

NASA Calls HST Ground Test a Success

by Michael Braukus

The most comprehensive ground system test ever conducted with NASA's Hubble Space Telescope (HST) has been called a success by NASA despite the challenge of an unplanned anomaly which provided an unexpected bonus.

The fourth in a series of ground system tests (GST-4) began Monday, June 20, 1988 at Goddard. It was scheduled to end early Sunday, June 26. This "full-up test" was designed to simulate almost a week of space flight operations and involved direct communication with the HST located in a clean room at the Lockheed Missile and Space Company, Sunnyvale, CA.

Overall Success

"Overall, the test was very successful," said Ron Felice, Goddard's deputy project manager of flight operations for HST. "Up until the anomaly, the test had exceeded our expectations in terms of science instrument operations, spacecraft operations and control room personnel."

The problem developed without warning on Thursday at 5 p.m., when the HST's onboard science computer and the instruments were placed in a safe mode which is a pre-planned state, activated when the computer senses unsafe conditions. The spacecraft's remaining subsystems continued to operate according to the GST-4 time line.

"Normally that would have been the end of the test," said Felice. "Instead, we convened systems and instrument specialists and, on a real-time basis, we developed processes to trouble-shoot the problem. Sixteen hours later, we established plans to work around the problem and recover safely into the GST-4 time line."

Timing Incompatibility

Felice reported that although NASA technicians are still studying the problem, a timing incompatibility between the science instruments and their computer ap-



GROUND SYSTEMS TEST—(Left to right) Charles Hicks, Bendix Field Engineering Corporation, and Thomas Bryant, Lockheed Missile and Space Company, both working under the Lockheed mission operations contract for the Hubble Space Telescope, man the Data Management System/Instrumentation and Communication console in the Space Telescope Operations Control Center, Building 3, during recent ground system test.

pears to have caused the problem. If this proves correct, the problem can be avoided in the future by a relatively simple operational procedure change which will not adversely affect the HST science mission capability.

On Friday, at approximately 12:15 p.m. the problem appeared again. "Once again the on board science computer and the instruments went into a safe mode. This time, because our technical people were exhausted from working 30 hours straight, we decided not to work the problem and to terminate the science portion of the test. The other elements of GST-4, which did not involve the science computer and its instruments, continued until late Friday evening when the test was ended."

"Actually, the HST's problem was an unexpected bonus for us," Felice explained. "It proved that we have established a team that is able to resolve problems involving an extremely complex and sophisticated spacecraft."

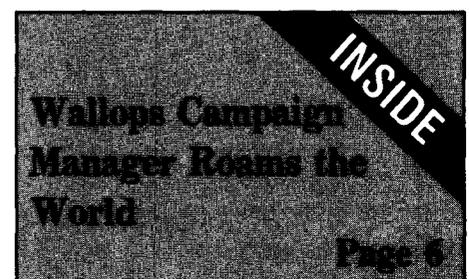
1989 Launch

The HST is scheduled to be carried into space onboard the Space Shuttle Discovery

in 1989. When placed in orbit, the HST will allow astronomers to see farther with greater clarity than ever before.

The HST is managed by NASA's Marshall Space Flight Center, Huntsville, AL. Goddard manages the HST's operations and observations. It also manages the Space Telescope Science Institute, Baltimore, MD. Additionally, Goddard manages five of HST's six instruments. HST is a cooperative project with the European Space Agency.

The six scientific instruments the HST will carry are: wide field and planetary camera, faint object spectrograph, high speed photometer, high resolution spectrograph, faint object camera and fine-guidance astrometer. The faint object camera was provided by the European Space Agency.





Talk from the Top

John W. Townsend Jr

On Tuesday, June 22, Center Director Dr. John W. Townsend, Jr. addressed employees in a "State of the Union" speech. Following are excerpts from the speech. The regular "Talk from the Top" column will resume with the August issue.

"I find the State of the Union here excellent. I think the morale at Goddard is very, very, good. I'm impressed . . .

"I think there's a reason for Goddard's morale being as good as it is, and I think it's partly because we were not hurt by the Challenger as much as some of the other centers In a way, that's luck. But there's also a reason

"We have been launching Delta rockets. We had a Scout launch just in March. We've had a number of sounding rockets, a number of balloons, and then we had a supernova, which was very good—one-in-every-300-years kind of luck.

"I think the fact that we have had things to do has helped our morale, and it's better than doing nothing.

Return to GSFC

"The question I get asked most often is 'What did you find when you came to Goddard after 20 years?'

"I don't find the culture changed at all: It's Goddard. It hasn't changed. It probably never will, to any major extent.

"I think there's a reason for that. Organizations are like people; they have a formative stage. They get used to doing things some particular way, and they continue doing them that way. Anytime anything goes wrong, they make sure that never happens again, so the culture continues to feed upon itself. In Goddard's case, I don't think that's bad. I shouldn't, because I was a part of shaping that culture

Diversity

"I find even more diversity at Goddard than when I left. That, in a way, surprised me. I knew Goddard was into a

Continued on page 3

ICE Launch Remembered

Goddard will celebrate the tenth anniversary of the launch of the International Cometary Explorer (ICE) on August 12. This celestial traveler is probably best remembered as the first spacecraft to intercept the tail of a comet. However, comet interception is not ICE's only famous first.

This 16-sided acrobatic spacecraft was the first space traveler to orbit at the Sun-Earth libration point, the first to traverse the Earth's distant geomagnetic tail, the first to make multiple swingbys of the Moon, and the first to use a lunar gravity-assist maneuver for targeting-escape trajectory. It also has made more gravity-assist maneuvers (five) than any other spacecraft in history.

ISEE-3

Known as the International Sun-Earth Explorer (ISEE)-3, when launched on board a Delta rocket from the Cape Canaveral Air Force Station, FL, on August 12, 1978, this spacecraft has participated in three separate and distinct scientific missions when only one had been planned.

For the first four years of its life, ISEE-3 observed conditions on the Sun and the Sun-Earth neighborhood as part of a series of three ISEEs designed to provide a better understanding of the interaction between Earth and the interplanetary medium.

ISEE-3 performed this original mission from a unique orbit around a gravitational point in space—the first satellite ever to do so. The point, Libration Point I, is located some 900,000 miles from Earth where the Sun and Earth's gravitational forces are in balance.

Detour to a Comet

ISEE-3 had completed the majority of its primary mission objectives by 1981, according to Dr. Robert Farquhar, the Goddard aerospace engineer who originally put ISEE-3 in its libration-point orbit. "NASA was looking for ways to get a spacecraft to explore a comet," he said.

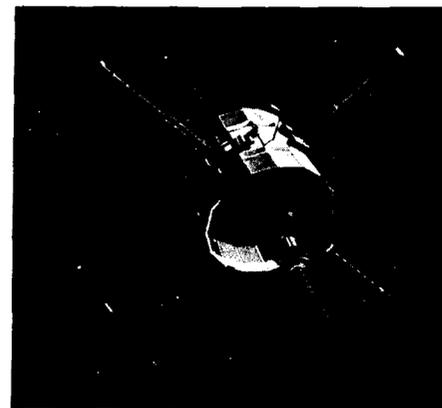
"It was too expensive to build a new spacecraft, so I proposed sending ISEE-3 to Comet Giacobini-Zinner instead."

The idea became even more attractive with the possibility of making an extend-

ed exploration of the Earth's magnetic tail along the way. Thus, ISEE-3 acquired two new lives at once: first, to explore the Earth's deep magnetic tail for about one year, then to intercept a comet.

On June 10, 1982, Goddard flight controllers began directing a 1,054 pound spacecraft out of halo orbit and into the geomagnetic tail on a completely new mission.

Exploring the geomagnetic tail involved what probably have been the most complex orbital maneuvers ever carried out by a spacecraft, including five passes by the Moon—one of which came within about 75 miles (120 kilometers) of the surface.

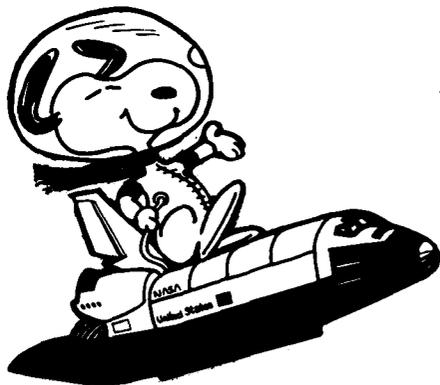


FAMOUS FIRST—Pictured is an artist's rendition of the International Cometary Explorer (ICE) which intercepted Comet Giacobini-Zinner's tail in 1985. Goddard remembers the tenth anniversary of the launch of ICE on August 12.

Finally, on December 22, 1983, on its last pass by the Moon, ISEE-3 began its journey to the comet and was given the new name ICE. Over the next 21 months, the course was corrected just four times before the satellite scored a bull's eye on Giacobini-Zinner's tail, just 5,000 miles from the cometary nucleus on September 11, 1985.

Return to Earth

ICE will return to the vicinity of the Earth in August 2014. At that time, it is planned to use a lunar gravity-assist maneuver to place the spacecraft into a high-apogee Earth orbit. From this location, it would be possible to recover ICE with an astronaut crew and eventually put it on display in the National Air and Space Museum in Washington, DC.



Manned Flight Awareness Program Recognized

by Roberta Valonis

The Manned Flight Awareness (MFA) Program is recognized as one of NASA's most successful, visible, and effective employee motivation programs. It offers the highest and most prestigious recognition available to employees of the NASA government/industry Shuttle/payloads team. While stressing the criticality of crew safety, quality workmanship, and mission success, MFA emphasizes and encourages a "team" concept by bringing together government/industry management, members of the Astronaut Corps, and outstanding employees throughout the workforce.

Under the auspices of NASA Headquarters' Office of Space Flight and the National MFA Panel, the program encompasses all NASA centers, as well as contractor and military organizations supporting manned space flight activities specifically related to Shuttle/payload programs. With policy guidance and direction from NASA Headquarters' MFA Chairman, the government/industry representatives that make up the National Panel conduct local motivation programs at each of their individual locations. In addition to materials such as mission decals, posters, certificates, and brochures, the MFA Program offers significant opportunities to recognize exemplary performance.

MFA Honoree Award

Selected participants have the opportunity to spend approximately three days at a NASA center where they receive a VIP tour of the facilities and attend a reception in their honor with senior NASA/Industry management and members of the Astronaut Corps. Traditionally, this program is held at the Kennedy Space Center and includes an opportunity to view a Shuttle launch. Up to three activities are held each year with participation

from NASA, contractor, and military organizations totaling approximately 250 honorees for each activity. Using established NASA criteria, selection for the award is made by local MFA panels and councils.

Awards and Visits

The Silver Snoopy Award is a silver pin (replica of Snoopy in space garb) and certificate presented personally by an astronaut for outstanding performance in support of manned space flight activities. The Snoopy Award is the astronauts' personal award to members of the workforce.

MFA certificates, awards, and astronaut visits give recognition for special tasks and achievements. An award for flight safety is presented to individuals who identify problem areas that are critical for safe manned flight. The MFA Panel also arranges astronaut visits to NASA centers and contractor plants.

History

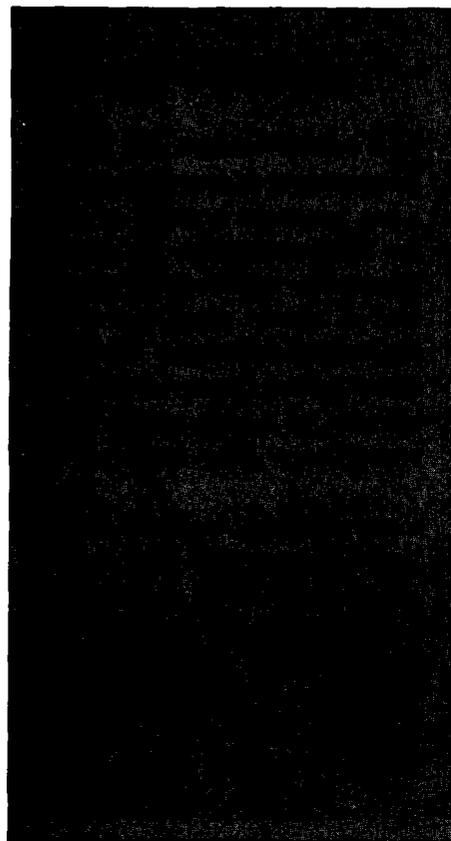
The MFA Program had its beginnings in the early days of the Mercury Program. Astronauts requested and supported the MFA concept as it played a very important role in their safety and in the delivery of error-free boosters, satellites, etc. for the nation's pioneering activities in manned space flight. As the concept of Manned Flight Awareness developed, it was introduced to major NASA contractors and other aerospace companies who supplied hardware and services for spacecraft and launch vehicles. At the invitation of NASA and the major contractors, thousands of suppliers of materials and services to them subsequently became involved.

Today, the MFA Program continues its inspirational and awareness activities throughout the growth of manned flight. The Space Station Program will soon become an active participant in the MFA Program.

The GSFC MFA Council membership is made up of representatives from each directorate and major support services contractors. The current GSFC members of the MFA Council are: Chairperson and Member of NASA/Industry National MFA Panel Roberta A. Valonis, Code 503; Mary Anne Hartman, Code 150; V. Sue Prevost, Code 250; Edward A. Rothenberg, Code 301; Kenneth O. Sizemore, Code 400.6; Raymond Mazur, Code 543; Theodore R. Gull, Code 680; Theodore C. Goldsmith, Code 730.1; James W. Gray, Code 820; Larry E. Hare, Bendix Field Engineering Corporation; Michael Plett, Computer Sciences Corporation; and Joe Giannovario, General Electric.

Questions or information relating to the MFA Program should be directed to your organization's MFA Council Member or to the Chairperson, GSFC MFA Program.

The next MFA Honoree Event is scheduled for the fall of 1988.



Solar Max Makes Rare Comet Discovery

by Carter Dove

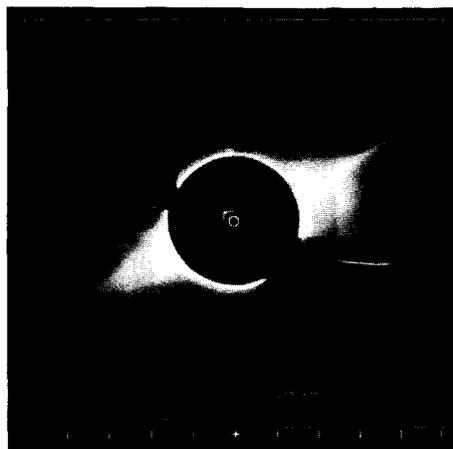
The coronagraph telescope on board the Goddard-managed Solar Maximum Mission (SMM) spacecraft has made a relatively rare discovery: evidence of two new Sun-grazing comets.

In a press release issued July 1, the High Altitude Observatory (HAO) of the National Center for Atmospheric Research at Boulder, CO, reported that a member of the HAO staff discovered the comets—designated SMM-1 and SMM-2—in the coronagraph images.

A member of Goddard's HAO observing team, Dr. O. C. (Chris) St. Cyr, said "Sun-grazing means that the comets get perilously close to the Sun during perihelion (point of closest approach) passage."

Although the coronagraph observations reportedly continued for many hours after the discovery images were taken, neither comet was detected emerging from behind the instrument's occulting disk.

According to HAO, the two comets were not detected at all by ground-based observers who routinely search the night skies for new comet discoveries.



SUN-GRAZING COMET—The comet known as SMM-2 shows as a streak in the lower right quadrant of this image from the SMM's coronagraph/polarimeter instrument. The relative size and location of the Sun is shown as a dotted circle. The black disk is the shadow of the SMM's occulting disk that blocks the bright light of the Sun and allows the much fainter corona to be seen. The bright tail of SMM-2 is shown extending several million miles from the Sun. (Photo: courtesy of the High Altitude Observatory, Boulder, CO.)

The two series of images—obtained October 5 and 17, 1987—are said to show

the comets approaching the Sun at speeds estimated to be 250 km (155 miles)/sec, (SSM1), and 200 km (125 miles)/sec (SSM 2).

In support of the relative rarity of the SMM's discovery, HAO cited such examples as the Naval Research Laboratory's SOLWIND coronagraph aboard the Air Force P78-1 satellite which recorded only six Sun-grazing comets during six years of operation.

Additionally, SMM's coronagraph captured images of comet SOLWIND-5 in July 1984.

Following launch in February 1980, the SMM's coronagraph failed after eight months of operation. Then, in April 1984, astronauts of the Space Shuttle Challenger (STS-41C) repaired both the SMM's defective coronagraph and its attitude control system in the first on-orbit satellite repair in history.

Along with St. Cyr, the HAO observing team at Goddard consists of David Kobe, Timothy Warner, Carolyn Waugh, and Robert Lee, all of Code 602.6.

Fifteen Years of Child Care

Entertaining clowns and energetic kids joined the festivities at the Goddard Child Development Center's fifteenth anniversary picnic on Sunday, June 12.

More than 100 Goddard employees and their children participated in the entertainment provided by the Goddard Recreation Center. The moon bounce, spin art, and the bean bag toss were favorite activities for the children—not to mention the adults!

The Goddard Child Development Center, Inc., is a unique nursery school which provides full day care for 65 children between the ages of 32 months and kindergarten. The entire program is parent-originated and parent-administered. In June 1973, the school opened its doors, committed to the purpose of combining quality day care with excellence in early childhood education.



HAPPY ANNIVERSARY TO THE GODDARD CHILD DEVELOPMENT CENTER—The 15th anniversary of the Goddard Child Development Center was celebrated at the Goddard Recreation Center on June 12. President Nancy Abell (left), Director Barbara Karth (middle), and first president Ann Merwarth present the dessert for this special occasion.

INSIDE

Since joining NASA at the Wallops Flight Facility in 1964, Richard H. "Dick" Bradford has traveled to all corners of the Earth to conduct scientific balloon and sounding rocket missions.

In those 23 years of roaming the world, the unassuming, 42-year-old program and mission manager has been involved in more than 2,500 rocket launches, has been associated with three total solar eclipse events, and has been engaged in a list of balloon launches too long to remember.

The 5-foot 11-inch manager recently returned from two months in Alice Springs, Australia, where he served as campaign manager for NASA's balloon experiments to study Supernova 1987A. He had made two previous trips to Australia for earlier supernova campaigns.

Fifteen balloons—ranging in size from 11 million to almost 30 million cubic feet—have been launched from Alice Springs since the discovery of the supernova in February 1987. To a considerable extent, the success of those campaigns belongs to Bradford, who supervises all aspects of the operations, and to a dedicated crew of specialists from the Wallops-supervised National Scientific Balloon Facility in Palestine, TX.

The blue-eyed, blond-haired mission manager began his career at Wallops as an electromechanical apprentice trainee. He graduated from that program in 1968 and



SKETCHING THE PATH—Dick Bradford, Campaign Manager for a series of balloons launched to study Supernova 1987A, traces the path of a balloon launched from the Australian plains.

began work in the Project Operations Section as a project coordinator.

Bradford has been test director and project coordinator for the three total solar eclipse events—Wallops in 1970, Canada in 1979, and Africa in 1980.

Of all the places he's been, Bradford enjoyed his experiences in Africa most of all.

He was involved with the Panamanian Tropospheric Investigation in 1981, and U.S. campaigns have taken him to Texas, South Carolina, Missouri, California, Florida, Maine, New Mexico, and Hawaii, as well as Alaska, to name a few.

One of his worst experiences, he explained, occurred at Wallops. That's when a Nike-Hercules rocket "almost went

back over our shoulders" after the rocket blast somehow got underneath the steel plate that held the launcher to the ground.

His most satisfying activity was the eclipse program in Canada.

"We had to build a range from nothing, right in the middle of a forest," Bradford explained. "We had to do it all."

One would think that after 23 years in a program, a person as involved as Bradford has been would have seen everything. But that's not the case at all!

Bradford, who lives with his wife Diane, also a Wallops employee, in Public Landing, has yet to see a solar eclipse. He was always stuck in the launch control room making sure all went well with the sounding rocket launch and flight.

GSFC Gives Teachers An Education

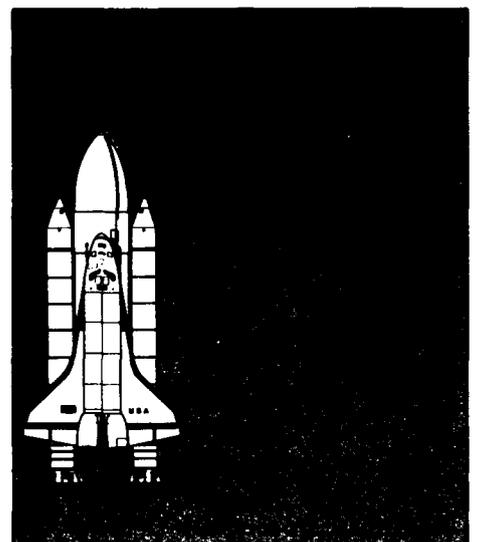
by Patti Simms

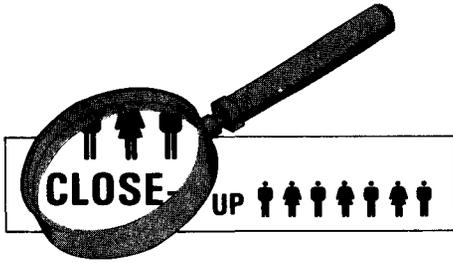
Teachers don't often get the chance to build an experiment that could actually be flown on board a shuttle mission. But twenty participants of the NASA Educational Workshop for Mathematics and Science Teachers (NEWMAST) program were given this opportunity during a 12-day program that began June 19 at Goddard, sponsored by Goddard's Educational Program Office and the National Science Teachers Association.

The program was established five years

ago to give teachers an opportunity to increase their knowledge of space science and technology and to encourage them to take this knowledge and interest back to their students and community.

The twenty teachers worked together to build a space shuttle experiment. They also participated in educational field trips to Langley Research Center and the National Air and Space Museum. The teachers also engaged in laboratory experiences and heard informative lectures from Goddard scientists, engineers, and technical specialists.





BARROWMAN

Congratulations to **JAMES S. BARROWMAN**, who was formerly Project Manager of the Attached Payloads Project and was reassigned as Project Manager of Explorers and Attached Payloads (EAP), Code 410. He will be responsible for all activities of the former Explorer Missions Project and most of the activities of the former Attached Payloads Project.



MARGOLIES

The former Deputy Project Manager for the Explorer Missions Project **DONALD MARGOLIES** was assigned as Barrowman's deputy. Margolies will assist the Project Manager in providing leadership for planning, implementing, directing, and coordinating a comprehensive Explorer class and attached payloads development program.

LUIS GONZALES was appointed Project Manager of the Upper Atmosphere Research Satellite (UARS) Project, Code 430. He was formerly Chief, Systems Engineering Office, Engineering Directorate. Gonzales was awarded the NASA Exceptional Service Medal in 1977 and 1983.



GONZALES

NSTL Renamed Stennis Space Center

NASA's National Space Technology Laboratories (NSTL) has been officially renamed the John C. Stennis Space Center by executive order of the President.

President Reagan signed the order to rename the center for the distinguished Mississippi senator who is retiring after 41 years of service to the nation and the state.

The center, near Bay St. Louis, MS, began as the Mississippi Test Facility in 1961 and tested the Saturn V first and second stages for the Apollo program. It became NSTL in 1974.

Retirees

Congratulations to the following employees who recently retired from Goddard:

	Code	Years
Ambrose, Robert E.	534.1	34
Bujanski, Robert S.	292.1	34
Cosner, Donald L.	712	21
Dowdy, Gully C.	303	21
Fortney, William D.	743.1	33
Lehan, Richard A.	284.3	36
Monroe, Robert A.	292	37
Scholl, Harland F.	290	34
Taylor, Harry A.	610	37
Walch, Carl L.	313.1	36
Watson, Robert S.	515.1	30

Lindsay Lecture Honors Burlaga and Nordberg

Special recognition was given to **DR. LEONARD F. BURLAGA** for his outstanding contribution to space science at the 23rd Annual Lindsay Lecture, held in Goddard's Building 3 Auditorium on June 10. Dr. Burlaga received the 1988 John C. Lindsay Memorial Award for "markedly advancing the natural way that order at the star can be transformed into an increasingly turbulent medium in the circumstellar cavity." Dr. Raymond Hyde, a distinguished British scholar in fluid dynamics, presented the Lindsay lecture.



BURGALA

At the lecture, Center Director Dr. John W. Townsend, Jr. presented Mrs. Beatrice Nordberg with the first copy of a Committee on Space Research (COSPAR) medal named after her late husband, **DR. WILLIAM NORDBERG**. COSPAR will present the medal for outstanding contributions to the application of space science. Dr. Nordberg was a former Director of the Space and Earth Sciences at Goddard and was involved in the COSPAS/SARSAT search and rescue project until his death in 1975.

NEWSFLASH!

Goddard welcomes **SHARON C. FOSTER** the newly named Director of Management Operations, effective July 3. In this position, she will be responsible for the direction and management of the administrative and institutional functions of Goddard.

See story next issue.

U.S. SAVINGS BONDS

THE GREAT AMERICAN INVESTMENT

Gemini Capsule Refurbished

Seventeen Plant Operations and Maintenance employees recently refurbished the Gemini-11 capsule now on display at the recently-renovated Greenbelt Visitor Center. The job, which took more than

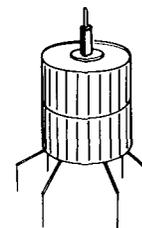
300 hours and cost approximately \$500 in materials, included repair or replacement of gauges, upholstery, metal interior, and interior and exterior painting.



GEMINI REFURBISHING CREW—Pictured in the bottom row (from left) are: Eugene Thomas, Code 291.4; Francis Drury, Code 291.2; Charlie Holloway, Code 291.4; and Joseph Merryman, Code 291.4. Second Row: Steven Johnston, Code 291.3; Andre Jackson, Code 290.1; Marion Palmisano, Code 291.3; and Victor Crawford, Code 291.3. Third Row: Robert Jenkins, Sr.; Code 291.3; Richard Karas, Code 290.1; Charles White, Code 291.4; Ralph Ryder, Code 291.1; William Fuller, Code 291.4; Curtis Evans, Code 291.3; Edward Ashelford, Code 291.3; Anthony Swann, Code 291.3; and Joseph Polowczuk, Code 291.4.

Reagan Reaches Antarctica with ATS-3

President Reagan transmitted a Midwinter's Day message to scientists in Antarctica on June 22, using the Goddard-managed Applications Technology Satellite (ATS)-3.



Launched on November 5, 1967, ATS-3 is one in a series of multi-purpose engineering satellites, designed specifically for useful applications of space technology through communications, meteorology, navigation, and Earth resources management.

President Reagan's message was:

- > "I am very pleased to greet the men
- > and women conducting important scientific research at installations across the
- > darkened seventh continent.
- > "In 1931, Lawrence Gould, Chief
- > Scientist of Admiral Byrd's first expedition, said that scientific research in any
- > new field works by trial and error and
- > naturally often finds itself running up
- > blind alleys. . . . [You've] passed the
- > blind alley stage . . . little as we know
- > about the Antarctic, we . . . know enough
- > to realize that we can go looking for
- > specific things."
- > "Today, more than 50 years later,
- > Dr. Gould's words remain true. Through
- > science, we have seen that Antarctica is
- > critical to the complex system interacting
- > processes that govern our environment. Science and support personnel
- > like you who are in Antarctica now
- > help us learn more about our planet and
- > its environment.
- > "As you celebrate Midwinter's Day
- > 1988, you may think of the Sun's return.
- > For you, this day represents a turning
- > from the dark winter night toward
- > the first sunrise. But it also suggests a
- > different type of light—the knowledge
- > you gain will guide the world toward
- > greater understanding of cosmic, climatic,
- > and geological principles. On behalf of the people of the United States,
- > I commend your dedication. You have
- > my best wishes for continued success
- > during the coming months and for a safe
- > return to your homes. God Bless You.
- > Signed RONALD REAGAN"

NASA
National Aeronautics and
Space Administration
Goddard Space Flight Center

Goddard News

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Managing Editor
Rande Exler
Assistant Managing Editor
Carolynne White
Senior Editors
Michael Braukus, Carter Dove,
Jim Elliott and Joyce Milliner