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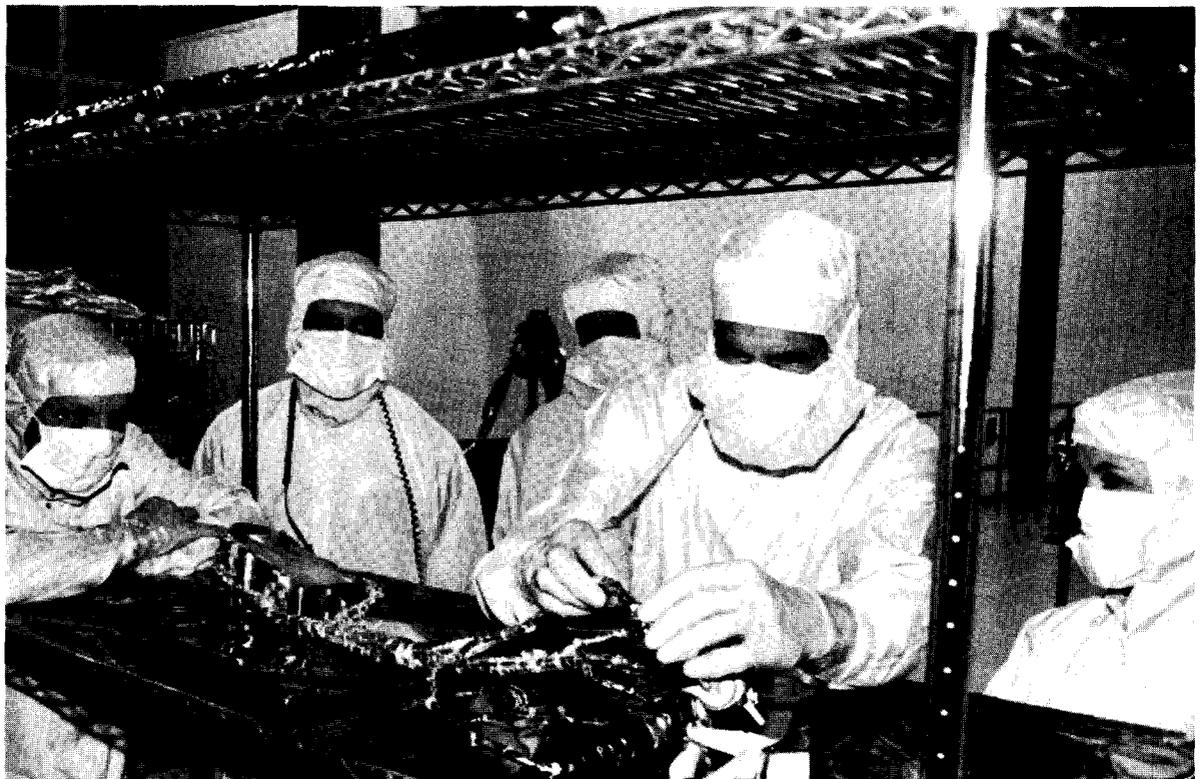


Photo by Ron Moltere

STS-61 Crew Training

Preparations for the first servicing mission of NASA's Hubble Space Telescope (HST) continue this month with the departure from Goddard of the Wide Field/Planetary Camera-II (WF/PC-II) and the Corrective Optics Space Telescope Axial Replacement (COSTAR) for delivery to the Kennedy Space Center, Fla.

A significant milestone takes place in September when HST replacement components WF/PC-II and COSTAR are mated to their carriers. Astronauts will install these components on the 43-foot-(13 meter)-long,

14-foot-(4 meter) diameter HST during the mission.

Mission STS-61 is a planned 11-day flight featuring at least five spacewalks with seven crew members dedicated to servicing of the Hubble Space Telescope. Launch is currently targeted for early December.

Here STS-61 crew members (from left) Story Musgrave, Tom Akers, Greg Harbaugh and Kathy Thornton (far right) look on as Jeff Hoffman works on the Goddard High Resolution Spectrometer repair kit.



Directors' Dialogue

Q: We share Goddard with many wild animals. It is pleasant to see deer and rabbits early in the morning and ducklings in the spring. We also have a colony of federal cats. Is anyone at Goddard officially responsible for the welfare of these animals?

A: Goddard is very proud of its wildlife and habitat and while there is not any one group responsible for animal welfare, several organizations on Center are actively involved with various projects. Code 205, the Safety, Environmental and Security Office is actively working with researchers to test deer birth-control technology.

Actual injections of a safe protein-based control will commence this fall. This will allow deer herd management without hunting. This is being done in coordination with the Humane Society of the United States and under a Maryland Department of Natural Resources (DNR) permit. Code 290, the Plant Operations, Engineering, and Maintenance Division, has joined a newly-established "Green Wedge" working group of local Federal agencies and Maryland's DNR. The Green Wedge is composed of Federal lands equaling approximately 20,000 acres (8,093 hectares) of shared wildlife

habitat. The group's goal is to manage efficiently the Green Wedge habitat through partnering and sharing resources. Goddard will gain the expertise of such reputable organizations as Patuxent Wildlife Research Center and Maryland's DNR to assist in managing its 1,200 (485 hectares) acre share of the common habitat.

**Sherry Foster, director,
Management Operations
Directorate, Code 200.**

Questions for Directors Dialogue may be sent in to Directors' Dialogue, Code 130, with or without identification. Due to space limitations, not all questions can be answered. Questions are sent to the appropriate directorate office as written but may be edited for space and clarity before being printed. Some questions may be answered outside of this forum.

Goddard Opens Building to House State-of-the-Art Laboratory

A ribbon-cutting ceremony on Friday, July 23, marked the official opening of the latest addition to the GSFC campus. The 58,000-square-

foot (5,388-square-meter) Quality Assurance and Detector Development Laboratory (QUADDL) will provide office and laboratory space for

Goddard's Materials Branch and a state-of-the-art Class 100 cleanroom laboratory—a virtually dust-free environment—for the Electron Device Development Section.

Because both organizations use hazardous chemicals and materials in their research, the operations have moved into the new, specifically-designed and constructed facility for storage of hazardous chemicals and gases.

The Materials Branch provides a broad spectrum of analytical and support services to all Goddard flight projects. These include material assurance and review, development, identification, certification, failure analysis, and non-destructive evaluation and testing materials.

The Electron Device Development Section develops and produces a variety of advanced sensors for ever more demanding space applications. These sensors will become the searching eyes of instruments designed to probe the secrets of the universe and understand the workings of our planet.



Photo by Bruno Munoz

A ribbon cutting ceremony held on July 23 marked the opening of the new Quality Assurance and Detector Development Laboratory, Building 30. Cutting the ribbon (from left to right) General Billie McGarvey, director, Facilities Engineering Division, NASA Headquarters; Sharon Foster, director, Management Operations, Code 200; Dr. James Trainor, Associate Center Director, Richard Marriott, head, Materials Branch, Code 313, and Mitchell Brown, assistant director for operations, Engineering Directorate, Code 700.

Midwest Flooding

This image of the recent Mississippi River flooding shows St. Charles, Mo., where the Mississippi converges with the Illinois and Missouri Rivers. The image was acquired by the Moderate-resolution Imaging Spectroradiometer (MODIS) Airborne Simulator (MAS) flying aboard a NASA ER-2 aircraft as it returned to Ames Research Center, Moffett Field, Calif., on July 29, 1993, as the rivers neared their flood peak. The MAS was used to gather data on clouds and aerosols in the recent Sulfates, Clouds and Radiation (SCAR)-A experiment at Wallops Flight Facility. The MODIS instrument is scheduled to fly on the Earth Observing System (EOS) AM-1 spacecraft in 1998.



What's UP?

August 1993

Compton Gamma-Ray Observatory

Days in orbit: 849

The observatory's propulsion system priming operation, providing propellant at tank pressure to the two B-side orbit adjust thrusters, was completed successfully on July 21. A short engineering test burn of those thrusters, to help evaluate the orbit reboost options, occurred on August 3. Currently, the best estimate for beginning the orbit reboost is early September. As of July 22, the mean orbital altitude of the observatory was 218.58 miles (351.77 kilometers), with science operations continuing. All detectors are fully operational.

Extreme Ultraviolet Explorer (EUVE)

Days in orbit: 420

The satellite passed a mission milestone this month when the last gap in the All Sky EUVE Survey was filled, and data collection activities for the map were completed. The observatory continues to perform very well. All payload instruments are fully functional and the Explorer Platform subsystems are still configured to their primary electronics. No tape recorder, gyro, battery or star tracker failures have occurred.

Hubble Space Telescope (HST)

Days in orbit: 1,102

The program is on track for a December 1993 launch for the HST First Servicing Mission (FSM). The Ground Support Equipment (GSE) for HST operations at Kennedy Space Center, Fla., is already at the Cape and the Flight Support Equipment was shipped in early August. The high priority payload items, with the exception of the Solar Array Drive Electronics, are at GSFC. The solar arrays and gyros already have successfully completed testing at GSFC. The STS-61 crew spent a week and a half at GSFC working directly with the flight hardware in the cleanroom, using the EVA tools and crew aids and performing fit checks. In parallel with the hardware activities in the cleanroom and normal scientific observations with the observatory, the GSFC operations teams are involved in regular scheduled simulations to exercise and validate the servicing mission timeline.

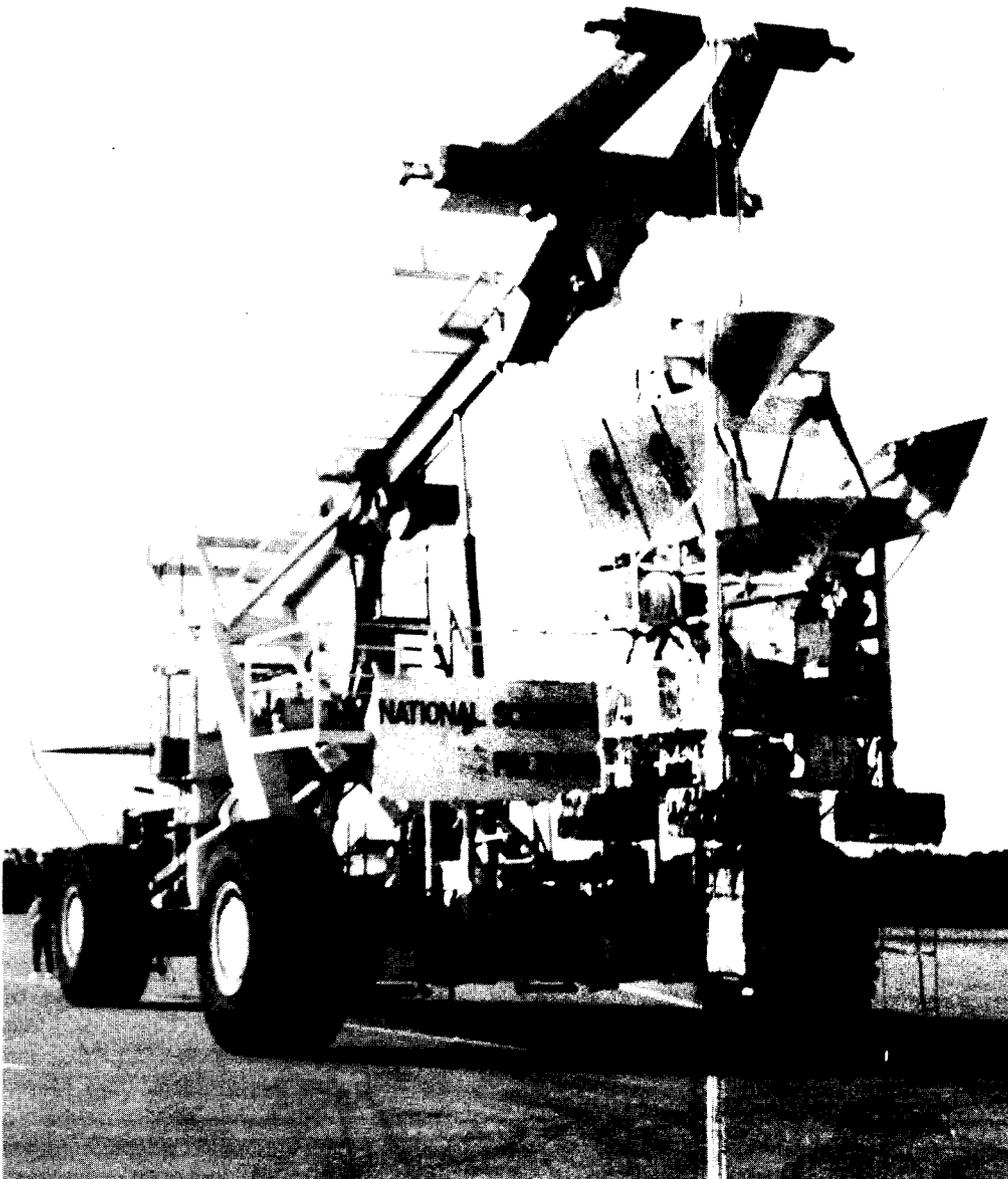
Upper Atmosphere Research Satellite (UARS)

Days in orbit: 687

Goddard's Upper Atmosphere Research Satellite (UARS) is into its 23rd month on orbit, collecting data on the chemistry,

dynamics and radiative inputs to the upper atmosphere. The battery reconditioning procedures took place in June as planned. Battery performance remains stable and voltage monitoring continues. All batteries have positive power readings and the state-of-charge is increasing. Meanwhile, all of the instruments except the Cryogenic Limb Array Etalon Spectrometer (CLAES) and the Improved Stratospheric and Mesospheric Sounder (ISAMS), continue to gather excellent data. CLAES completed its planned period of operation in May, 1993 and ISAMS experienced a chopper motor failure in July 1992. In June, special issues of Geophysical Research Letters (GRL) and the Journal of Geophysical Research concerning UARS instruments and data analysis were released. The cover of GRL shows a UARS image of the southern hemisphere. In 1992, the UARS instruments CLAES, the Microwave Limb Sounder (MLS) and the Halogen Occultation Experiment (HALOE) provided the most complete picture of perturbed constituent concentrations, during Antarctic spring, ever before seen. This indicates very high chlorine monoxide, low ozone, low polar nitric acid and low water vapor in the southern hemisphere's lower stratosphere.

Mysterious Radiation Sources Add to Riddle of Early Universe



Goddard's Medium Scale Anisotropy Measurement (MSAM) instrument is transported to its launch site at the National Scientific Balloon Facility in Palestine, Texas.

By Michael Finneran

Goddard researchers are working to unravel the mystery of two radiation sources they discovered while probing the cosmic microwave background radiation, a remnant of the Big Bang explosion that gave birth to the Universe.

Two unresolved sources appeared in the small patch of sky that Goddard's Medium Scale Anisotropy Measurement (MSAM) instrument viewed during its June 1992 flight

from the National Scientific Balloon Facility in Palestine, Texas.

"This is very puzzling, especially because we've looked at all the catalogs available to us, and there aren't any known point sources in the area that we scanned. These sources have the same spectral signature as the cosmic microwave background," said Dr. Edward S. Cheng, of the Infrared Astrophysics Branch, Laboratory for Astronomy and Solar Physics, Code 685. Cheng is a scientist with the MSAM project.

The MSAM's mission was to detect, on a finer angular scale, the slight temperature variations in the cosmic background radiation that first were detected by Goddard's Cosmic Background Explorer (COBE) last year. These temperature variations are believed to be caused by the initial distribution of matter that led to the formation of present-day structures — planets, stars, galaxies and galaxy clusters.

COBE viewed a seven-degree patch of sky, which at the source of the cosmic microwave background radiation translates into a region that has evolved to be much larger than the size of the observed Universe today.

MSAM measured a half-degree area — about the width of the moon — which corresponds to the size of the largest structures known to exist. This allows for more direct comparison of the temperature variations in the background radiation to present-day structures in the Universe, Cheng explained.

"We've detected fluctuations on the order of a part in a hundred thousand. It's about what people would expect from scaling the COBE results," said Cheng. "The amazing thing is that in our small patch of sky we found two objects that look very much like point sources — that is, like unresolved sources of radiation."

The sources add another element of uncertainty to the search for answers about the origins of the Universe.

"If we can detect two of these point sources, then how do we know that the cosmic microwave background radiation fluctuations are not these sources as well as a distribution of much dimmer sources?" asked Cheng.

Cheng said the sources may prove to be exotic galaxies or some other bizarre quasi-stellar source.

Then again, they might be something entirely new.

"If, indeed, the cosmic background itself has bumps that look like point sources, or very small compact sources," said Cheng, "that too would be a very exciting thing."

Students and Teachers Get A Taste of Summer at Goddard

by Tammy Jones

The end of Summer 93 also brings closure to the educational programs sponsored at Goddard. What follows is sampling of programs designed to expose students and teachers to science, engineering and technology:

Goddard's Educational Programs Unit of the Office of Public Affairs recently concluded several programs, including one for teachers—the NASA Educational Workshop for Mathematics, Science and Technology Teachers (NEWMAST) program. Twenty-five teachers participated in the two-week long workshops on math, science and technology. NEWMAST is cosponsored by NASA and the National Science Teachers Association (NSTA) in cooperation with the National Council of Teachers of Mathematics (NCTM) and the International Technology Educational Association (ITEA). NEWMAST is held annually at each NASA center. Judy Sullivan, a teacher from Perry Hall Middle School, Baltimore, Md., coordinated Goddard's program.

It has been another successful year for NASA's Summer High School Apprenticeship Program (SHARP). Past participants of the program have gone on to some of the country's top colleges. SHARP, a highly successful program that targets minority students, is conducted at all NASA centers. This year there were 35 SHARP students at Goddard and two at Wallops. Cyn Gossier, a teacher from Tall Oaks Vocational High School in Bowie, Md., is the program's coordinator.

The Space Club Scholars Program gives students a realistic work experience in space science and engineering. This summer, 30 students spent six weeks interning at Goddard and Wallops, working with volunteer mentors in the science and engineering fields.

Students who participate in the Scholars Program are selected on an academically competitive basis. "It is not unusual for their composite SAT scores to exceed 1,300, and a few will top 1,400," said Steve Korpon, program coordinator from Severna Park High School, in Severna Park, Md. The program is

supported by the National Space Club Youth Education Committee, which provides each student with a \$600 stipend.

Goddard also conducts educational programs managed by the Equal Employment Opportunity Office (EEO) and the Office of University Programs.

EEO sponsored 68 graduate and undergraduate interns from colleges and universities around the country. Two of the largest programs and exclusive to Goddard are the NASA Technical Experience for Select Students (NTESS) and the Public Service Internship (PSI). NTESS is the only program in the Agency that provides summer work experience for students with disabilities. PSI is the only program in the Agency that provides experience for non-technical majors at the graduate level.

The Office of University Programs was busy with 19 students from around the country who came to Goddard to participate in the NASA Space Academy. Space Academy gives future leaders of the space program a unique perspective on the entire Agency.

Photo by Debbie McCallum



David Carter, Code 924 helps SHARP student Tere Dickson with a project.



Photo by Pete Baltzell

NEWMAST participants take turns looking through a microscope as Goddard's Dr. Patrick Taylor, Code 921, assists. From left: Taylor, Andrea Reger, James Standiford and Robert Glasbey.

Goddard Employee is NASA's First African-American Launch Commentator

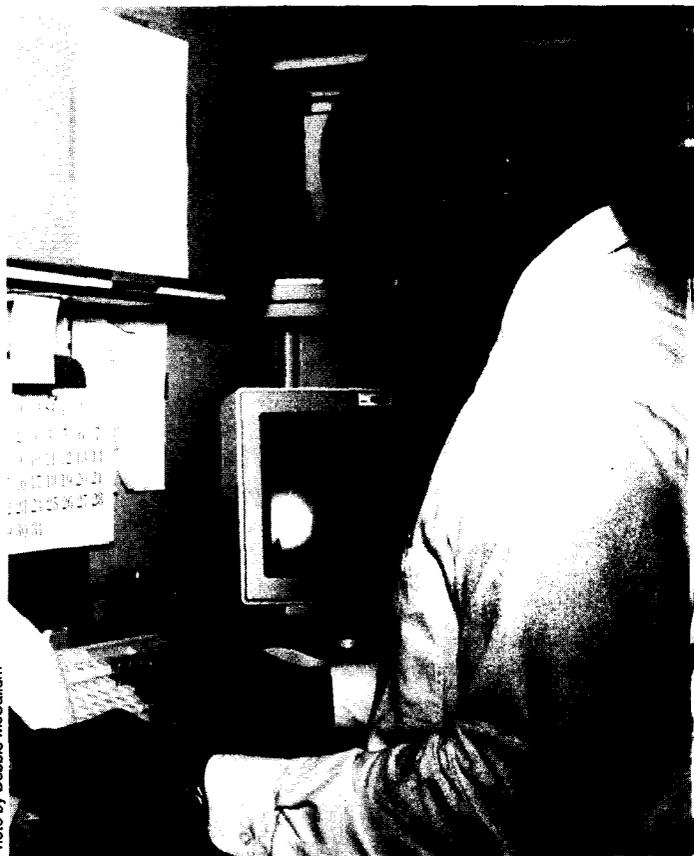


Photo by Debbie McCallum

Fred Brown

By Michael Finneran

Kennedy Space Center's Lisa Malone added her name to the list of firsts for minorities and women in 1989 when she became the first female to do commentary for a space shuttle mission.

Now a Goddard employee has become the first African-American to perform launch commentary for NASA.

Fred Brown, a public affairs specialist, served as commentator for the flight of the Atlas rocket that lifted a meteorological satellite, National Oceanic and Atmospheric Administration (NOAA)-I, into orbit August 9 from Vandenberg Air Force Base in Lompoc, Calif.

But while it was a first for the space agency, the former Marine says he was just following orders when he earned his footnote in NASA history.

"I don't think it's a big deal," said the 34-year-old Brown, who also is editor of the Goddard News. "It's just part of the job."

Brown traveled to Vandenberg and worked for several days with NASA and Air Force personnel to develop a script for the launch which was scheduled for 6:02 a.m. Eastern Daylight Time. As is typically the case for launch commentary, the preparation time far exceeded the actual air time.

"We went on the air at 2:30 a.m. Pacific Daylight Time and were scheduled on the NASA Select satellite for three and a half hours," Brown said. "The commentary ended five minutes after the launch took place. After that, it was just a matter of replaying the

launch and the sequence up to the launch. So the commentary was about thirty, thirty-five minutes."

Teenage broadcaster

Although it was Brown's first launch commentary, he's no stranger to the broadcast booth. The New York-native began broadcasting at age 13, as an announcer doing play-by-play and color commentary on closed-circuit TV for his junior high school football team in Lincolndale, N.Y. Since then, he has pursued a public affairs career with an emphasis on radio and television.

"When you're doing commentary you're not talking all the time," said Brown. "You have to take a breather here and there and just let events unfold. If there's a portion where you need to jump in, you jump in and say what you need to say, and hit the points you want to get across to your audience."

"In the case of NOAA-I, I wanted to get as much out about the NOAA satellite itself and its job," said Brown, who lives in Alexandria, Va., with his wife, Sharon, and 13-month-old daughter Leah. "From the Air Force point of view, I wanted to get out information about the launch vehicle, which was an Atlas-E, a refurbished ballistic missile."

Marine background

Before coming to NASA, Brown spent nearly a decade in the Marine Corps as a public affairs specialist and broadcaster. He began as a reporter and photographer writing for a weekly publication. He later was stationed in Puerto Rico for three years, where he was chief of the radio section for the Navy Broadcasting Detachment. He was the anchor for three daily news broadcasts, hosted a nightly Jazz show, directed live TV newscasts and contributed to a weekly news program called "Navy News This Week," which airs on local cable channels around the country. He also narrated a number of Marine Corps training videos.

"I had a lot of fun, got a lot of experience, got to meet different people and work with some good people," Brown said.

Served in Gulf

His last assignment before leaving the Marines was in Quantico, Va., where he'd been stationed since 1989 with a short break in Saudi Arabia as part of the public affairs detachment for Operation Desert Storm. Brown was stationed in Riyadh with the Armed Forces Radio and Television Service's Desert Network. He was the Network's assistant news director and anchor of the radio news broadcast "Desert Update," which was distributed worldwide by satellite. He also hosted a weekend entertainment radio program for troops serving in the Gulf.

Before the Corps, Brown served as the student manager of WVYC-FM, the York College of Pennsylvania radio station. He also worked part-time for a local AM station, where he was a news and sports anchor, and was an overnight disc jockey on the weekends. He joined Goddard in March 1993.

Is another NASA launch commentary in Brown's future?

"It's not for me to decide what commentary I do," he said, "but I think there's another NOAA launch in ninety-four, so I guess I'll be doing that, plus whatever else comes up."

"I enjoy it," Brown said. "It's like doing radio. And I like doing radio."



Goddard Award Winners View Shuttle Launch

The latest group of Goddard Manned Flight Awareness (MFA) honorees witnessed the April nighttime launch of STS-56, which carried two Goddard payloads—Spartan 201 and the Shuttle Solar Backscatter Ultraviolet Experiment .

The MFA launch honoree award is the highest and most prestigious award available to employees of the NASA/industry shuttle/payloads team. The primary objective of the MFA program is to ensure safety and mission success by emphasizing to NASA and industry employees the importance of their work.

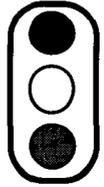
Pictured from left to right are: seated: Gary Welter, Code 510.1, Elizabeth Citrin, Code 441, Deborah Moran, Code 530, Catherine Cavey, Code 287, Calvin Segree, Code 515. Second row: John McQueen, Code 532, William McKellar, Code 532, Chiquita Sorrels, Code 551, Milton Slade, 553, John Grunder, 553. Third row: Jonathan Steele, 502, Felipe Flores-Amaya, Code 553, John Smith, Code 502 and , Edward Plyer, Code 542. Not available for photo: Kevin Hartnett, Code 513, Kenneth Huffman, Code 743 and John Russo, Code 551.

Appointment

MITCHELL BROWN recently was appointed Assistant Director of Engineering for Operations, Code 700. In this position Brown is responsible for assisting the Director of Engineering and Deputy Director of Engineering in the planning, budgeting, scheduling, organization and conduct of a broad program of technological research and development. and Operations.

Brown has served as associate chief for Facilities Engineering, Code 270, since march 1993. Prior to this assignment he served as head of the Planning and Programming Branch, Code 272, from July 1984 to March 1993.

Soil Conservation Road Traffic Study Planned



Motorists on Soil Conservation Road will be stopped and asked to fill out a survey sometime in September as part of a study to determine traffic use.

The Facilities Engineering Division (FED), Code 272 will conduct the survey as part of the Traffic Study and Main Gate Analysis, which will assess the impact of growth planned for Goddard's East Campus.

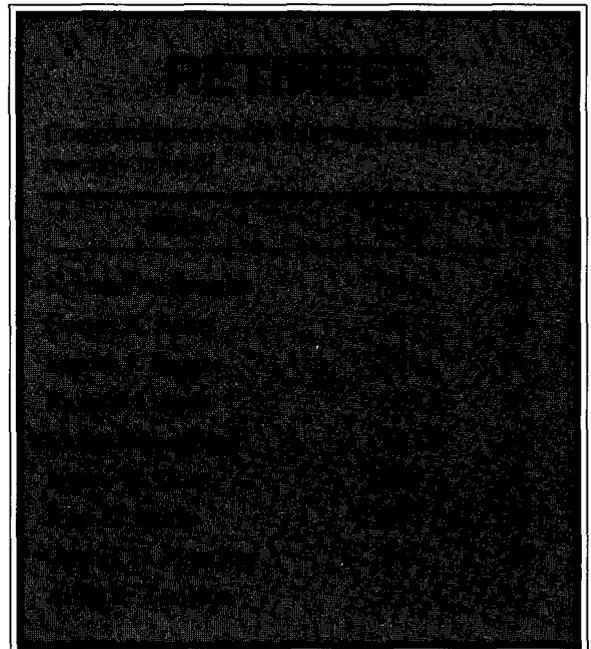
"This will help us understand the effects of this growth on the Main Gate, our Federal neighbors and the local community," said Darlene Brummell, an FED architectural planner who is coordinating the study. "It also will identify alternatives to provide a safe and effective means of vehicular access to and from the two campuses."

The roadside survey will be conducted over a 12-hour period, although a date has not been determined. FED's plans to conduct the survey on an unannounced day so that the sample is representative of normal traffic. Results of the survey will be publicized, however.

Postcard survey

The survey will be printed on a stamped postcard with questions about driver use of Soil Conservation Road. Goddard owns the road where it passes through the center.

"If you receive a postcard survey, we will appreciate your cooperation by promptly completing the survey and dropping it into the nearest U.S. mail box," Brummell said.



Goddard Managed Weather Satellite Launched into Orbit



NASA Photo

August 1993

The National Oceanic and Atmospheric Administration (NOAA)-I, an environmental satellite that will monitor the Earth's oceans and atmosphere was launched at 6:02 a.m. (EDT) August 9, aboard an Atlas-E launch vehicle from Vandenberg Air Force Base, Calif.

NOAA's polar-orbiting satellite program is a cooperative effort. NOAA is responsible for establishing the observational requirements and for operating the system. NASA, through Goddard, is responsible for developing and procuring the spacecraft and for conducting the launch and orbit checkout of the satellite before turning it over the system to NOAA for operational control.

The satellite was renamed NOAA-13 in orbit. It is circling the Earth every 102 minutes at an altitude of 541 miles (871km). Upon orbital checkout, the polar-orbiting spacecraft will observe a different portion of the Earth's surface on each orbit

and view the Earth's entire surface and cloud cover once every 12 hours.

In orbit, NOAA-13 joins NOAA-11 and NOAA-12 in collecting meteorological and ocean data for transmission directly to users around the world. Environmental data will also be recorded onboard for relay to central data processing centers.

The use of NOAA satellite data in several key industries such as agriculture, construction, marine shipping, fishing, utilities and aviation results in more than \$5 billion annually, according to NOAA officials. In addition to their use in weather forecasting, the satellites provide data used for monitoring ozone depletion, global sea ice, global vegetation, forest fires, atmospheric aerosols and solar storms.

The 3,775-pound (1,712-kg) satellite carried search and rescue equipment, which picks up emergency signals from beacons aboard downed aircraft or ships in distress and the ARGOS/Data Collection System, provided by France, which receives temperature, pressure and altitude data measured by instruments around the world. The search and rescue equipment picks up the distress signals and relays the information to stations on the ground which pass the locations of the beacons to Coast Guard and Air Force rescue teams.

The search and rescue equipment onboard include the Canadian-built SAR repeater (SARR) and the French-built SAR Memory (SARM). The spacecraft services three frequencies—121.5, 243 and 406.05 Mhz.

The search and rescue program is part of an international effort known as COSPAS/SARSAT. Major figures in the program are Canada, France, Russia and the United States. Since the program's beginning in 1982, it has been responsible for saving more than 3,200 lives. The SARSAT project is managed at Goddard for NASA.

Goddard News

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