Executive Training Institute for scientists and engineers. He is the recipient of several NASA awards and citations including Goddard and NASA Headquarters Exceptional Awards and the NASA Outstanding Leadership Medal.

## Space network test successful

*by Ernie J. Shannon*

What satellite communications enthusiasts have long dreamed of became a bit closer to reality recently when Goddard engineers delivered American satellite data through a Japanese communications satellite.

"The ETS-6/UARS test was the culmination of years of planning," said Tom Ryan, Code 501. "The success was due to the hard work, determination and creativity of the NASA/NASDA teams who resolved many problems on a very limited budget. This is the first of a number of tests involving spacecraft from the three agencies that will eventually lead to interoperability."

A network of geosynchronous satellites strategically placed around the world capa-

ble of supporting other satellites has been on the drawing boards for years. The realities of vastly differing designs and other issues, however, has always been a challenge to the dream. Still, a group called the Space Network Interoperability Panel has worked diligently for a decade toward their recent accomplishment.

The panel is a tripartite study involving NASA, the European Space Agency (ESA) and the National Space Development Agency of Japan. Its primary focus is the study of the feasibility of making the data relay satellite systems of the three organizations compatible.

At Summer's end, data from the Upper Atmosphere Research Satellite (UARS)

was relayed to the Japanese Engineering Test Satellite VI. From there, the data traveled to the ground station in Tsukuba, Japan and was transferred by international link to Goddard where the satellite control facilities are located.

Interoperability offers a number of potential operational and economic benefits especially for cooperative international missions such as the Tropical Rainfall Measuring Mission.

"The spirit of cooperation among personnel from the three agencies has been outstanding. We trust this will result in making the potential benefits real ones in the not-too-distant future," said Ryan.

# Saturn moon mystery continues: could Hubble have discovered shattered satellites?

The Hubble Space Telescope has discovered several orbiting clumps of icy rubble that could be the remnants of recently shattered moonlets orbiting near the outer edge of Saturn's ring system.

Astronomers say this could represent the discovery of a new class of ephemeral, transitional object in the solar system which provides new clues to the origin and evolution of Saturn's spectacular rings.

This startling conclusion is based upon Hubble's observation of Saturn made as Earth crossed the plane of the ring system on Aug. 10, which provided a rare opportunity to seek out faint satellites in and near the ring plane.

"Ring plane crossing" refers to the brief interval when the Earth crosses the plane of Saturn's rings, allowing them to be seen edge on. At such times, the usually bright rings are seen only as a faint, thin line, and Saturn's smaller satellites become visible. These events are rare, occurring in groups of two or four at intervals of about 14.5 years. The previous series of crossings occurred in 1980.

The latest Hubble pictures gave astronomers an opportunity to confirm the presence of two new satellite first discovered by the Space Telescope in images taken during the May 22 ring plane crossing. Rather than solving the moon question,

however, the August observations presented astronomers with a new mystery.

"We realized these moons are too bright to have gone undetected when the Voyager spacecraft flew by Saturn in 1980 and 1981," said Philip Nicholson of Cornell University, Ithaca, N.Y.

A further complication is that the August pictures seem to show at least three new objects, and in different orbits from the two May objects.

"They also appear to be very elongated or arc-like, unlike a satellite should be," Nicholson said. "One possibility is that they are large clouds of debris from small satellites shattered by impacts with chunks of space debris, possibly comets, sometime during the 14 years since the Voyager 2 flyby."

Just as a small handful of chalk dust can make a large dust cloud if tossed in the air, a shattered moonlet would be much brighter and more visible than when all of its mass is compressed into a single solid body.

The discovery of objects in this transitional phase is not totally unexpected, Nicholson said, because one scenario for the origin of Saturn's ring system is that it is made up of countless fragments from several pulverized moons. This idea is reinforced by the fact the new objects orbit

Saturn near the narrow "F" ring, which is a dynamic transition zone between the main rings and the larger satellites. Moonlets in this region can easily be disrupted by Saturn's tidal pull if they are fractured by an impact, forming a cloud of debris. Eventually such a cloud would spread around the moon's orbit to form a new ring.

The dynamics of this zone also are evident in Hubble's observations of the satellite Prometheus. Although a third object seen in the May images was first suspected to be another new satellite because its location did not match the predicted position for any of the known satellites charted by Voyager, it now appears that this body is in fact Prometheus, which has slipped in its orbit by 20 degrees from the predicted position. Nicholson suggests that this may be a consequence of a "collision" of Prometheus with the F ring, which is believed to have occurred in early 1993. The moon may have passed close enough to one of the denser, lumpy regions of the F ring to have its orbit changed.

The researchers plan to obtain further observations of Saturn's moons and rings during the third ring plane crossing, which occurs on Nov. 21.

## Federal budget process update

by *Donna Drelick*

The White House and Congress agreed on a plan to keep the government running beyond the Oct. 1 deadline while they attempt to resolve budget issues. The agreement, or continuing resolution, allows federal employees to report to work while Congress finishes negotiations on 13 appropriations bills. The continuing resolution gives lawmakers and the White House six additional weeks to discuss spending priorities.

On Sept. 11, the Senate Appropriations Subcommittee on Veterans Affairs (VA), Housing and Urban Development (HUD) and Independent Agencies, marked-up HR2099 which includes NASA funding for Fiscal Year (FY '96). The Senate

Subcommittee's allocations for NASA show discrepancies between the House-passed version of the budget and the Administration's requested amount. The bill will go to a House/Senate conference where differences in the two versions will be worked out and included in a final bill.

In addition to the Appropriations measures, this year's budget battle also may include confrontations over the Reconciliation Bill which give specifics on deficit-reduction steps and the required legislation to raise the debt limit.

# For John A. O'Keefe the adventures continue

by David Rubincam, Code 921

"Rumor is out that you are going to quit your day job after a mere 52 years," read a congratulatory message sent by Neil

heard in geophysical circles.

One of his more interesting accomplishments while at the agency was to explain

John Glenn's mysterious "fireflies," which the astronaut saw floating past his window during his historic Project Mercury flight in 1962.

O'Keefe immediately realized from the slow speed of the objects relative to the capsule that they had to emanate from the spacecraft itself. This later proved to be correct: they were waste water turned to ice crystals by the cold of space and illuminated by the Sun.

"I've always been grateful for your elegant explanation of the beautiful and delicate 'fireflies' I saw outside my

capsule," said Glenn in a letter on the occasion of O'Keefe's retirement.

O'Keefe and coworker Han-Shou Liu also were the first to explain the dynamics of the rotation of Mercury, wherein the planet closest to the Sun is locked in a resonance, spinning three times for every two trips around the Sun.

During the 1960's and '70's O'Keefe actively participated in the Apollo program and developed an abiding fascination for tektites, small glassy spheres found here on Earth. The prevailing view is that tektites are formed here by meteorite impacts. But O'Keefe, never the one to follow the herd, thinks that it is impossible for short-lived events like impacts to make glass of tektite composition and purity. Instead he believes that tektites are formed by a slow cooking

process in the interior of the Moon and are shot to Earth out of lunar volcanoes.

In the 1950's, even before he joined NASA, O'Keefe was thinking about space. He hit upon the idea of putting retroreflectors on satellites and published it. The retroreflectors were to reflect light from searchlights back to the Earth, allowing precise tracking for geophysical purposes. Searchlights proved to be impractical, and the notion of using light for tracking was independently rediscovered by others years later, after the laser was invented. They put the idea to use in the American LAGEOS, French STARLETTE, Russian ETALON, and other laser retroreflector satellites. They continue to measure such phenomena as continental drift and the wobble of the Earth's pole.

O'Keefe was presented with the NASA Award of Merit in 1992 for his many contributions to space science, and the astronomer has probably come the closest of any NASA employee to winning the Nobel Prize.

In the 1950's his daughter contracted malignant melanoma, a particularly deadly form of cancer. Fortunately, she was cured. The incident made O'Keefe think about medicine.

Borrowing ideas from astronomy, he conceived of the optical near-field microscope. He even tried to make one with the help of his neighbor Fred Murphy, a teenager who lived next door. Their equipment proved to be too crude, and O'Keefe settled instead for publishing the principle. As with the retroreflector satellites, the idea was independently rediscovered by others without knowledge of O'Keefe and turned into the scanning tunneling microscope, netting its inventors a Nobel Prize.

O'Keefe could make any subject clear and, with his knowledge and insights into the workings of Nature, was often consulted by colleagues. He gave many of the early colloquia at Goddard, which he enlivened with his keen wit. His many friends at Goddard will miss the lively interchange of ideas with one of the Center's most distinguished scientists.



John O'Keefe

Armstrong, the first man to walk on the Moon.

It was true, astronomer, Dr. John A. O'Keefe, Code 681, retired in March after a lengthy career with NASA, much of it spent at Goddard. In fact, O'Keefe joined the agency when it was first formed and Goddard was nothing more than a suite of offices in Silver Spring. Later, when the Center was built, he moved to the Greenbelt site.

O'Keefe's tenure at Goddard was long and distinguished. In the early years he and his coworkers analyzed the motion of the first Earth satellites and concluded that, apart from the long-known rotational flattening, our planet is slightly pear-shaped. The discovery made the national news and the phrase "pear-shaped Earth" is still

# Smithson medal awarded

by Ernie J. Shannon

A popular electronic exhibition from the Smithsonian Institution's National Museum of Natural History in Washington, D. C., has earned Goddard's Dr. Gene Carl Feldman, Code 902.3 the prestigious James Smithson Bicentennial Medal.

The World Wide Web feature, called Ocean Planet Online, is an electronic version of the museum's Ocean Planet exhibition, which opened in April. Feldman, who is an oceanographer, created the Smithsonian's first on-line exhibition in collaboration with the Institution's Environmental Awareness Program. The

medal was presented to the Goddard scientist by I. Michael Heyman, Secretary of the Smithsonian Institution.

Ocean Planet Online is organized around an interactive floor plan of the museum's exhibition. It includes text, graphics, audio and video. According to Feldman, Ocean Planet "demonstrates for the first time how the Smithsonian can electronically share the beauty and excitement of its exhibitions around the world."

Ocean Planet Online "extends the breadth and depth of the museum exhibition," says Judith Gradwohl, curator of the

exhibition. "With links to oceanographic resources around the world, the program provides much more than an electronic walk through the museum. The best part is that it is available free to people with access to World Wide Web," she said.

The World Wide Web address is:  
[http://seawifs.gsfc.nasa.gov/ocean\\_planet.html](http://seawifs.gsfc.nasa.gov/ocean_planet.html)

## Combined Federal Campaign underway

Goddard's Combined Federal Campaign (CFC) kickoff was held on Oct. 5 in the Building 8 Auditorium. The campaign officially began on Oct. 9 and will run through Nov. 3.

Last year Goddard employees donated over \$425,000.

The goal for 1995 is \$390,000. During the first week of the campaign, more than \$60,000 was collected. Four employees were awarded Eagles and two were awarded double Eagles for donating one percent and two percent of their salaries respectively.

There are approximately 2,600 organizations in the "Catalog of Caring." Among organizations on the list are those involved with children, the homeless, health care, domestic violence, substance abuse and medical research. Organizations that are close to the Goddard community include the Goddard Child Development Center, the Melwood Horticultural Training Center, the John Lamb Foundation and Vocational Services, Inc. With such a broad scope, it should be easy to select a worthy cause and support it.



CFC Poster

Photo by Randy Frisch

## Fall series continues

The Goddard Engineering Colloquia fall series continues with the following presentations:

**November 6:** John J. Wozniak, ANGV Program Manager for the Applied Physics Laboratory presents "Advanced Natural Gas Vehicle (ANGV) Development."

**November 13:** Dr. Tom Van Flandern, Meta Research presents "Exploding Planets and Non-Exploding Universes."

**November 20:** Dean Kamen, Founder, U.S. FIRST presents "Creativity in Engineering."

**November 27:** Dr. Stephen W. Rouhana, Automotive Safety and Health Research Department General Motors Research and Development Center presents "Biomechanical Engineering of Human Surrogates-a Crash Course in Crash Test Dummy Design and Use."

# NASA promotes excellence in America's education system

by Tammy Jones

A project is in the works that will put into place standards for technology education.

Few school systems in this country have an articulated technology studies program for all students from kindergarten through the 12th grade. Dr. Richard Satchwell, assistant director of the "Technology For All Americans Project," says this is because there is a lack of consensus on what should comprise technology programs, and there is confusion concerning the relationship of a technology program with other allied disciplines, such as science and mathematics.

Satchwell, speaking to a recent Goddard employee colloquium, says there are inadequate resources within school systems to conceive and develop a technology program and insufficient numbers of teachers prepared to teach technology.

What does this mean for the future of American schools? Satchwell thinks there is hope.

"The Technology For All Americans Project" wants to make a difference and will begin by developing standards for technology education. The project is administered by the International Technology Education Association (ITEA) and funded by NASA and the National Science Foundation. The project is being administered in a number of phases. Phase I will develop a rationale and structure document that will lead the way to standards. Phase II will develop curriculum content, student assessment, teacher education and program standards for K-12 technology education.

The vision for NASA's role in education is to promote excellence in America's education system through enhancing and expanding scientific and technological competence. Diane Cockrell, Code 130, a teacher and education specialist, says Goddard's education programs are built around key strategic elements. They are to enhance teachers'

abilities to teach science and technology by providing them with new experiences and tools.

Satchwell says that technological knowledge and capability are chief resources for our economy. Technology education programs teach students to understand, use and control technology.

The project is overseen by a 22-member commission which provides advice on the overall planning, development, and implementation of the project; identifies strategies for how to best disseminate and promote the project; and assures that the project develops materials that will serve all Americans. The commission membership is comprised of persons with backgrounds in science, math, engineering, humanities, industry and business, supervision and curriculum development and technology education. The standards are expected to be completed and disseminated by March 1996.

## Solar-Terrestrial Physics

Continued from page 1

The SOHO spacecraft is a unique ESA three-axis stabilized spacecraft measuring 3.7 meters (12.1 ft) in diameter and 3.8 meters (12.5 ft) in height. The total spacecraft mass at launch is approximately 1,850 kg (4,080 pounds).

The mission is designed to last for at least two years. NASA is responsible for the launch and operation of SOHO. Several NASA facilities will support the collection and dissemination of SOHO science data. The NASA Deep Space

Network will be used to collect SOHO-wide band data via radio from the U.S. The Central Data Handling Facility at Goddard will produce a "key parameters" record of data to serve as a guide to the much larger volume of raw data.



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The GSFC Solar Data Analysis Center will distribute and archive SOHO data. Detailed analysis of the data will be performed by investigators using computers at their own sites and at Goddard, and sharing the data through NASA Science Internet connections throughout the United States, Japan, and Europe. An Experiment Operations Facility located in Building 3/14 will be used to coordinate and plan the scientific operations of the mission.

"If SOHO shows us something we didn't know, or confirms conclusively something we think we know, it will be an outstanding success. Currently, there are many things about the Sun and space between the Earth and Sun that we do not understand. If we learn something new that will help mankind in the future, it will be well worth the investment," said Poland.

NASA's participation in the SOHO program is managed by the Space Physics Division, NASA Headquarters.