

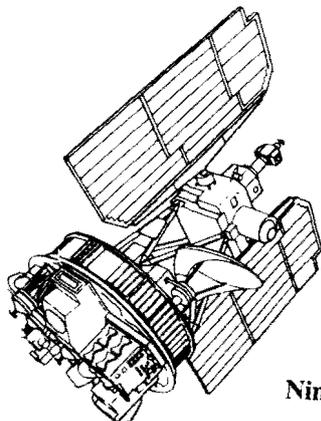
1987: A Year to Remember

The year 1987 has been a year of significant scientific opportunity for Goddard — the brightest supernova in more than 400 years continues to be studied by our scientists — and a year with a disturbing message — the Total Ozone Mapping Spectrometer (TOMS) instrument aboard the Nimbus-7 spacecraft revealed the lowest total ozone value ever observed in Antarctica.

Goddard also took steps towards future growth this year. Ground-breaking ceremonies were conducted for an addition to Building 2 for expanded data processing capabilities and for the Spacecraft Systems Development and Integration Facility which will be the largest clean room of its kind in the world. Additionally, the new Building 13A opened its doors this year to accommodate our growing Tracking and Data Relay Satellite System. Construction of a second ground terminal for TDRSS at White Sands, NM, also was started.

The year 1987 will be remembered as a year of changes in management. Goddard welcomed a new Center Director (Dr. John W. Townsend, June), Comptroller (Duke Stanford, March) and Director of Space and Earth Sciences (Dr. James Trainor, September).

Among the many significant 1987 Goddard scientific and other accomplishments, we remember:



Nimbus-7

JANUARY

Wallops Conducts Launch Down

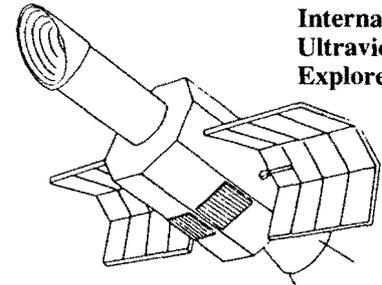
Under: In the first of two long-duration balloon flights from Alice Springs, Australia, Goddard's Wallops Flight Facility on January 25 launched a scientific balloon which landed seven days later near Concepcion, Paraguay. The balloon carried a joint experiment by Louisiana State University and the University of Washington to study nuclear interactions and cosmic ray composition. Although the flight was terminated because of adverse weather conditions, the balloon's scientific payload was recovered in good condition.

FEBRUARY

GOES-H Satellite Launched From the Cape:

The Goddard-managed GOES-H weather satellite was launched aboard a Goddard-managed Delta 3924 rocket from Cape Canaveral Air Force Station, FL, on February 26. After an approximate 30-day checkout by Goddard controllers, the GOES-H — GOES-7 when in orbit — was turned over for operation to the National Oceanic and Atmospheric Administration (NOAA). In addition to providing cloud cover images and atmospheric temperature profiles (or "soundings"), GOES-7 collected space environment data and conducted an experiment for detecting emergency distress signals on the ground from geosynchronous orbit.

Wallops Conducts Research Program in Greenland: Goddard's Wallops Flight Facility launched a series of suborbital rockets from Sondre Stromsfjord, Greenland, during the Greenland II/COPE (Cooperative Observations of Polar Electrodynamics) project from February-April. The research—to gather new knowledge about the solar-Earth relationship—was conducted in cooperation with the Air Force Geophysics Laboratory (AFGL) at Hanscom Air Force Base, MA; the Danish Meteorological Institute (DMI) in Copenhagen, Denmark; and the National



International
Ultraviolet
Explorer

Science Foundation (NSF), Washington, DC. Five of the rocket-borne experiments released chemicals creating artificial vapor clouds above 155 miles (250 km) which were visible over a 500-mile (800-km) radius from the launch site.

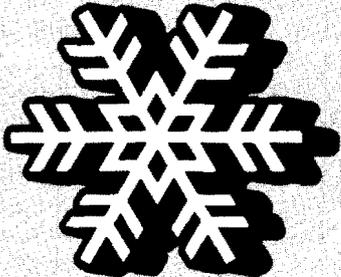
IUE Observes Supernova (SN)1987A.

The Goddard-managed International Ultraviolet Explorer (IUE) spacecraft began on February 24 to return images to Earth of SN1987A, the brightest exploding star seen since 1604 and the first bright supernova since the invention of the telescope about 1609. SN1987A—located approximately 170,000 light years from Earth in the Large Magellanic Cloud, a neighboring galaxy of our own Milky Way—is considered to be the most significant astronomical event of the century. The IUE images of SN1987A were monitored at the IUE Telescope Operations Control Center

Continued on page 5

**COSPAS/
SARSAT
REACHES
1,000TH SAVE MARK**

PAGE 6



**HAPPY
HOLIDAYS!**

NASA Awards Space Station Contracts

by Michael Braukus



SPACE STATION PRESS CONFERENCE—Left to right: NASA Associate Administrator for the Office of Space Station, Andrew J. Stofan; NASA Administrator, Dr. James C. Fletcher; and NASA Deputy Associate Administrator (Development) for the Office of Space Station, Thomas Moser, announced the winners of the Space Station work packages at a press conference at Goddard's Visitor Center on December 1.

The Nation's first permanently manned Space Station came a step closer to becoming a reality when NASA Administrator Dr. James C. Fletcher announced the selection of four aerospace firms for final negotiations leading to award of cost-plus-award fee contracts at a press conference held in the auditorium of the Goddard Visitor Center on December 1.

Before announcing the awards to the standing-room-only audience, Dr. Fletcher commented briefly about the contract selection process. He said, "Needless to say, we expected the best in all aspects, in engineering expertise, in creativity, in solid design philosophy and cost effectiveness, and I am sure we have the best.

"The nation can rest assured that the top people in the American aerospace industry will design and build the Space Station, which in my mind is so vital to our country's future in space."

The four companies selected for the first phase of the Space Station program were: Boeing Aerospace Company, Huntsville, AL; McDonnell Douglas Astronautics Co., Huntington Beach, CA and Houston, TX; General Electric Company, Astro-Space Division, Valley Forge, PA and East Windsor, NJ; and Rockwell International, Rocketdyne Division, Canoga Park, CA.

The contracts include two program

phases. Phase I will cover the approximate 10-year period from contract start through one year after the Space Station is completely assembled. Phase II is a priced option which, if exercised, will enhance the capabilities of the Space Station configuration in the 1991-1999 time frame.

The total cost proposed by the four companies is approximately \$5 billion for the Phase I effort and approximately \$1.5 billion for the Phase II priced-option effort. The work is broken down into four packages, each containing a unique but interdependent portion of the Space Station. The combined work package cost, should the Phase II option be exercised, would be approximately \$6.5 billion.

The Work Package 1 contract, managed by the Marshall Space Flight Center, calls for Boeing to provide the U.S. laboratory and habitation modules, logistics elements, resource-node structures, airlock systems, environmental control and life support system, internal thermal, audio and video systems and associated software.

The Johnson Space Center manages the Work Package 2 contract, which calls for McDonnell Douglas to provide the integrated truss structure; mobile servicing system transporter; airlocks; resource node outfitting; hardware and software for data management system; the communications and tracking system; the guidance.

Continued on page 6

NASA Selects Contractors for Space Robot Study

by Michael Braukus

NASA's Associate Administrator for Space Station, Andrew J. Stofan, announced recently the selection of Grumman Space Systems, Bethpage, NY, and Martin Marietta Astronautics Group, Denver, CO, for negotiations leading to the award of parallel, firm-fixed-price contracts for definition and preliminary design (Phase B) studies of the Space Station Flight Telerobotic Servicer (FTS). The FTS will be a space robot with automated features that will assist crews in the assembly, maintenance and servicing of the Space Station and visiting spacecraft.

Expected to be effective this month, these contracts will continue for nine months at a cost of \$1.5 million each. The studies will be performed at the contractors' facilities.

Managed by Goddard, the FTS will allow robotic in-space assembly of Station elements and payload servicing. The FTS is slated to be launched on the first Space Station assembly flight. Initially, the FTS will be capable of performing such diverse tasks as installing and removing truss members, installing fixtures on the truss, changing out Space Station orbital replacement units, mating thermal utility connectors and performing inspection tasks. The FTS also will enhance crew safety and productivity by reducing extravehicular time, using robots for hazardous tasks and freeing crewmembers from routine tasks.

As the system is evolved, it will perform telerobotic servicing and repair of spacecraft visiting the Space Station. In the future, an FTS-equipped Orbital Maneuvering Vehicle could retrieve, as well as service, spacecraft beyond the Space Station's orbit.

In their studies, the contractors will analyze and evaluate various design concepts for the FTS, as well as the areas of robot configuration, the workstation, software and the FTS-to-Station interface requirements.

A key element of the Space Station program, the FTS will employ technology not used on previous NASA spacecraft. Robotics technologies developed in the FTS program are expected to have terrestrial applications and will play a role in enhancing the United States' industrial competitive posture worldwide.

NASA Pipeline

HEADQUARTERS, Washington, DC — NASA has announced an increase of the allowable end-of-mission landing weight for Space Shuttle orbiters. The allowable landing increase to 230,000 pounds from the previous limit of 211,000 pounds has been made possible by an on-going structural analysis and additional review of forces encountered by the orbiter during maneuvers shortly before landing. Rear Admiral Richard Truly, associate administrator for space flight, said, "Our initial analysis indicates that this change will allow the Space Shuttle to carry a cumulative weight in excess of 100,000 pounds of additional payloads into orbit through 1993."

KENNEDY SPACE CENTER, Kennedy Space Center, FL — A month-long procedures review for stacking the flight solid rocket motors for the next Space Shuttle mission (STS-26) is underway at the Kennedy Space Center in preparation for a return to flight status. KSC workers are involved in the practice exercise of stacking and destacking redesigned solid rocket motors. The test will certify new equipment and procedures, provide training for the ground crews, demonstrate field joint leak check procedures and gather data to improve the process. Major features of the new solid rocket motor design include a tighter fitting joint with the capture feature, a third o-ring, bonded field-joint insulation, joint heaters and a radially-bolted, case-to-nozzle joint design.

DRYDEN FLIGHT RESEARCH FACILITY, Edwards, CA — Successful taxi tests of the Rotor Systems Research Aircraft (RSRA) at Dryden have cleared the way for flight testing. Flight investigations are aimed at the eventual development of a stoppable rotor X-wing flight vehicle that could cruise at the high speeds of a fixed wing aircraft, yet have the vertical flight capability of a helicopter. Initial flight tests will be made without the X-wing rotor system. Installation of the four-bladed X-wing rotor will occur later this year. A four phase test program will lead to possible flights with the complex X-wing rotating.

JOHNSON SPACE CENTER, Houston, TX — The Fourth Annual NASA/Contractors Conference on Quality and Productivity was held at Johnson recently. More than 450 aerospace professionals, including a number of Government and industry senior executives, attended the 2-day conference to exchange information and ideas. The theme of this year's conference was "Achieving Excellence Through Teamwork." The opening keynote speech by NASA Deputy Administrator Dale Myers, luncheon speech by Boeing Company President and Chief Executive Officer Frank A. Shrontz and an evening address by former NASA Administrator James M. Beggs highlighted the first day of the conference. The conference was sponsored by NASA to provide a forum for the agency and its contractor organizations to discuss quality and productivity issues of mutual interest.

MARSHALL SPACE FLIGHT CENTER, Huntsville, AL — Full mission-duration tests of Space Shuttle main engines 2022 and 2019 have been successfully conducted, completing the acceptance testing of the first two engines to fly on the next Shuttle mission. The 520-second tests were conducted November 21 on engine 2022 and November 28 on engine 2019 at NASA's National Space Technology Laboratories, Bay St. Louis, MS. The tests were followed by complete engine examinations and test data analysis which showed that the engines performed within established standards. At each test sequence stage, engine physical examination included oxidizer heat exchanger leak checks. There has been no sign of leakage in engine 2022 and inspection of 2019 is in progress. The third engine slated for the STS-26 is being prepared for its three test firings. It has been installed on the test stand from which engine 2022 was just removed. Officials expect acceptance of the three flight engines for the STS-26 mission to be completed in time for delivery to the Kennedy Space Center, FL, prior to the first week of January.

New NASA News Vehicles

Whether your pleasure for getting NASA news is in the telephone, the television or the written word, NASA's Office of Internal Communications has something for you.

If the telephone tempts you, call 453-NEWS daily beginning in early January and get a 90-second audio report. If voice plus video fractures your fancy, watch weekly on closed-circuit TV for NASA Update or catch it in one of the auditoriums. But if the written word woos you, read News-In-Brief, NASA Activities and the weekly news release summary. Here's the lineup:

NASA Headline Report—This daily audio report will be available about noon and will include news generated by NASA, plus a digest of what others are saying about us.

NASA Update—The newly-formatted video magazine will be scaled down to five minutes from its 20-minute predecessor, which ran from early 1986 to early 1987. The program will offer a quick look each week at NASA news. The first installment was December 4. Check *Dateline Goddard* for the viewing schedule.

News-In-Brief, NASA Activities and the weekly news release summary—News-In-Brief and the weekly news release can be obtained from the PAO Bulletin Board on GSFC mail. News-In-Brief is a written report about what others are saying about us, provided daily on NASA teletext. NASA Activities, the bimonthly agency house organ, will occur in a new format, possibly a new name. And the weekly news release summary will be a compilation of stories written by the agency.

Remember, it's easy to keep abreast of agency activities. Regardless of how the word travels, NASA has a vehicle for bringing it to you. ROLL with NASA's Internal Communications. Read On, with the written reports; Listen to the audio report; and Look ahead, don't miss NASA Update.

Goddard Launches Experiments To Study Exploding Star

by Carter Dove

In what could be termed a virtual scientific "saturation" effort, NASA continued at press time to conduct a three-phased campaign—including balloon and sounding rocket missions managed by Goddard's/Wallops Flight Facility (WFF)—to observe the century's most significant astronomical event: Supernova 1987A, an exploding star.

SN1987A—discovered February 23 this year in a nearby galaxy, the Large Magellanic Cloud—is 170,000 light years from Earth. (A light year is the distance that light travels at 186,000 miles per second).

From balloon facilities at Alice Springs and rocket facilities at Woomera, Australia, the Wallops team had, as of press time, launched three balloons and three rocket missions—six in all—to observe the remnants of the exploding star with gamma, x-ray and ultraviolet experiments.

Balloons and Rockets

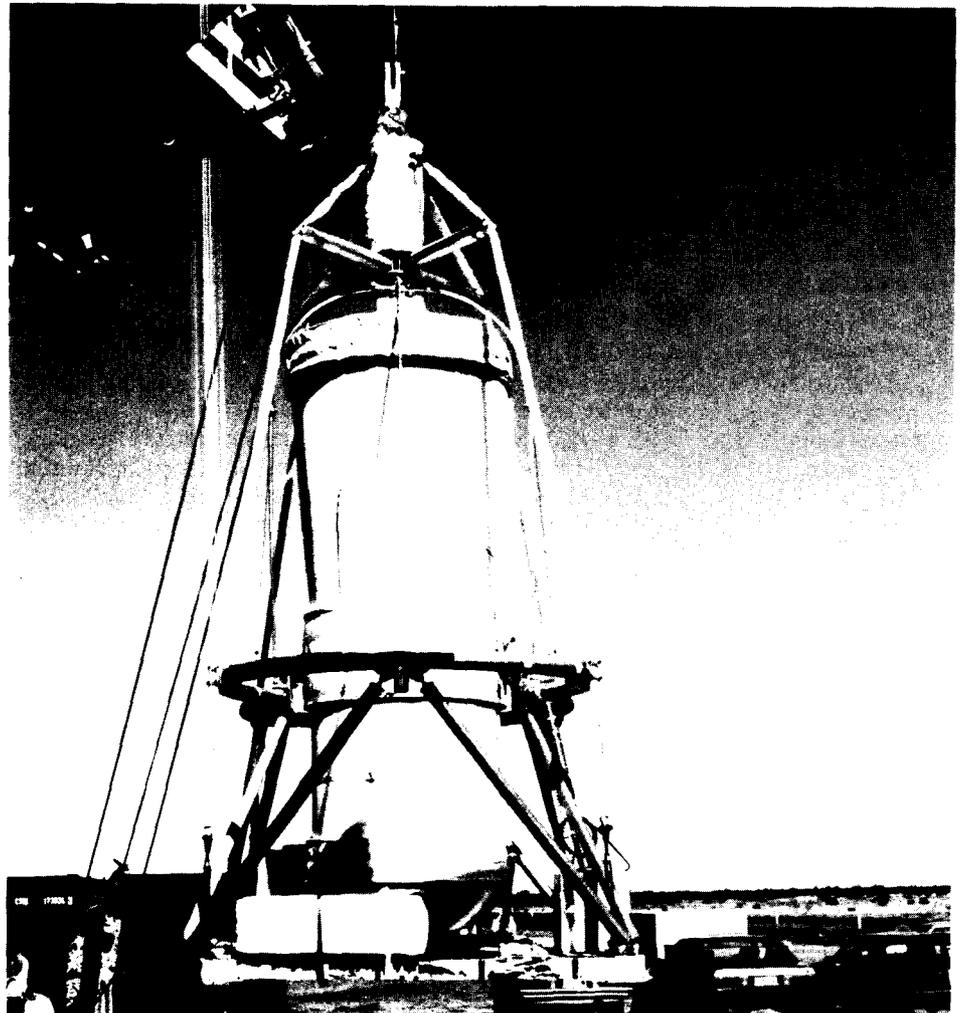
In the first launch, October 29, the 28.4 million cubic foot, helium-filled balloon lifted experiments—a joint payload of the Lockheed Palo Alto Research Center, CA, and the NASA/Marshall Space Flight Center, AL—to an altitude of 130,000 feet. The balloon was aloft for 43 hours 9 minutes.

On November 14, the first of the rocket launches carried an x-ray experiment from Pennsylvania State University, PA, on a successful 14-minute flight. The second launch on November 18 suffered rocket attitude control system (ACS) and experiment malfunctions which voided its ultraviolet observations.

However, that same day at Alice Springs the balloon team successfully launched a 3,000-pound experiment from the California Institute of Technology, Pasadena, to observe gamma radiation produced by the exploding star. The payload of this second balloon launched landed 320 miles west of Alice Springs, near Lake Mackay.

The final sounding rocket in the fall campaign was successfully launched on December 4. It carried an x-ray experiment for Columbia University, NY.

On December 6, the last balloon was launched with the Jet Propulsion Laboratory's gamma-ray experiment on board. The 29.47-million-cubic-foot balloon carried a 2,000-pound payload and had a suspended weight of 3,000 pounds. It was airborne for 12 hours 3 minutes and landed 500 nautical miles west of Alice Springs.



CAL TECH GONDOLA GRIP— NASA launched the California Institute of Technology's Gamma Ray Instrument Package (GRIP) during the fall supernova sounding rocket and balloon campaign from Alice Springs, Australia. GRIP first flew during NASA's spring 1987 campaign. Picture: The GRIP payload at Alice Springs, Australia. The system is 21 feet high and 5 feet in diameter.

NASA's balloon campaign manager at Alice Springs is Richard H. Bradford of WFF. The rocket campaign manager at Woomera is W.A. Brence, also of WFF.

The third part of NASA's three-dimensional SN1987A effort, the Kuiper Airborne Observatory (KAO), was scheduled to fly eight missions from Christchurch, New Zealand during November 2-28 under the direction of NASA/Ames Research Center, CA. The KAO, a modified U.S. Air Force C-141 jet transport, observed SN1987A in the infrared spectrum.

The balloon, sounding rocket and airborne campaign is a continuation of a two-year program to study SN1987A, a program which began last May and ended in June. Then, the KAO conducted a number of studies out of Christchurch, and scientists at Alice Springs launched three

successful balloon missions.

At that time, scientists were able to collect little information because the x- and gamma rays still were being contained within the outer part of the star.

Since that time, instruments aboard the Japanese satellite, Ginga, and aboard the Soviet space station, MIR, have detected hard x-rays. As a result, scientists have theorized that gamma rays should start to escape at any time.

NASA's supernova campaign in Australia will resume in 1988 with balloon launches in January and sounding rocket launches in February.

The current investigations by NASA of SN1987A are being conducted in Australia and New Zealand because the exploding star is only visible in the southern hemisphere.

1987

Continued from page 1

at Goddard. Launched in 1978, the IUE is a joint project of NASA, the European Space Agency and the United Kingdom Science and Engineering Research Council.

MARCH

Delta Launches Indonesian Satellite: A Goddard-managed Delta Rocket—Delta 182—lifted Indonesia's Palapa-B2P communications satellite into orbit following launch from Cape Canaveral Air Force Station, FL, on March 19. The Delta launch vehicle for this mission was the 3920 model, consisting of an extended Thor; long-tank first stage, augmented by nine Castor IV strap-on solid motors; a liquid-fueled Aerojet second stage engine; and a PAM (Payload Assist Module) third-stage solid motor. Palapa-B2P now provides greatly enhanced capability to the communications network that covers more than 13,000 islands of Indonesia, the Association of South East Asian Nations (ASEAN) and Papua, New Guinea.

MAY

Konza Prairie Experiment: North of Interstate 70 near Manhattan, central Kansas, more than 100 scientists on May 26 gathered at the Konza Prairie Natural Area to begin the first of four field campaigns aimed at determining how land vegetation affects climate and weather. The project is known as the First Field Experiment (FIFE) of the International Satellite Land Surface Climatology Project (ISLSCP). The chief objective of ISLSCP is to develop methods for translating satellite data into information about land surface biological and physical properties, particularly those that interact strongly with the atmosphere. Five specially-instrumented aircraft and several Earth observation satellites overflew the site to measure and transmit key data back to Earth. Goddard was the lead NASA center in the project. Nine of its scientists participated in the field campaigns, which concluded in late October.

JUNE

New Director at Goddard: Dr. John W. Townsend, Jr., formerly Executive Vice President for Corporate Development, Fairchild Industries, became Director, Goddard Space Flight Center. Townsend succeeded Dr. Noel W. Hinners who accepted an appointment as Associate Deputy Administration (Institution) at Headquarters NASA, Washington, DC.

Townsend was Goddard's Assistant Director, Space Science and Satellite Applications, beginning in 1959. He was Deputy Director from 1965-1968.

Ground Breaking For New Spacecraft Facility: Ground was broken for the Spacecraft Systems Development and Integration Facility (SSDIF) which will contain the world's largest clean room of its type. When completed in 1989, the SSDIF will provide approximately 78,000 square feet of floor space. The only facility of its kind on the East coast, the SSDIF will enable Goddard to satisfy a national need for increased capacity to handle large payloads in a clean environment.

JULY

Wallops Launches Plasma Physics Experiments: Goddard's Wallops Flight Facility successfully launched two suborbital rockets and three scientific balloons to mark the start of the Wave Induced Particle Precipitation (WIPP) campaign. Project WIPP scientists from several universities and government agencies conducted coordinated experiments to study the role of natural and man-made disturbances in the radiation belt and the resulting effects on the ionosphere. The primary source of the man-made waves was a Navy very low frequency transmitter; the primary source of the natural waves was lightning. These scientific missions are part of the NASA sounding rocket program, managed by Wallops.

AUGUST

GSFC Supports Antarctic Ozone Experiment: Using near-real-time ozone maps produced by the TOMS (Total Ozone Mapping Spectrometer) instrument aboard the Goddard-managed NIMBUS-7 satellite, NASA began its Airborne Antarctic Ozone Experiment this month. NASA's ER-2 and DC-8 aircraft began flights into the Antarctic ozone hole to measure ozone, aerosol profiles and other chemical constituents of the Antarctic atmosphere. The Goddard support will help scientists better understand the nature of a puzzling phenomenon: the decrease of ozone over the Antarctic during early spring over the past eight years.

SEPTEMBER

Astronaut Rick Hauck Addresses Groundbreaking Ceremony: Astronaut Rick Hauck addressed a group of Federal, state of New Mexico and contractor

representatives at a groundbreaking ceremony at White Sands, NM, for the second Tracking and Data Relay Satellite System (TDRSS) ground station. This \$18.5-million facility, located about three miles north of the existing TDRSS ground terminal, is expected to be completed by mid-1989 and in operation by early 1993. Construction includes an 80,000-square-foot main terminal, a 25,000-square-foot support building and a 9,000-square-foot power plant, plus roadway and gas and water lines. The new facility will become a backup to the existing station in supporting the increased mission requirements in the Nation's space program in the mid-1990s. Hauck, a principal speaker at the groundbreaking ceremony, will command the STS-26 mission, now set for launch in June 1988.

OCTOBER

Unique Research Facility Opened at Goddard: In an unprecedented arrangement, NASA, the Universities Space Research Association and The University of Maryland, College Park established a space data and information sciences research facility at Goddard, effective October 1. Known as the Center for Excellence in Space Data and Information Sciences (CESDIS), the facility will serve as the nerve center for a network of researchers from leading university and industry computer science departments across the country. This "telecenter" will allow researchers to work on NASA problems at their home institutions and share their experiences via communications network meetings.

Supernova 1987A Balloon and Rocket Campaign Begins From Australia: In a three-dimensional effort to study SN1987A—an exploding star 170,000 light years from Earth—Goddard's Wallops Flight Facility managed a series of balloon and rocket launches from Alice Springs and Woomera, Australia, respectively, during October-December. The balloon and rocket payloads—designed by scientists from NASA, and U.S. universities and industry—obtained gamma, x-ray and ultraviolet observations with their specialized instrumentation. SN1987A was discovered February 23 from an observatory in Chile. A major confirmation of the sighting came from the International Ultraviolet Explorer (IUE) spacecraft, managed by Goddard.

Continued on page 6

Satellite-Aided System Reaches 1,000th Save Mark

by Randee Exler



The 1,000th person in history has been saved with the direct assistance of COSPAS/SARSAT, the international satellite-aided search and rescue system. The historic save occurred last September 10—the fifth anniversary of the first COSPAS/SARSAT save in 1982—but verification of the event delayed its announcement until now.

The 1,000th save was made in the North Sea when three sailors were rescued from the water near their almost-sunken freighter, the *Froland*. Although a mayday radio call from the *Froland* alerted search and rescue authorities at the Rescue and Command Center (RCC) in South Norway that the small coastal freighter was in trouble, it was distress signal from an activated Emergency Position Indicating Radio Beacon (EPIRB) onboard the vessel and intercepted by a COSPAS/SARSAT satellite that gave authorities its location.

Less than an hour after the EPIRB signal was relayed to the Norwegian Rescue Center by satellite, the three sailors were fished from the icy sea. They had been in the frigid water for 2 1/2 hours: all suffered from hypothermia; one later died. Without COSPAS/SARSAT, likely all would have perished.

Principal COSPAS/SARSAT operating nations are Canada, France, the United States and the Soviet Union. Two Soviet navigation satellites and three U.S. weather satellites serve the system.

The research effort for the U.S. participation is conducted at Goddard. Fred Flatow is the SARSAT Mission Manager.

Space Station Contracts

Continued from page 2

navigation and control system; extravehicular activity systems; the propulsion system; the thermal control system; and associated software.

General Electric (GE) was awarded the Work Package 3 contract that is managed by Goddard. The contract calls for GE to provide a free-flying, unmanned, polar-orbiting platform that will carry scientific experiments in Sun-synchronous or other near-polar orbits, and two attach points, including a pointing system, for accommodating scientific instruments on the manned base.

GE also is responsible for integration of the flight telerobotic servicer to the Space Station, appropriate Space Station information activities, associated software and for planning NASA's role in satellite servic-

ing. Additionally, GE is responsible for defining requirements and interfaces for a satellite servicing facility.

The Work Package 4 contract, managed by the Lewis Research Center, calls for Rockwell's Rocketdyne Division to design and fabricate the station's electric power system. This system includes power generation and storage, management and distribution of electrical power and associated software.

The Space Station is scheduled to be placed into Earth orbit in the mid-1990s.

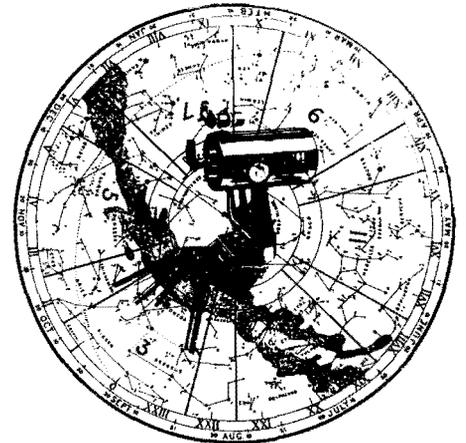
In concluding his comments, Dr. Fletcher said, "Designing the Space Station and building it in orbit will be a challenge of enormous magnitude, as you well know. But when we are through, we will have built the key to our future in space."

1987

Continued from page 5

NOVEMBER

Goddard Scientists Develop Method to Measure Neutrinos: Drs. Hong-Yee Chiu and Yoji Kondo of Goddard, joined by contractor scientist Dr. Kwing L. Chan, have developed a method to measure the mass of the electron neutrino. It is among the least understood of the elementary particles in the universe, a particle so small that it is measured in terms of electron volts, instead of grams. Because their numbers are so great, neutrinos may account for the "missing mass" of the universe. The detection of a neutrino burst from Supernova 1987A was the first from outside the solar system and provided valuable information on the rest (not moving) mass of the electron neutrino, according to the scientists.



Watch for Star Watch!

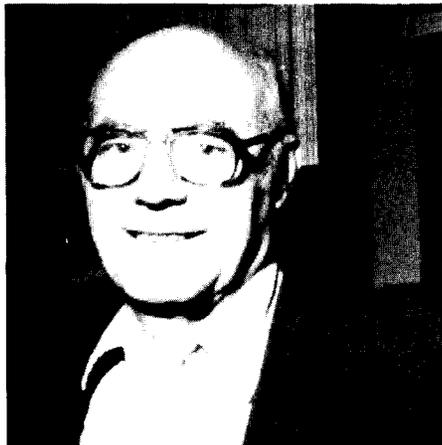
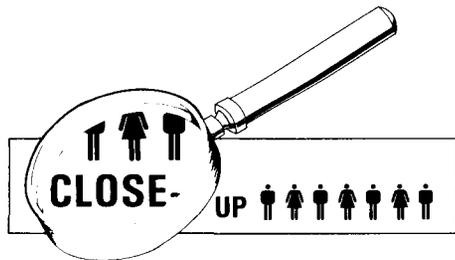
The Visitor Center (VC) will open its doors on the second Saturday of each month from 7:00 to 9:00 p.m. for a monthly star watch. Bring your own telescope and binoculars or use one of the VC's three telescopes to peer at the Moon, planets and other celestial objects.

The VC owns two reflector telescopes: a 4-inch and an 8-inch. The VC's latest acquisition is an 8-inch Schmidt-Cassegrain telescope with a clock drive. This feature allows the telescope to be programmed to track celestial bodies as they move across the sky.

Special programs built around the star watch will include astronomical lectures, films and telescope workshops. Check Dateline Goddard for details.

**See your name
in print!**

Mail your story to the Goddard News
(Code 130), or call the Editor at
286-7277.



DONN

DR. BERTRAM DONN, Code 690, coauthored *Atlas of Comet Halley 1910 II* along with Dr. John C. Brandt, Goddard's former chief of the Laboratory for Astronomy and Solar Physics and Jurgen Rahe, of both Remeis Observatory, Bamberg, Federal Republic of Germany and NASA's Office of Space Science and Applications, recently. The *Atlas* includes drawings of visual observations of Comet Halley, 1910 and 1835 as well as photographs of Comet Halley in 1910. Images in the *Atlas* are arranged in chronological order.

Blood Donors

Following is a list of Goddard donors who were cited by the American Red Cross with gallon pins at the bloodmobile of Dec. 2, 1987:

NAME	GALLONS
George Fleming	7
Morton Friedman	16
Cathy Gormley	2
Barry Kirkham	8
Timothy Klein	1
Sue Prevost	2
John Redding	2

The next bloodmobile visit will be on February 3, 1988 from 8:30 a.m. to 1:30 p.m. in the Building 8 auditorium. **THANK YOU, GODDARD, FOR YOUR CONTINUED SUPPORT OF THIS PROGRAM!!!**

RALPH W. MOLLERICK has been appointed Head, Mechanical Application Section, Mechanical Engineering Branch (Code 731.3). He replaces **JOHN WEBB** who has been reassigned to the Space Station and Shuttle Payload Engineering Office (Code 730.1).

Congratulations to **ROBERT E. FEDERLINE** who was recently appointed Head, Mechanisms Section, Electromechanical Branch (Code 716.1). Federline replaces Joseph Stiuletti who retired.

Retirees

Best wishes to the following Goddard employees who retired recently!

	CODE	YEARS
Adams, Kesley	521.2	22
Bocucci, Beatrice	621	25
Holmes, Richard G.	440	31

Former NASA Administrator **James M. Beggs** sent the following thank-you note to Center Director **Dr. John W. Townsend, Jr.**, recently. **Dr. Townsend** wanted to share the note with all employees:

Dear Jack:

Mary and I will long remember the splendid evening with all of you and we will treasure the model of Goddard.

The events of the past few years are now fading into history but our association with the NASA family will always be with us.

Please give all our friends at Goddard our thanks and appreciation as well as our continuing affection.

With all good wishes.

Sincerely,

Jim Beggs

Government/Industry Team Honored

Sixteen Goddard employees and contractors were recently recognized for their contributions to the Shuttle Program at the Manned Flight Awareness Honoree Event held October 27-29, 1987, at the Marshall Space Flight Center in Huntsville, AL.

Launched with the Mercury missions in the late 1950s, the Manned Flight Awareness (MFA) Program was initiated to im-

press upon NASA and industry employees the crucial importance of their work, and to underscore the necessity of manned flight.

Before departing for Marshall, Dr. John W. Townsend, Jr., Center Director, congratulated the honorees and presented each of Goddard's 16 honorees with a Certificate of Merit.



MANNED FLIGHT AWARENESS HONOREES—Sixteen Goddard employees and contractors were recently recognized at the Marshall Space Flight Center. They are: (seated left to right) Martin E. Basko, Bendix Field Engineering Corporation (BFEC); Gail L. Swick, Computer Sciences Corporation (CSC); Adrienne D. McDuffie, BFEC; Holly L. Miller, BFEC; Amar N. Suri, CSC. (Standing left to right) Fredric Messing, CSC; Charles M. Uvaas, Code 553; James O. Cappellari, Jr., CSC; Gregory C. Marr, Code 553; Paulino Garza, Code 553; Sandy Hunter, BFEC; Joseph H. Curley, BFEC; Donald L. Becker, BFEC; Alvin C. Miller, CSC; Harry T. Solomon, BFEC; Robert A. Sperling, Jr., CSC.

Spacelab Astronaut Bonnie Dunbar Visits Goddard

by Carolynne White

When the world watched Neil Armstrong set foot on the Moon, 18 years ago, astronaut Bonnie Dunbar was a ceramic engineering student at the University of Washington. As she continued her education, space exploration became so commonplace that

people actually called NASA to complain that live broadcasts of the latest achievement interrupted their soaps, Dunbar recalls.

Dunbar spoke to Goddard employees Monday, November 23 as part of the Secretarial Colloquium program. Her talk

included highlights of the space program and footage of her flight on Space Shuttle Mission 61-A, the West German D-1 Spacelab.

Originally contracted by the European Space Agency, the Spacelab mission conducted experiments in three main focus areas: materials science, life science, and communications. As Mission Specialist, Dunbar's tasks included taking photographs, conducting various experiments, and participating in some, such as life science experiments dealing with the human body's reaction to zero gravity.

In front of a slide backdrop of a T-38 jet, Dunbar explained to a full-house in the Building 3 Auditorium, that these small jets are used to help astronauts-in-training experience zero gravity. As the jet flies 40 or so parabolas in a row, the up and down motion simulates a zero gravity environment. Accordingly, astronauts have dubbed it the "Vomit Comet".

Dunbar has logged more than 700 hours flying time as a co-pilot in the T-38 jet, in addition to more than 200 hours in a single engine aircraft. Since becoming a NASA astronaut in 1981, she has logged a total of 169 hours in space and currently is maintaining generic flight crew training in readiness for NASA's return to Shuttle flight.

Ultimately, however, Bonnie Dunbar would like to fly on Space Station, scheduled for the mid-1990's.

Future Secretarial Colloquia will include a seminar on Physical Fitness for Secretaries in February, and a "Dress for Success" Fashion Show in April. For more information, contact Theresa Wirth, x65121. All employees are welcome to attend these seminars.



SECRETARIAL COLLOQUIUM—Astronaut Bonnie Dunbar discusses the future of the space program in front of a slide showing a shuttle launch from the Kennedy Space Center, FL.

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