NASA
National Aeronautics and Space Administration
Goddard Space Flight Center

Goddard News

Greenbelt, Maryland and Wallops Island, Virginia

Vol. 31 No. 3 March 15, 1984

STS-41C

Goddard to Play Major Role in SMM Repair

Goddard will play a major role in the Solar Maximum Repair Mission (SMRM) during Shuttle flight 41C, expected to be the most spectacular space mission ever conducted. The Orbiter Challenger is to be launched April 6 from Cape Kennedy, Florida, carrying five astronauts in the first attempt ever to service and repair a spacecraft in orbit.

After deploying a 8000-pound spacecraft called the Long Duration Exposure Facility (LDEF), Challenger will rendezvous with an ailing solar spacecraft in order to retreive it, repair it and re-deploy it into orbit.

The solar spacecraft is the Solar Maximum Mission (SMM) observatory, which, after its launch in February 1980, operated successfully for 9 months before becoming partially disabled. SMM's attitude control system failed as did its Coronograph Polarimeter (CP), one of seven instruments for investigating solar flares. The SMM is a major research effort for investigating the physics of solar flares.

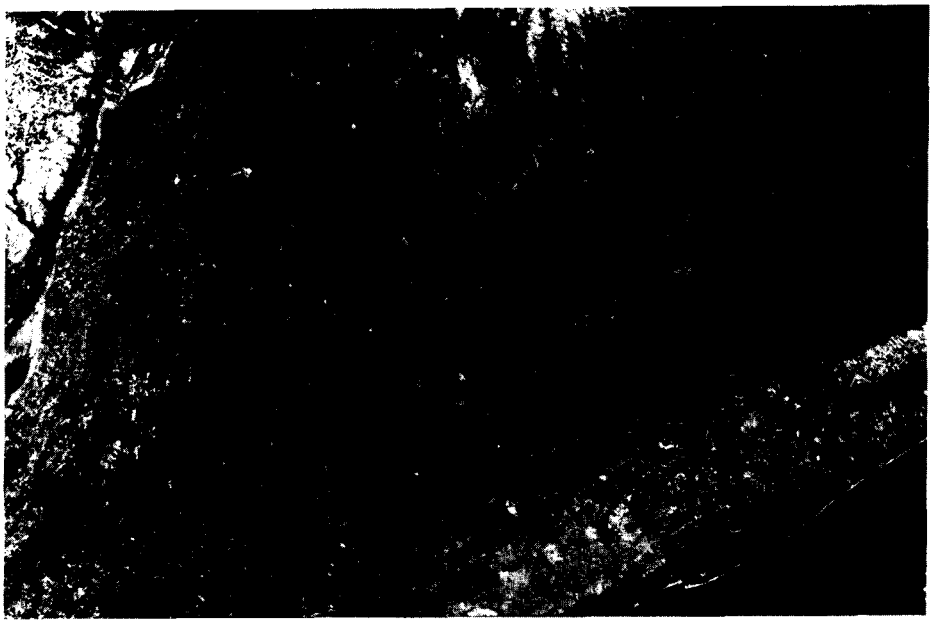
Repairs to be made during STS-41C include replacing the attitude control system module, replacing the main electronics box on the CP and placing a cover over the gas vent of the X-Ray Polychromator. Goddard Project Manager for SMRM Frank Cepollina said scientists are hopeful all in-

Continued on page 4

Landsat-D Prime launched successfully, MSS, TM images returned

NASA successfully launched the Landsat D Prime spacecraft March 1 to supplement the ailing Landsat 4 satellite, which developed problems in its power generating system and x-band transmitter after having been launched in 1982. Landsat D Prime is the fifth in a series of Earth resources satellites.

Landsat D Prime's mission is to satisfy continuing requirements for timely, accurate and reliable data on Earth resources. The data is used for research and applications in oil and mineral exploration, agriculture, forestry, geology, land use and water management.



MSS IMAGE - The first image relayed by the Landsat 5 spacecraft occurred March 4 while the satellite was passing over the New York City area. This Multispectral Scanner image shows much of New York City, the Hudson Valley, eastern and central Long Island, Connecticut, and northern New Jersey. At the eastern end of the island, the accelerator at the Brookhaven National Laboratory appears as the white circular area. In the lower center of the image Manhattan is clearly visible. The first images from the spacecraft's Thematic Mapper (TM) offered even greater clarity than the MSS. The first TM images were made March 6 of the Texas and Oklahoma area.

Landsat D Prime, like Landsat 4, is carrying the Multispectral Scanner (MSS), and the advanced, high resolution, Thematic Mapper (TM). Landsat 4 was launched in 1982 and has transmitted more than 168,700 MSS images of portions of the Earth and more than 9,400 TM images. The TM provides data in seven spectral bands with greatly improved resolution.

A secondary payload, University of Surrey Satellite (UOSAT-B), attached to the second stage of the Delta launch vehicle, was launched in tandem with Landsat D Prime. UOSAT-B is a communications and scientific satellite sponsored by the Radio Amateur Satellite Corporation (AMSAT) and is being used to stimulate more interest in space science and engineering among radio amateurs and students.

After launch, and a checkout of 32 days, Landsat spacecraft and MSS operations are to be turned over to the National Oceanic and Atmospheric Administration (NOAA). NASA plans to

Continued on page 8

Goddard develops new carrier for sounding rocket experiments; SPARTAN One Scheduled to Fly on Discovery in August, 1984

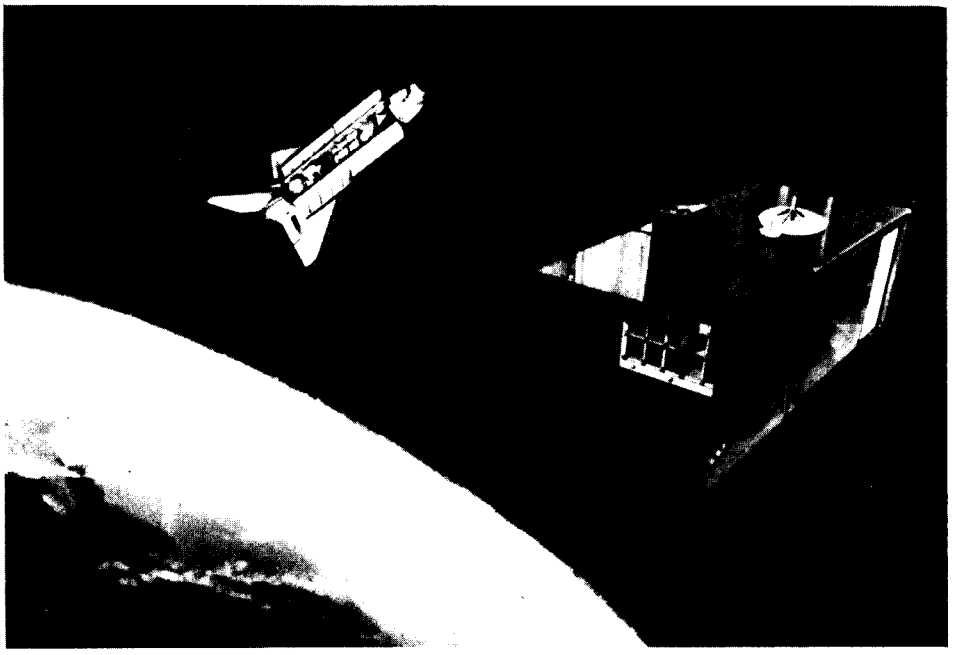
Goddard's Special Payloads Division (SPD) is developing a carrier for sounding rocket experiments to be flown and deployed by a Space Shuttle. Called Spartan 1, its first test is scheduled for an August '84 Shuttle flight on the Orbiter Discovery.

The first Spartan payload will carry an x-ray experiment from the Naval Research Laboratory. Discovery will use its robot arm to deploy the 2,200-pound boxlike structure and leave it to operate autonomously for over 40 hours. During the first half of Spartan 1's operations, Discovery will travel at least 80 miles from the payload and return slowly during the second half. The payload then will be retrieved and stowed in the cargo bay, powered down for the remainder of the mission and returned to Earth.

The Spartan project began in 1979 with a major objective to devise a means for Shuttle-borne sounding rocket experiments. Project officials expect to augment existing sounding rocket operations with longer data acquisition times offered by the Shuttle. At the same time, they expect to continue the high rate of success typical of current sounding rockets by using existing hardware and methodology where possible.

According to project officials here at Goddard, the Spartan operational concept is to use the Shuttle and her crew's resources as little as possible. This will allow maximum flight opportunities and quick reaction time, according to Project Manager Dave Shrewsberry.

Plans call for the crew to employ the Autonomous Payload Command System (APSC) to communicate with Spartan while in the cargo bay. Upon release of Spartan, its onboard timers will begin. All operations will be preprogrammed based on deployment time. At the end of the data gathering, the spacecraft will stabilize itself and await pickup by the Shuttle. Recovery is essential because all data will be stored in a tape recorder onboard the spacecraft, eliminating communications between the orbiter and the payload. Relative position of the two spacecraft will be determined by ground-based radars.



Spartan 1—An artist's version of Spartan 1 deployed from the Shuttle. The first Spartan payload will fly on a Shuttle flight this summer. The Spartan concept provides an opportunity to place sounding rocket type experiments into Earth orbit via the Space Shuttle.

Success of Spartan 1 should encourage the flight of additional Shuttle-borne sounding rocket instruments as a low-cost approach for scientific exploration of space. Work on Spartans 2 and 3 already has begun in anticipation of a successful first flight, according to Shrewsberry.

"We plan to phase out fine-pointing sounding rockets by 1990," Shrewsberry said. "SPARTAN 1's success should prove that sounding rocketry can be merged into STS operations without taxing complications. We're confident that the SPARTAN concept can be, successful."

Goddard Art Club displays spring paintings

Although admittedly rushing the season a bit, the Goddard Art Club has taken down the paintings of winter and hung its most recent creations in tribute to the returning spring.

Although the 21 paintings give evidence of the ever-continuing interest in landscapes, seascapes, still lifes and interiors, a new emphasis in the spring show is on portraiture.

This reflects the club's dedication of Thursday evenings to the painting of the human being from the model. Two of the four portraits in the show are of Goddard women who agreed to sit for the club.

Tuesday evenings are still dominated by the other forms when Tom Furlow, former art teacher in Prince George's County, now retired, is the club mentor. The members will pursue the elusive art of trying to capture the human likeness even more intently in the near future when a well-qualified portrait painter will come aboard on Thursday evenings to lead the search. In the meantime, the still lifes, landscapes, seascapes and all the other assorted scapes will proceed apace for your critical scrutiny. Prices are reasonable.

Keep the Center in touch with what you are doing.

Mail your story to the Goddard News, or call the Editor at

344-8102

COBE satellite to study universe

by John C. Mather, Goddard Laboratory
for Extraterrestrial Physics

The Cosmic Background Explorer (COBE) satellite will be launched in the late 1980's, to measure the diffuse infrared and microwave light of the universe. This diffuse light is one of the remnants of the Big Bang, the primeval explosion 15 billion years ago which started the expansion of the universe. Three instruments on board the satellite will detect electromagnetic radiation (light) with wavelengths from 1 micrometer to 1 centimeter and will measure the brightness of the sky in each direction, at each of 100 different wavelengths. This information will be converted into maps that show the universe as it existed in the very distant past, only 500,000 years after the Big Bang. At that time, the universe was only 1/1000 as large as it is today. That is when the hot electrons and protons joined to make hydrogen atoms, and the universe became largely transparent, as it is now.

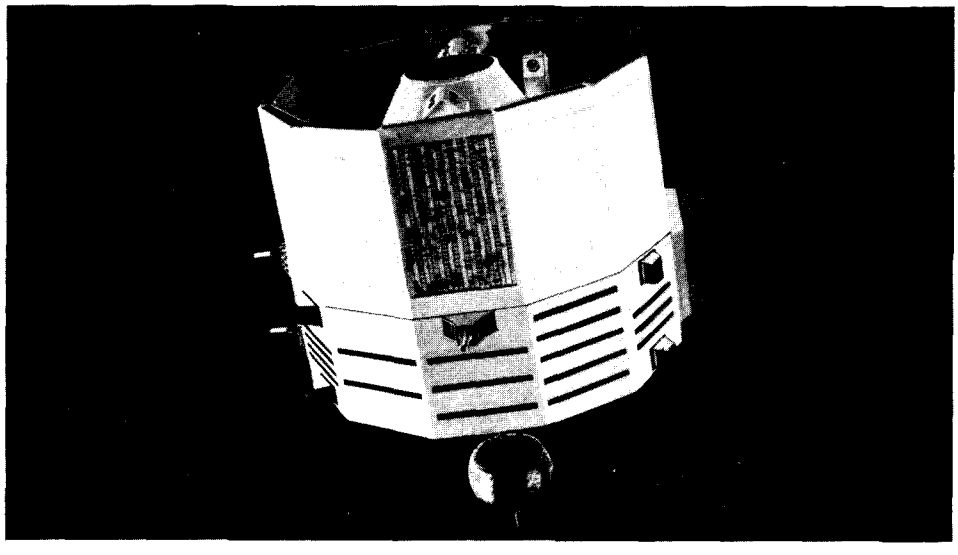
This general picture of the Big Bang is widely accepted by astrophysicists, who are now attempting to fill in the details. Does the universe rotate? Does it expand equally in all directions? Was it homogeneous in the beginning (the same everywhere), or did it have a center or an edge? As far as we can tell, it has none. If the explosion was uniform, then how and when did the matter group itself into galaxies and clusters of galaxies? Is there any sign of antimatter annihilation? Was the explosion turbulent?

The instruments on the COBE satellite can see more distant light sources, and can therefore see farther back in time, than ordinary telescopes. Unlike a telescope, which must greatly magnify a distant galaxy to study it, the COBE studies the glow of huge regions of space that will eventually form into billions of galaxies. On the other hand, accurate measurements of such large regions require very carefully designed equipment and data analysis to distinguish the distant universe from objects near the Earth. A satellite is needed to place the instruments above the interference of the Earth's atmosphere.

The COBE experiments were proposed to NASA in 1974. In 1976, six scientists were selected to define the mission in detail: Ranier Weiss of the Massachusetts Institute of Technology, George Smoot of the University of California at Berkeley, David Wilkinson of Princeton University, Sam Gulkis of the Jet Propulsion Lab, and Michael Hauser and John Mather of the Goddard Space Flight Center. In 1982, NASA officially approved the development of the satellite, which is being managed by Goddard. Launch is now planned for late 1987 or 1988 using the Shuttle.

One of the three instruments (the Far Infrared Absolute Spectrophotometer) measures the spectrum (brightness at each wavelength) of the radiation extremely accurately. The Differential Microwave Radiometers make an exceptionally sensitive map of brightness differences across the sky. The third (the Diffuse Infrared Background Experiment) searches for light from the first (unknown) objects to form after the Big Bang. Two of the instruments require operation at a temperature of 2 Kelvin (degrees above absolute zero), which is provided by a large tank of liquid helium similar to that used by the recent Infrared Astronomical Satellite (IRAS)

The spacecraft will weigh about 10,000 pounds. It will boost itself into an orbit about 600 miles above the Earth, passing near both poles and staying near the twilight region of the Earth. This orbit will allow it to map the entire sky twice in the course of its expected one year life.



ARTIST RENDERING OF COBE—The Cosmic Background Explorer has been specifically designed for studying the Big Bang, the primeval explosion that started the expansion of the universe, and for measuring the diffuse infrared and microwave background radiation, which includes the primary remnant of the explosion.

Space Shuttle Student Involvement Project meeting

Goddard will host a symposium for the National Science Teachers Association/ NASA Space Shuttle Student Involvement Project from March 21-24. The project provides secondary school students a chance to propose experiments for flight aboard a Space Shuttle. Forty students and their teacher-advisors from two geographical regions will propose their experiments to scientists and engineers from government and academic institutions. Purpose of the project is to stimulate interest in science and technology through students' direct involvement in space research. For more information contact Elva Bailey, 344-7207 .

IUE Symposium

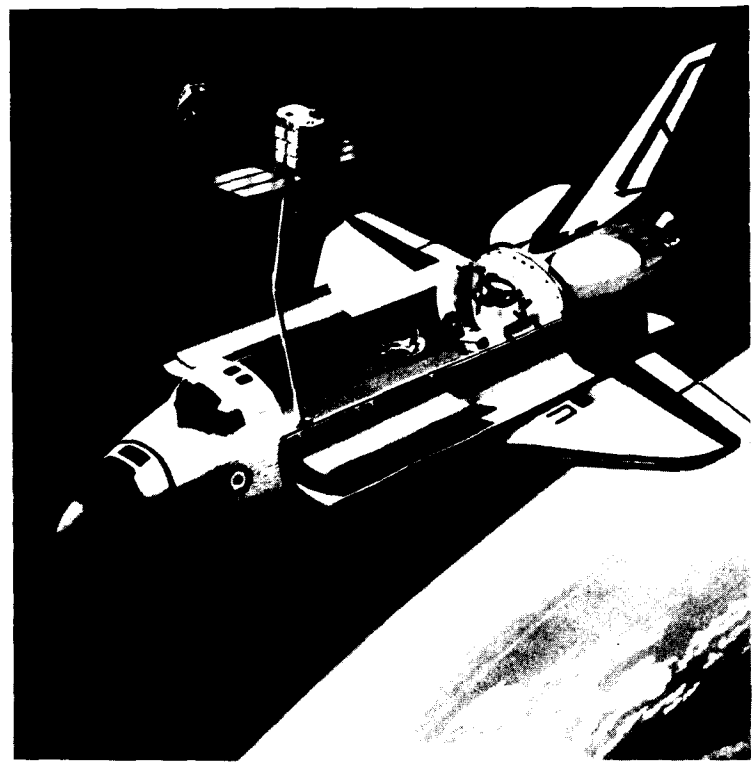
Goddard will hold the third International Ultraviolet Explorer Symposium from April 3-5 in building 26, room 205. The three-day meeting is entitled, "Future of Ultraviolet Astronomy" based on six years of IUE research. More than 100 contributed papers have been submitted for presentation. Over 150 people are expected to attend, including many foreign scientists. For more info, contact Dr. Jaylee Mead, 344-8543.

All Center events are scheduled by Silvia Green, code 253.

Next Shuttle mission includes first in-orbit repair

Continued from page 1

Mission Specialist Dr. George D. Nelson approaches the Solar Maximum Mission satellite at an altitude of some 269 nautical miles to stabilize the satellite and begin the repair sequence. Dr. Nelson moves toward the satellite at a speed of one-half mile an hour, using the Manned Maneuvering Unit. Before him he carries a coupling device to grapple the satellite and hold it steady while the Shuttle approaches to within 30 to 50 feet. The Solar Maximum Mission satellite was launched Feb. 14, 1980.



As the Shuttle's Remote Manipulator Arm grapples the Solar Maximum Mission satellite, Dr. George D. Nelson decouples himself from the satellite and moves away. In the cargo bay, Mission Specialist Dr. James D. van Hoften prepares to receive the satellite and commence repairs.

struments will regain their data gathering capability. However, he said that because of electronics problems with the Hard X-Ray Imaging Spectrometer, scientists are indicating only a 20 percent chance of obtaining 90 percent use of that instrument.

Four of the instruments require fine pointing accuracy from the spacecraft and are not functioning properly with the spacecraft spinning through space, as it has since the attitude control system failure.

Repairs to the spacecraft will be made on flight days three and five.

Retrieving The Satellite

To conduct the repair mission, the Shuttle will ascend 299 statute miles immediately after launch. Following the LDEF deployment on flight day two, Commander Bob Crippen and Pilot Francis Scobee will maneuver the Shuttle higher by another four to 10 miles, or to an altitude equal to the SMM, parking approximately 300 feet away from the spacecraft.

Before Mission Specialist George Nelson attempts to capture the spacecraft, engineers in the Payload Operations Control Center (POCC) at Goddard will deactivate the attitude control system on the spacecraft. SMM will continue to "spin", according to William N. Stewart, Mission Operations Manager at Goddard. However, with attitude control system deactivated, Nelson will have an easier time stabilizing the spacecraft.

When Nelson has stopped the spacecraft from spinning, Crippen and Scobee will move the Shuttle about 30 feet closer to SMM so Mission Specialist Terry Hart can reach out with the robot arm, grapple it and maneuver it into the Flight Support System's cradle in the payload bay. SMM will be locked onto the spacecraft remotely by Hart, who also engages two umbilicals which provide electrical power from the Shuttle to the spacecraft.

In the meantime, Nelson will remove the Manned Maneuvering Unit, the 338-pound jet-powered backpack used successfully on STS-41B, and join astronaut James van Hoften, in the cargo bay of the orbiter, who also is conducting a "spacewalk," but will remain tethered to the Shuttle.

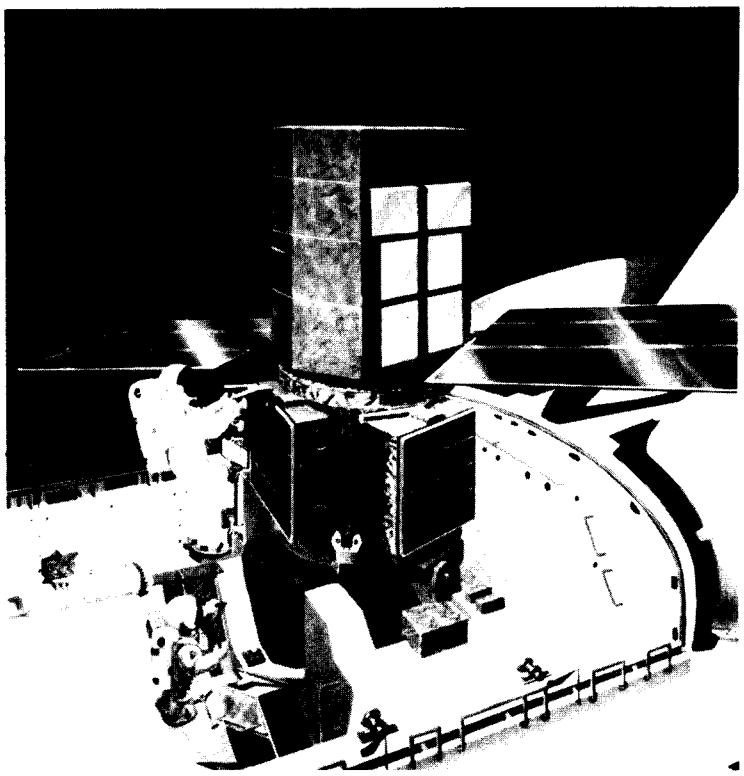
Repairing SMM

In the cradle, the SMM will be tilted forward 25 degrees so its solar arrays can clear the orbiter tail as it is rotated, providing better access to the attitude control system module. Nelson and van Hoften then will position themselves to begin replacement of the faulty control system module.

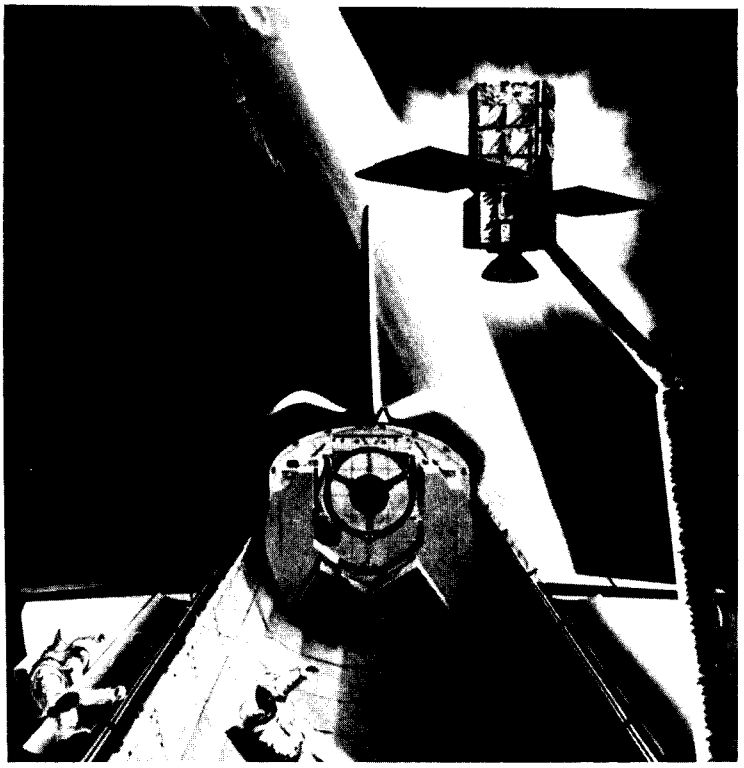
To keep from floating away, van Hoften will secure his feet on a foot restraint attached to the end of the robot arm. Nelson will be secured below on a portable foot restraint. Van Hoften then will unscrew two bolts, remove the module, and replace it with a spare module. Replacing the module is expected to take 45 minutes.

The more difficult task of replacing the Main Electronics Box (MEB) on the CP

Solar Max repair will be spectacular space effort



With the Solar Maximum Mission satellite attached to Servicing Platform in the aft end of the cargo bay, Mission Specialists Nelson and van Hoften conduct repairs. On the first Extra-Vehicular Activity (EVA) day, the failed Modular Attitude Control System is removed and a replacement system installed. On the second EVA day, a failed main Electronics Box is replaced in the observatory's Coronograph Polarimeter (CP). The CP is one of seven scientific instruments aboard the satellite for investigating solar flares.



Repairs completed the Shuttle's Remote Manipulator Arm lifts the Solar Maximum Mission satellite from the cargo bay. The Shuttle releases the satellite at an altitude of 290 nautical miles. The Solar Maximum Mission satellite, whose replacement cost is over $200 Million, is expected to operate effectively with its instruments functioning for at least two years after repairs.

comes next. It is more difficult because the spacesuit gloves are bulky, and the replacement requires working with scissors and small screws. Van Hoften will pull back some thermal protection and install a hinge so that a panel on the MEB can be opened like a door. He is expected to remove all but four of the six screws which hold the panel closed, using an electric screwdriver. That activity will conclude activities for flight day three.

Flight Day Five

After receiving clearance from Goddard's POCC, Nelson and van Hoften will make another extravehicular activity. Van Hoften will unfold and tape back the protective thermal blanket, remove the remaining screws on the panel and secure it open with a special bracket. Van Hoften then must unscrew 22 screws, each with a head no bigger than one-eight of an inch, while wearing gloves comparable to boxing gloves. The screws hold 11 electrical connectors, and van Hoften will have to cut some additional wiring before he can remove the electronics box.

The electronics box is then removed and stowed. A replacement box will be moved into position, at which time Nelson and van Hoften will exchange roles. Nelson will remate the MEB's 11 electrical connectors with clips, eliminating the need to reinstall the previously removed screws. He then will remove the panel support bracket, close the panel door, secure the six panel screws and reinstall the thermal protection.

Redeployment

After repairs are made to the SMM, Hart will then pick up the SMM via the robot arm and hold it off to the side of the Shuttle, where Goddard engineers will deploy a Tracking and Data Relay Satellite System antenna on the SMM and conduct tests with the spacecraft's new attitude control system. The onboard computer will have been reprogrammed completely between EVA's, with Goddard engineers having sent up and checked out 44,000 words of the spacecraft's 48,000-word memory.

The SMM will remain on the arm outside the cargo bay throughout the night. The next day, Hart will position the spacecraft above the Shuttle, and, after receiving "go" for release from Goddard, will gently drop it from the arm's grasp, placing it back in orbit. The Shuttle will station keep about 200 to 300 feet away for approximately two hours and will remain relatively close to the SMM for about (8) eight hours before beginning preparations for reentry.

The spacecraft will undergo a checkout period of about 30 days before becoming operational again, according to Stewart.

Cost of the repair mission has been estimated at about $48 million. The cost of a replacement satellite, including launch costs, would have amounted to an estimated $235 million.

Contractors, please submit those ideas

by Pat Greco
Awards Office

The Suggestion Program has immediate openings for contractor employees. We are not interested in just any contractor employee, but those who have cost saving, health and safety, and environmental control ideas. This program has always been open to all Goddard Civil Service employees, and we are very happy to announce that we can extend an invitation to our contractor employees as well.

There are approximately 8,000 contractors at Goddard and Wallops. With that number of personnel, surely there are many ideas that are just waiting to be explored. Has something happened lately that you feel you could have done better, in less time? Have you noticed safety hazards or environmental problems and believe that you have the right solution for them? Have you ever asked yourself—"why didn't I think of that?" or even worse "Why didn't I do something about that—now someone else has."

Here's your chance, write those ideas down. Submit them to the Awards Office to be evaluated. The Employee Suggestion Form 17-38 is the form normally used for submitting suggestions. If you do not have easy access to these forms, submit your idea on a plain sheet of paper, and we'll do the rest. Be sure you identify yourself, your company, telephone number, and location.

Your suggestion could result in Center-wide recognition. Your suggestion, if implemented, makes you eligible for the "Suggester of the Year Award." This award is presented to the individual whose suggestion has had the most beneficial impact on the Center. The "Suggester of the Year Award" is a plaque that is presented by the Center Director at the Annual Joint NASA/Goddard Awards Ceremony held in December.

Don't keep those ideas to yourself—help Goddard and help yourself to peer and management recognition. For further information, please contact the Awards Office, 344-6118.

PEOPLE

Academic programs abound at Goddard

UPS PROGRAM STARTED—Five employees began their second semester recently in Goddard's newly-established Undergraduate Professional Study [UPS] Program. UPS brings to three the number of academic programs now offered by the Employee Development Branch. With the addition of UPS, all employees now have access to a formalized academic program. The program allows professional administrative employees to be released for up to 16 hours per week with pay to prepare for and attend classes. The year-long program includes an optional year if participants maintain a "B" average and get management approval. Goddard pays for tuition and books. Standing left to right: Martha Harding; Mary LaFleur; Mary Troup and UPS Coordinator Carolyn Casey. Sitting left to right: Barbara Johnson and Cindy Jones.

NEW USE PARTICIPANTS—Ten employees recently began Goddard's Undergraduate Study Education [USE] Program. The program is similar to UPS, but is for nonprofessionals. From left to right: Mary Kenny; Donald Shirk; Regina Davidson; Garcia Blout; Jeanne Burkhart; Richard Fedorchak; Debra Johnson, Denise Racz and Robyn Nowak. Not pictured is Roland Wescott. Not pictured but continuing from last year's program are Linda Phelps; Wendy Niederberger; Sharon Gealson; Cynthia Sharopshire; Wayne Wright; Robert Frostrom, Jr. and Francis Drury.

PEOPLE

New employee explains job like veteran

Twenty-four-year-old Brad Parker has worked as an engineer at Goddard for only eight months, but he explains the details of his job like a seasoned vet.

Parker is a materials engineer in the Materials Control and Applications Branch and currently is responsible for operating a Scanning Electron Microscope (SEM), a high-resolution microscope which uses an electron beam instead of light as the illumination source.

Parker received a B.S. Degree in Chemical Engineering in 1982 and said he finds his educational background "very applicable" to his current work assignment.

"My chemistry background is useful in understanding various material properties and my engineering experience provides insight into the applications of materials," he said. "... I really like the troubleshooting aspect of materials engineering because it allows me to play an important role in helping solve problems over a wide range of activities."

". . . It's gratifying to know your work is helping solve an important problem."

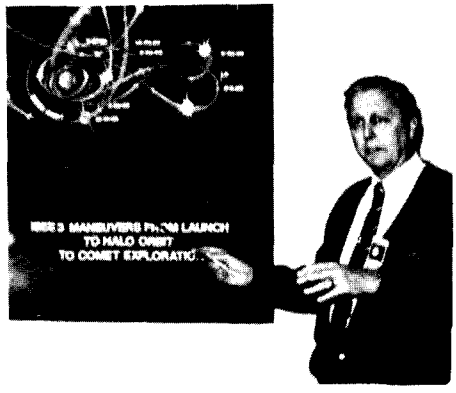
He used as an example a recent assignment in which he was asked to identify a contaminant which caused degradation in the reflectance of mirrors used on an experiment flown on STS-8.

"Using energy dispersive analysis of x-rays (EDAX), I determined the contaminant composition, which helped isolate the contaminant source. It's gratifying to know your work is helping solve an important problem," Parker said.

Parker recently completed several computer science courses at the University of Maryland and also has plans to get an advanced degree in materials engineering. He plays in the Goddard soccer league and enjoys skiing, jogging and tennis. He also has interests in ceramic art, sculpture and calligraphy.

President Reagan praises Farquhar

Goddard engineer conceives cometary explorer mission



Dr. Robert W. Farquhar

President Ronald Reagan has sent a personal letter to Goddard's Dr. Robert W. Farquhar praising him for his "pivotal role" in conceiving and planning the mission that will send the International Cometary Explorer (ICE) to Comet Giacobini-Zinner.

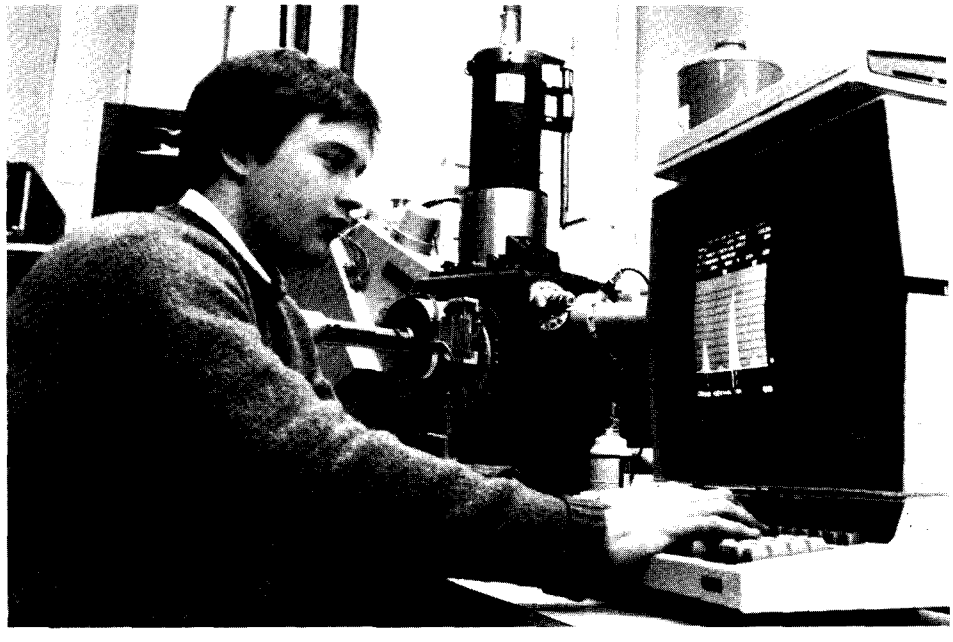
"I recently learned of the pivotal role that you played in conceiving and planning for the use of the Explorer spacecraft ISEE-3 to rendezvous with the Giacobini-Zinner comet in September of 1985," the president wrote.

"The Explorer's encounter with Giacobini-Zinner will be the first close-up inspection of a comet, and it will come six months before several other spacecraft are scheduled to intercept the Halley's Comet. NASA estimates that by diverting the Explorer, as opposed to building a new spacecraft, you may have saved the nation as much as $200 million while gathering much of the same information. I want to congratulate you and your colleagues on this splendid achievement.

"Our nation was built by men of your vision, creativity and determination. Please accept my best wishes for every future success and happiness."

The president's reference to ISEE-3 represents the name of the spacecraft before it began its cometary exploration. ISEE-3 is the acronym for International Sun-Earth Explorer.

Farquhar is Senior Staff Engineer for Advanced Projects (Code 580). He generated the plan to have ISEE-3 accomplish some cometary exploration and served as flight director on the mission that sent the spacecraft by the Moon five times before being thrown into deeper space by gravity for its encounter with the comet. ICE also will make two upstream passes of Comet Halley.



PARKER EVALUATES MATERIAL—Parker performs elemental evaluation using energy dispersive analysis of x-rays [EDAX] produced by the electron beam of the Scanning Electron Microscope [SEM].

Safekeeping

Director compliments Center's safety awareness

My compliments to all the managers and employees who last year gave added attention to safety here at Goddard. I am pleased to inform you that these actions reduced the number of civil service lost time accidents from 27 in 1982 to 17 in 1983—an improvement of 63 percent.

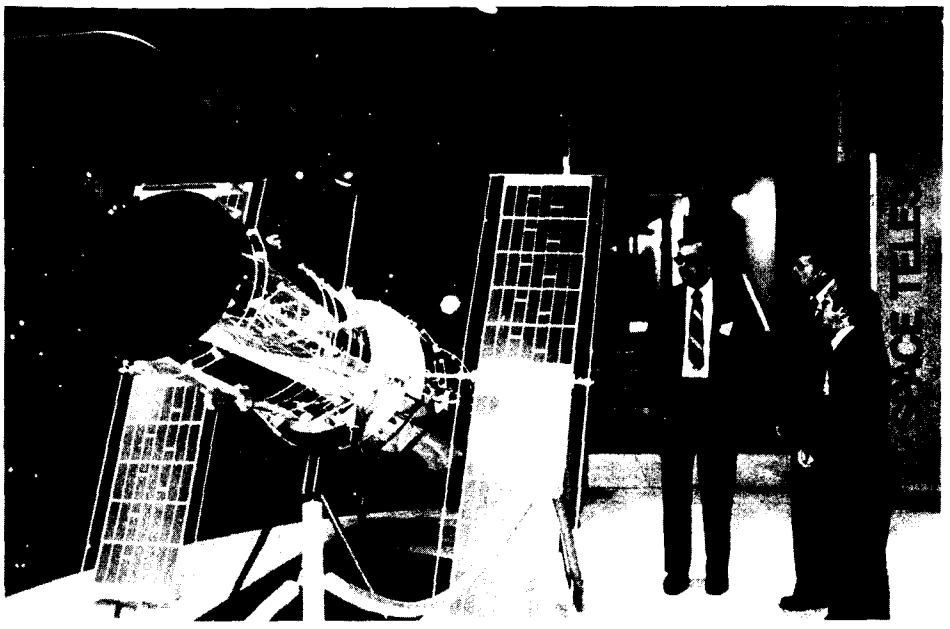
There is, however, another way of looking at these numbers that does cause some concern. Last year, 17 of our people were so seriously injured that they were unable to return to work the day following their injury—even if just to perform light duty. Last year, 122 civil servants (and 164 contractor employees) were injured seriously enough to seek medical attention at the Health Unit. If one adds to these numbers the minor injuries and near misses experienced on Center, one can appreciate the negative effect accidents have not only on our productivity, but also on the Center's quality of life.

After citing a success, I am content to pass out praise and to express my hopes for continued success. In this case, however, I am compelled to encourage everyone to reduce accidents even further. I emphasize that attitude for two reasons. First, I think we can improve our record even more. If everyone would increase their level of safety awareness enough to think through the consequences of their actions before they "take a chance," our accidents would decrease dramatically.

I would like for supervisors and managers to help foster this awareness as an integral part of their continuing activities.

Secondly, no task is so important that people be injured in its accomplishment. Even one serious injury is too many. Throughout 1984, I hope all of us will generate within ourselves and others that level of awareness needed to eliminate most—if not all—personal injuries.

Noel W. Hinners



CONGRESSMAN VISITS—From left to right: Representative Harold Volkmer [D-Mo.], Center Deputy Director John J. Quann and Space Telescope Operations Manager Joseph Rothenberg view a model of the Hubble Space Telescope at the entrance of the Space Telescope Operations Control Center [STOCC]. Volkmer, Chairman, House Space Science and Applications Subcommittee, toured Goddard during his visit last month and was briefed on several Goddard projects. Two days prior to Volkmer's visit, the STOCC was opened with a ribbon-cutting by Quann and Princeton's Lyman Spitzer, who suggested the idea of a space telescope in 1946, before satellites existed.

NASA National Aeronautics and Space Administration
Goddard Space Flight Center

Goddard News

Greenbelt, Maryland and Wallops Island, Virginia

The GODDARD NEWS is published monthly by the Office of Public Affairs, Goddard Space Flight Center, Greenbelt, Md. 20771. Deadline for submitted material is two weeks before the date of publication. For additional information on articles contained herein, contact the editor on (301) 344-8102.

Editor: David W. Thomas

Scholarships offered to NASA dependents

The NASA College Scholarship Fund, Inc., a Texas nonprofit organization, is offering free college scholarships to qualified dependents of current and former NASA employees.

The fund was established from a gift from James Michener, the noted Pulitzer Prize winning author. Michener said he made the contribution because he holds NASA in such high esteem, and that he feels that it is important for education to go forward in America.

Two scholarships, $1,500 each, will be awarded for the 1984-85 school year in this second year of the program. Applicants must be pursuing a course of study in science or engineering, leading to a recognized undergraduate degree at an accredited college or university in the United States. Additional scholarships are expected in future years.

Applications are available in the Goddard Employee Welfare Association (GEWA) Exchange Store. For more information, call 344-8498.

All completed applications, transcripts and related materials should be sent to:

BE5/Scholarship Committee
NASA College Scholarship Fund, Inc.
Houston, Tx. 77058

Deadline is no later than March 30, 1984.

Landsat 5 *Continued from page 1*

operate the TM until 1985, before transferring its operation to NOAA.

In orbit, the spacecraft name becomes Landsat 5. Goddard project manager for Landsat is Luis Gonzales. Dr. Vincent Salomonson, also of Goddard, is project scientist.

The launch marked the 174th launch by a McDonnell-Douglas Delta launch vehicle-the 40th straight success and 163rd overall.